

# DRAGON USER



*The independent Dragon magazine*

October 1986

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## Editorial

Last month's bargain cards have been stripped as if by locusts, and dealers with cheap hardware report that it's going fast. We have so many questions to answer that we're running a page of Communication this month. New subscriptions are still flowing in, and we get plenty of suggestions as well.

Sometimes we can pull out of the hat the very article which scores of readers have been requesting; sometimes we can't but we keep trying. We would like to do that sound up of printers, but we won't publish anything which hasn't been tested by a Dragon User — so if you have recently installed a new printer, get in touch. You may be able to help DU.

Do you write? As well as original ideas from contributors, we often have a pile of suggestions looking for a voice-wright. Tell me who you are and what you can do, and I'll send you the next requests list.

I'll be setting aside a page for programming tips soon, so we want to hear from anyone who thinks their solution is neater and more elegant (or just more useful) than the run of the mill. This can be planning and designing as well as routines. The Dragon Can Do, so tell us what it's doing for you.

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(All repeat words)  
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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 submissions 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 typed. Please leave a wide margin and a double space between each line. Programs should, wherever possible, be prepared printed on plain white paper and be accompanied by a tape of the program.

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



# Letters

## Seeing is deleting

I HAVE discovered that the Dragon in BASIC mode saves the rest of the text in the cursor position whenever you hit the "T" key and get into INPUT mode.

This gives you the facility of deleting unwanted characters by using the left arrow key instead of counting in characters for edit. You simply move the cursor to the first character you wish to retain, after the characters to be deleted, then enter INPUT mode and finally hit the left arrow key until the first character to be retained is reached. This gives you visible control of what you're deleting.

Tommy Grand  
Hastingsdon 130  
WABCO MOI RANZ  
Norway

## Line feed switch

MY interest was aroused by "New Line" in Dragon Answers, August 1988. The Siskosha GEMMOK Mark 2, which I used, has four small switches inside the cover. When the printer leaves the factory all four switches are in the OFF position. The third switch controls line feed, and is put in the ON position to obtain line feed. This is dealt with in the maker's manual, and mentioned in an article in DU July 1983, page 17.

Eric Bage  
28 Antford Road  
Barnes  
London SW13 3QJ

## FC error found

THEIR is nothing quite like using information from one's own article and finding it to be in error... I was setting up a numeric POKE value in a BASIC program for use in a machine code routine as per the technique on page 21 of the March 1988 DU, and four values larger than 32767 an FC error occurs

when using the 3263 255 technique at the top of the page. For unsigned, double byte values that may exceed 32767, the least significant byte of any variable N can be obtained by: POKE PO+1, N-(INT (N/256)\*256)

Signed values -1 to -32768 will suffer a similar fate so: POKE PO+1, 256-PO- (INT (256-PO)/256) will be needed. This was the technique I had always used until adopting the shorter NAD 255' statement!

Pam Darcy  
21 Wycombe Lane  
Woodson Green  
High Wycombe

## Ideas for Israel?

I AM the head manager of the Israeli Dragon Users Club. Our club is a profit club, so wanted to join an adult club but there is no such club in Israel, so we decided to build our own club. We would like to hear from our Dragon users with ideas on how to run a club.

Januar Sagay  
Hemod 177  
P.O. Box 44444  
Israel

## Helpful sounds

IN THE course of writing some simple Basic programs for children with mental handicaps, a recurring problem was the inability to read instructions on the screen by children who were unable to follow verbal instructions. A solution was found in recording the instructions verbatim on the tape directly after the program, timing the speech with a stop watch. Then all that is needed is a MOTOR ON/AUDIO ON command in the program, followed by a suitable pause, provided by the Dragon's built-in timer, on a four-note loop. After some adjustment the lengths of the loops were adjusted as follows:  
1 to 7650 = 3 seconds; 1 to 7660 = 5 seconds; 1 to 7680 = 10 seconds; 1 to 7690 = 15 seconds; 1 to 74150 = 20

seconds; 1 to 75600 = 30 seconds.

A for-matching must be used if the timer has already been set as part of the program. If the pause is set slightly longer than the instructions, then the MOTOR OFF/AUDIO OFF command can be followed by a tone to indicate when to start the game just like those horrible telephone answering machines. Of course, reminders to switch off the "play" button on the recorder would be a good idea as well.

Using this method, perhaps some real sounds could be incorporated into games without the pauses. I rigged a cassette with a continuous loop to play some recorded galloping noises for a horse-race game, the possibilities for adding sounds, music or speech into programs are only limited by the length of the cassette tape using this method... unless a continuous loop is rigged in a separate cassette.

Stuart Beardslee  
1 West Gorton  
Alders Lane  
Notwood  
Gowerly Bridge  
West Yorks

## Elusive computer

IN THE editorial from September 1988 you mentioned that Burkhard were trying to produce a DRK Dragon with hard discs and Pico. Do you have any more information? Also, my back in July 1984 GEC brought out a new Dragon, called the Professional, and a couple of people were advertising it for £699 inc. VAT. When I rang Commodore Computers last year they told me the Professional never made it to the open market. Is this true or is there any chance of obtaining one?

G.C. Bailey  
9 Draycott House  
Dirch Hall Lane  
Longfirth  
Manchester

BURKHARD have not produced any new models that we know of in the last twelve months; the only effective way of getting a DRK Dragon is with a hardware add-on. We

had pictures of the Professional many months ago, but we never saw a live one. If any did make it on the market, they will be in private hands by now. Does anyone know more about the Professional?

## Lack of data

IN THE August edition you featured "Screen Designer" by Dennis May. An interesting and revealing program. There was one snag, however. Those of us who do not possess an Altair micro-assembly and had to POKE in the data found that the "Shifting Screen" featured in Listing 4 would not work because of insufficient data.

On close close examination I find that the following appears to have been omitted:

0688 73 53 75 65 65 65  
0689 73 53 75 65 65 65  
06C0 00  
06C2 67 51 72 80 74 6F

In the main assembly listing (2), two items appear to have been left:

705E 32  
70C4 72

I wish you and Dragon User every success and I hope that you obtain the support you deserve, not only from subscribers, but from advertisers as well.

Ray Smith  
9 Dean Road  
Parkstone  
Poole  
Dorset

## Change of address

THANK YOU for publishing my article for the "Touchmaster Graphics Tablet". As I have moved, the address in this article is no longer correct.

For those without a letterbox, I can supply any of my programs from Dragon over at the original price of £3.00 each. These include the Microprocessor (plus tape), machine code monitor, GEMFest and the graphics tablet program.

Peter Whitaker  
c/o 126 Coventry Road  
Mansfield  
Nottinghamshire  
CV10 3BD



## Cult status

THANKS for your mention in the August edition of DU of the efforts I and my colleagues put into the *Coolest show* with the amateur radio demo.

Comments made in DU about the Dragon being almost a 'cult' mic amongst hams are certainly true. I have come to rely on my three Dragons quite considerably in my amateur radio activities as have others I know of. Some time ago DU carried a letter from (or an article about) the very large group of hams in the Nottingham/Derby area, who regularly every Sunday operate on a frequency of 144.525 MHz FM with text, graphics and general chat being sent all over the place, well, they are still going strong and I hope, subscribing to the mail order DU.

Keep up the good work. Incidentally, we have already had several enquiries from hams, even in South Africa, as a result of the August issue. Did you know that *Revamp* (Neville John Design Design) experiment by a ham? If you think this is a call coincidence, have a look at the American *Go-Go* mag. *Revamp*

too. Over the last three years virtually every edition carries articles and programs concerning amateur radio applications. Knowing something about electronics, you see, we all know that the 6805 is superior to the 286, and all the rest. That is why we bought lots, not to play games.

Finally, taking of *Revamp*, an ad. appeared in there some years ago for an edition (based with 286) to enable the Co-Go town (CPM80) interesting, eh?

P.J. Reed G5ZZZ  
7 Fairview Avenue  
Whetstone  
Leicester LE12 3UD

## Sulking designer

I THANK you for publishing my program 'SCREEN DESIGNER' in the August edition; however, an error has been pointed out to me that will cause the program to hang up or crash during Option 4, its program file of 8 characters is used.

This is because of the program, instead of being sent to the PCHRD subroutine 04H800, it is sent to the routine CBLINK.

and therefore because of the following instruction, it cannot meet the condition to allow the program to continue.

To rectify this item, in the Machine Code Data listing &H00F7 should be '80' and &H00F9 should be '05'. The Assembler listing should read:  
7800 08000 0TH800 JSR  
8800.

I apologise for any confusion and inconvenience this error may have caused.

May I take through this page extending my apologies to anyone who had to wait for a copy of the program, or a reply, due to my spending a lot of time away during the August-September period.

David Riley  
21 Corns Road  
Abingdon  
Leeds LS12 4GP

## Random numbers

OVER the past couple of months a lot has been said about random numbers, mostly in the competition. Very little information is provided in the manual about using RND; however, I recently came across a 16-bit random-number generator in a machine language package. My first question was, why not use a RND call to the RND function, my second was how does the Basic RND function work?

The first answer was easy. The Basic RND function returns a random number in the Floating Point Accumulator as a real number (hence its theory it can have any value '0-32' to 16 + 38). This is naturally not easy to handle in machine code except by using the INTENV routine in Basic (88820).

The second answer was more interesting. From what I gleaned from the RND the RND function seems to be based on a 32-bit random number generator linked with Floating Point mathematics. For some time I have used 'RND (-TIMER)' to generate the RND function for games programs etc. without knowing why it worked. Looking at the RND function it becomes ob-

vious that this has three separate functions.

In the manual RND is said to return a number between 1 and the number specified. In actual fact RND(X) gives a whole random number between 1 and X if X is greater than 0, a fractional random number between 0 and 1 if X is 0 and 0 if X is greater than 0 the value of the new seed (this will also be between 0 and 1). It appears that the seed is generated from a function of the number 1688934987.

This means that a set sequence of random numbers can be repeatedly reproduced by using the same seed, without having to store them in memory and could be useful for statistical studies.

10 A=RND(-120 FOR X=1  
40000 PRINT RND(10) NEXT

This program will always produce the same sequence at the same seed is generated each time.

Since a program will never return at exactly the same time after the computer has been turned on every day, the value of TIMER will be effectively random. So seeding the RND function with the value of TIMER will guarantee a different sequence each time.

A common suggestion for scrambling the RND function is based on the 'seed for a key' basis. It becomes obvious that this merely shifts the sequence to many places along.

To truly randomise RND the only solution is to use RND(-TIMER).

Robert J. Bickman  
1 Spymore Street  
Salford  
Greater

## Bridging a gap

THAT the Dragon 32 had a bridge master, I inserted the cartridge before switching on the computer, and wiped the contents of the cartridge off. The shoe which supplied the dose arrived only a mere. The receiver of Dragon Data Ltd. could not help me.

Dr David J. Mason  
81 Maryville Park  
Belfast  
BT5 6LP

## Routine solution

In response to Brian Cadogan's request (DU, August '86), I have written out a few CUMANA 3.0 CODE POKEs and the addresses of the sector READ/WRITE routines in PCMS, and here they are:

```
CODES          number of sectors DRIVE  
CODEE CODEF    buffer address for sector read/write  
CODES CODES     if nonzero-decrement 0005 in each PQ  
0005            when reaches zero — turn off the disk motor.  
0009            VERIFY flag: 0=off, nonzero=on.  
000A            DRIVE number  
000F CODEE      AUTO=current line number.  
000E CODEE      AUTO=current.  
0008            AUTO flag: 0=off, nonzero=on.  
000C CODEE      ERROR CODEE line number.  
000E            ERROR CODEE flag: 0=off, nonzero=on.  
000F CODEE      ERL  
000A            ERL  
000E            sector read routine.  
000A            sector write routine.
```

ENTRY for both routines: (RHL)=track, (RLO)=SECTOR-1, CODEE and CODEE set to the relevant values before calling these routines.

After using these routines, remember to POKE an nonzero value to location 0005, because if you don't, the motor won't stop (it is stopped only when the location REACHES zero, not when it already is zero).

Danny Halenish  
Oprea 00000  
Israel



## News desk

If you have any new products for the Dragon — software or hardware — ring the News Desk on 01-437 4343

## User Group

THE National Dragon Users Group tell us that their monthly newsletter Dragon Update is up to its 34th issue, and that their membership is increasing steadily since they formed in 1984 to combat rumours that the Dragon was dead.

The NDUG has members overseas as well as in the UK, and encourages other newsletters to reprint their articles and reviews. Dragon Update prints reviews, news, practical information about software and hardware, and readers' programmes. 'Anyone in the group is

likely to be picked on at any time to do just about anything... we try to balance things so that we cover all Dragon related interests, so that there is something for everyone... the subscription covers only essentials such as printing, postage, phone calls etc.'

Subscriptions are £5 annually, £8 overseas, from Paul Gaskie (Chairman) at Naxosine, Rold, Worthing, Sussex. NDUG is usually represented at national shows, so look for them next time.

## Disc editing utility

PAIDCOMMS have produced a new utility for editing machine code programs. Source-maker disassemblers, memory to DragonDOS disc in the format DPG2DREAM, Source Code Data File, which can then be loaded into DPG2DREAM for subsequent editing and reassembly. It is said, says Paul D'Arcy, for tailoring the files of the hex dumps which appear in DU to one's own system and personal tastes. It is also helpful in editing software, particularly in changing from cassette to a disc based system, where sup-

port is not available from the Source-maker with User Guide and a Master and Work Discs is available at £180 inc. vat, £180 overseas, all inclusive, and as a cassette based system shortly at the same price. This version will work in conjunction with all the DREAM packages (ALLOREAM cartridge, cassette, CodaDOS, DREAM cassette, DREAM and DREAM BUS cassette).

Orders and enquiries to Paidcomms Ltd., 21 Wycombe Lane, Wycombe Green, High Wycombe, Bucks HP12 3JG.

## Radio Dragon

PERKSOFT tell Dragon User that they have assisted supplies of Dragon power supplies and individual transformers. Says Harry Whitehouse: 'There has been a shortage of the original product for some time. As a result, we commissioned the design and manufacture of a new, heavy duty replacement. As a service to the Dragon community which has supported us for the best part of four years, we settle our quota of heavy loss, in order that everyone can keep their Dragons in action.' The complete power supply costs £78.95, with two years' guarantee. For information contact Perksoft at 48 Queen St., Balderton, Newark, Notts.

NGGJ (Int. Tel. 0606) 705290.

Perksoft also have a service of interest to radio amateurs. Radio Dragon is an electronic magazine which costs the user 30 hours a week. Dragon and Tandy users with modems can download the whole magazine with a 2-3 minute cheap rates phone call, and then save, print or just read it through. It's free of charge, and does not take paid advertising, but will mention new services.

## Not Washed

PART of a line is missing from line 680 of last month's Core Issue: the missing characters are <crashed> to complete the phrase 'The rest have not crashed.'

## Dragon dance

MARIDIAN, the software house which produced Intabase and Spellbox last year, have three new packages on the market.

'Underbeings of Craft' is an adventure which begins in a deep pit where a hapless adventurer is imprisoned in an iron cage. The masterpiece turns and guide him to the surface. The game uses upper and lower case text, 66 locations and 165 words, and can be saved. The price is £205.

'Decadent' is a ten-game competition for one to five players, including Anagrams, Hangman, Shootout, Spider, etc. The games are designed

to suit people of different abilities and are good for parties, train the makers. The price is again £2.85.

Something a little different for the music buff, 'Incariously transcribed' four part harmony renditions of music by Bach and Scott Joplin, which can be played through the Dragon using its own sound capabilities, and routed through a hi-fi if the user wishes. The two-disc and one-disc tapes cost £3.95 each, £2.85 the set.

Orders and enquiries to Maridian, Broomers Cottage, Hawthorn Lane, Prestonoid, Great Missenden, Bucks HP16 0DD.

## Show releases

BLABY COMPUTER Games have added a fruit machine game to the three new releases (Fun, Bluster-Crash and Simple of Doom) which they are releasing at the Dragon Computer Show in Cardiff in October (information about the show from John.Peter.computers@britain (0400) 5076). 'And anything else has been finished at the time', says John Blaby.

Blaby also has a cache of working and non-working Dragons to sell, which they will be bringing to the show in London (November) and Cardiff (they do transformations as well).

## Knechtel Knews

BERNARD KNECHTEL Software introduces a new price and method of payment for their Disk Support Tool (DST) package on disk. The new price is £700 inc. postage and packing; payment can now be made by postal order (Bernie is not entirely clear whether this includes cheques and money orders, if sending a Post Office postal order, it should be crossed for security) instead of direct transfer.

We hope to be printing a

review of DST soon. When ordering, please state which version of DragonDOS you are using, and attach your name and address separately to both your order and your postal order.

Order and enquiries to Bernard Knechtel, Arnoval Matthews St. 8, 5030 Parnsford, West Germany.

## Even cheaper

PERKSOFT, CONTRIBUTORS, who last month put a collection of working and non-working Dragon 32s up for sale at their north London warehouse, report that the units have been selling well, and that they are slating the price of the non-working, spares-only units still left at £10 each.

The warehouse is at the Haybridge Estate, Castle Road, Camden Town, London NW1; for information and phone (credit card) sales phone 071 267 5911.

## Dragon date

OWING to the change in distribution, Dragon User will now be delivered in the last week of the month prior to the cover date.

News Desk — Page 9



# Dragon User People's Chart

DELLAS, beats in the multi-story offices of Being Oil, wide shouldered Personal Secretaries glide silently between wide, gleaming executive desks across wide examples of whistling carpet. In the panelled suite occupied by J. R. Being, J.R. himself takes down hand upon a wide cigar as he peruses a file deposited by one of those creatures.

"Whistles mean, takeover bid? filth. In hell is this Wintersoft, anyway? Part of KCI's Goddard's nerve?"

"Sir?" breathes the vision. "The latest report has just arrived. Finance are convinced that Wintersoft's may be in a stronger position than we imagined."

"Like what?"

"Well, sir, Juxtaposition—Starting of Dell's has topped the Dragon User People's Chart for the third month."

At this point J.R. bites his cigar in half. J.R.'s nerves will be jangled still further by Mr Robert Glassman of Dorset, who today states "Have fired, get a Dragon, it's money for Mr". Mr. Glassman wins our program contest.

Yes, you can win £25-worth of software from Microdeal if you can devise an interestingly witty sentence from the letters (or some of them) in the titles of your favourite three Dragon software packages. To do this, of course, you have to list your favourites—five, in fact, in that form to your right (or left) and send them to us. It's a game.

## Results September 1986

- 1 Juxtaposition.....(Wintersoft)
- 2 Shock Trooper.....(Microdeal)
- 3 Total Eclipse.....(Eclipse Fenmar)
- 4 Moon Cresta.....(Incentive)
- 5 Syzygy.....(Microdeal)

## Chart Eight

Wintersoft Chart No.8 issues at 11pm on Friday, 17th October 1986. Entries received after that time will not be eligible for inclusion in that month's voting. The editor's decision is final. Only one entry per individual per month will be allowed.

My top 5: Voting Month 7

|   | Name    |
|---|---------|
| 1 | Address |
| 2 |         |
| 3 |         |
| 4 |         |
| 5 |         |

My phrase is:

## Dragonsoft

New software for review should be sent to Dragon User, 12-13 Little Newport Street, London WC2H 7PP.

### Fifty and out...

**Program:** Cascade 50.  
**Supplier:** Cascade Games, c/o Players Cascard, Harrogate, N. Yorks.  
**Price:** £5.95

WHEN this cassette came out many years ago, I remember thinking to myself, "It can't be? 50 games on one cassette? They must all be atrocious!" Through time though, I mellowed and gained a different view of humanity. I felt that maybe humanity was inherently good, maybe the cassette had some good stuff on it.

A few months later now we buying the "Fabulous" Cascade 10.

I rushed home, set up Oxyg (my computer) and loaded the two games. Maze later, it wasn't very good. In fact it was written in BASIC and didn't really look very nice. In fact it was awful. But what did I

care... I still had 49 games to go.

I loaded the second game, Galactic Attack. It wasn't really very good. In fact it was written in BASIC and didn't really look very nice. In fact it was awful. But what did I care... I still had 48 games to go!

Three hours later I loaded the last game, Exchange. It wasn't really very good, either.

I was not a happy person. Dizzy and myself had had a great time loading fifty totally useless games.

All the games were in BASIC, although some were native Dragon (BASIC) — one of the games would not run as it was written in ZX-41 BASIC.

No attempt whatsoever was made at text formatting so the games looked as bad as they played.

May I congratulate Cascade Software on producing fifteen or two but fifty unplayable games.

Jason Orbaum



### Justified writer

**Program:** Electronic Author Supplier: Smithson Computing. Price: £14.95. cassette, £19.95 disk.

THIS review is like no other I have ever written, for it was written on a new and better word-processor than the old-fashioned Telewriter. Yes, sure, Telewriter is a fine word Processor, it's just that Smithson's Electronic Author is better.

The format is text window and command window. The text window is either 51 or 64 character-wide dependent on user choice, and twenty lines deep. The command window is two lines and allows input of the abbreviated commands to control 80 functions and text manipulation.

The keyboard scan doesn't appear to miss letters, even, and the text, even with 64 characters a line is clear, neat, and pleasant to read.

In theory, the E-side's "Canfig" program should allow the WP to work with any printer, it works fine with my Kenexa, but I'm having trouble trying to get the printing to work! It's a tape based WP but a Dragon-Dos version is available and a Delta Version is currently in production.

All the usual features: Search and replace (selective and global), block move, copy, and delete, word count, etc. are very easy to operate. The program also has come up on an unpatched Telewriter in that it has a right justification mode (built into it so that it is possible to have your text printed in clear blocks without a jagged right hand margin).

All in all, I like this word-processor and will now be using it instead of Telewriter. It would be nice to see word-wrap incorporated in an option.

Jason Orbaum





# Communication

Send in your questions, requests, and pleas to Communication, Dragon User, 12-13 Little Newport Street, London WC2.

**Problem:** Can anyone help us with software/hardware/special adaptations suitable for use by children with physical and mental handicaps? We have been given a Dragon 32 and cassette recorder, but cannot find any of the software we call our 'Dragon 32 Puff'; can someone provide some advice? Can he be sound-operated by wiring up a microphone? Can he talk to us? Any offers of help/ideas gratefully accepted.

**Enquirer:** Stuart Boardman, 20 Weymouth Children's Home, 35 Victoria Road, Epsom, West Yorkshire.

**Problem:** What are the functions of the ROM routines at addresses 3800H, 3C00H, 3400H, 3500H? What are the binary equivalents?

**Enquirer:** Paul Marlow, 90 Little Avenue, Berles, Walsall, West Midlands B52 6UP.

**Problem:** Could anybody help me in securing a circuit diagram for an EPROM burner for the Dragon 32?

**Enquirer:** Philip G. Kenney, 49 Clives, Stourbridge, Warwick, Staffs B77 4HH.

**Problem:** Is there anyone in Edinburgh who has a Dragon 32K who is willing to exchange games, etc?

**Enquirer:** Ryan Henderson, 2 East Clapperfield, Edinburgh, Scotland EH6 2TU.

**Problem:** Is there anyone out there who is willing to print out listings of basic programs for a Dragon User with no printer?

**Enquirer:** T. Jenkins, Llys Helys, Newport, Pembrokeshire SA42 0QZ.

**Problem:** Does anyone have or know about the Superchip card? Does anyone know of a TRS-Dragon computer for MC Press, does it exist or is a myth? **Enquirer:** Ian Pickett, 2 Pionade Road, Hurley, Leeds, Yorkshire LS4 3PL.

**Problem:** Is anyone using a Dragon 32 for duplicate bridge scoring?

**Enquirer:** I.W. Cox, 16 Tibury Road, Rushmore, Kent ME9 7PW.

**Problem:** I need to buy or borrow (all post paid) the following Dragon Users: June 1983, July 1983, August 1983, September 1983; also, has anybody got the demonstration 1-7 from Sprite Magic. I keep getting mistakes in lines 29 or 30 and I need one that works.

**Enquirer:** Dennis Gates, 184 Bels Road, Newton Hall Est., Durham, DH1 5LH.

**Problem:** Could you please tell me how to achieve a scrolling effect in Basic, on the Hires screen, as in games such as Starblitz, Speed Race etc.

**Enquirer:** Steve Davis, 93 Valley View, Lomington, Newcastle-upon-Tyne.

**Problem:** Would coupling two Dragon 32s together produce extra memory in more than the 256 already available? If so, how do I do the link up?

**Enquirer:** J. D. Wall, Stone Gables, Clarendon Road, Datchet, SL4 3JL.

**Problem:** I have owned a Smith Corona Speedcast 80 printer since Christmas, and have found it to be a bargain at around £100, however the manual is not clear on the production of graphics. I have tried several screen dumps and none of them work satisfactorily. I would also like to know how to load a program from DragonDOS using the Boot command.

**Enquirer:** Steven Baker, 24 Carroll Drive, Longon, Stoke-on-Trent, Staffs ST3 1SF.

**Problem:** I have got Speed Race, but because I have a dual centring joystick, sometimes I try to get track 3, I just get track 1, 3 or 4 instead. If anyone has any hints please write.

**Enquirer:** G. Mills, c/o WCE (SSA), Mily, H. G. Squabron, 7th Sig. Reg., DFFO 15.

**Problem:** I have a CPM-86 printer, but I don't have a program for dumping graphics onto it the right way up. Please help me because it is not very useful having a printer with pictures sideways on it.

**Enquirer:** Nicholas Parker, 15 Rattlefield Road, St. Albans, Herts AL1 4DA.

**Problem:** Is there any way I can adapt Microsoft's Backgammon game to work with my Trojan Lights Pen, as the game has a light pen facility?

**Enquirer:** Daniel Street, 41 College Drive, Gales, Aylesbury Bucks HP18 9QZ.

**Problem:** I have a Tandy 03P/H5. How do I bring the hires screen to the printer, is it a matter of a few simple pulses, or do I have to buy some software? If so, where do I buy it?

**Enquirer:** G. S. Phillips, 10 Broadstone Hall Road South, South Heston, Stockport, Cheshire SK5 7DG.

**Problem:** I have a Dragon 32 and an alphascan printer with an interface for a Spectrum. Can anyone tell me if the printer is compatible with the Dragon, and how I can wire it to a suitable socket? I have a ctronics cable, but when I remove the interface board the printer will not work with a bundle of wires and I don't know how to match them up with the cable. Can anybody send me a wiring diagram or help in any way please.

**Enquirer:** R. Burrows, 134 Parkfield St., Rusholme M4 4 3PT.

**Problem:** I have a small program about 2K which is in Basic and occupies lines 1 to 47 consecutively, and which has a fixed number (100+) of data lines.

attached to it, starting at line 100, making the total memory in excess of 2K. I use POKE 255,NEW to enable this large use of data. I tried to REM,NEW 100,NEW the whole program, and got RD ERROR. My four year old manual did not help, and I could not retrieve the program and had to CLOAD again. I checked the memory and found 62 left. By removing comments and leaving 500 bytes in memory, the REM,NEW worked. Could anyone explain what RD ERROR is and how to avoid it, using all available memory?

**Enquirer:** Alastair Gurr, 156 Folly Lane, St. Albans, Herts AL3 5JG.

**Problem:** Could anybody help a TRS CoCo 32S carrier with the conversion of the Writer program (May 83) and the Windows program (July 83) from Dragon format, especially the EXOC ADDRESS or DATA statement changes. Would also like to know if anyone is willing to sell their July 1983 issue, £100 and 10000 others - £100.

**Enquirer:** Edward Preece, 31 Ashton Lane, Severn Beach, Bristol BS33 3PP.

**Problem:** Is there a Stockport or South Manchester Dragon Club?

**Enquirer:** Keith Cresswell, 51 Weston Ave., Great Chapel, Stockport, Cheshire SK4 5JT.

**Problem:** I am looking for a copy of the Computational voice synthesizer program by Dragon Data.

**Enquirer:** John Campbell-Pearce, 12 Stait Street, Treharn, Rhondda, Mid Glamorgan, CF5 2PP.

**Problem:** I have a Dragon 32 converted to 64 and am puzzled by not being able to find the maximum (?) memory in 64 Mode; also I have been given a Hitachi compact floppy, disc drive model HD 3004 (4K5 Drive) and was wondering if anyone knew how to use it with the Dragon.

**Enquirer:** Mr. R. E. Paterson, 35 Lodge Oak Lane, Tordridge, Kent TN11 2EG.

**Problem:** I am a frustrated Dragonite with no printer. There used to be adverts for people who would print out listings for you, but I can't find any now. Do you know anyone with a suitable printer who would do this service?

**Enquirer:** T. Jenkins, Llys Helys, Newport, Pembrokeshire, SA42 0QZ.

**Problem:** What is RTTY and could I have some information on amateur radio?

**Enquirer:** R. Vaughan, 189 Port Tennant Road, Port Tennant, Swansea, W. Glamorgan SA1 5LJ.

## Communication

Stuck for a routine? Need some obscure equipment? Feeling out of it? Fear not — someone, somewhere can help you! Write down your problem on the coupon below (make it as brief and legible as possible) together with your name and address and send it to Communication, Dragon User, 12/13 Little Newport Street, London WC2H 7PP. We'll publish it as soon as we can — meanwhile, maybe there's someone who can help this month!

**Problem** .....

.....

**Name** .....

**Address** .....

.....



# Disc rescue

*Pam D'Arcy rescues good sectors from a corrupted disc.*

HAVING purchased a second-hand pair of 40-track single-sided drives at a bargain price (despite a round trip of 250 miles), a spate of RP prices followed making me feel that perhaps they weren't such a good bargain after all. This was in particular badly timed, problem as it presented essential BACKUPS being taken of discs full of new clumps of some contract work that I was testing on the Dragon. Of necessity, I quickly produced a few lines of BASIC to copy all the readable sectors of an affected disc to a newly formatted disc on the second drive. I have since added additional options, including single drive working, to produce DISKBLISS (Disk Back Up Good Sectors). Although it will now form part of my Disk-801 package (£70 + 50p RP) — hence the casual 'bravissimo', it is such a short but useful program that I cannot resist sharing it even with non-purchasers of DISK-801.

It has only been tested on 40 track single-sided, single and dual drives and cannot yet our 60 track double-sided system to func-

tion satisfactorily on the Dragon, but optional parameters are built into it for 40/80 single/double sided single/multiple drive operation. In order to cater for single drive users, 72 consecutive sectors (4 single-sided drive tracks) of data are read into 30 and 70 arrays between disc swaps, thus requiring 10 disc changes for a 40 track single-sided back-up — not much worse than BACKUP itself and pretty good, I feel, for a BASIC program. The occasional apparent 'fascitation' in reading in BASIC's garbage often being black taking place (32 sectors needs 18K of string stack at a time).

When reporting disc errors, no screen paging is included for those without printers. The error reports scroll from the bottom of the screen, there being ample time for them to be noted on paper before they disappear should there be a large number of them.

To ensure that the destination disc is error free before commencing the back up, DISKBLISS has a pre-copy option. Users of

single-sided 60 track systems will recognise lines 380-400 as being the guts of the 'pre-copy program' supplied by Dragon Data to correct the wrongly set up sector bit map.

A sector of ASCII space characters is written to the destination disc in place of sectors unable to be read from the source disc. Should the faulty sector have occurred in the middle of a BASIC program, LOADING and LISTING the program from the new disc after DISKBLISS has finished will probably show a wildly excessive line number preceding a number of space lines on the screen. DELETE the offending line number and as much as possible of an affected BASIC program will have been rescued.

When initially typing/testing programs containing automatic error handling (eg line 20 ERROR GOTO 60), it is often easier to start off by temporarily REMarking out such lines, although it is obviously an essential part of the program once you are happy that it seems to be typed in correctly. DISKBLISS program listing attached.

```

10 REM DISKBLISS (DISK Back Up Good Sectors) LJS, 10/10/80
11 REM: PROGRAMS DISKBLISS, DISKBLISS.COM, DISKBLISS.DAT and
12 REM: DISKBLISS.DAT2 (if separate back up good sectors)
13 REM: 80/80/80
14 REM: 10/10/80
15 REM: 10/10/80
16 REM: 10/10/80
17 REM: 10/10/80
18 REM: 10/10/80
19 REM: 10/10/80
20 REM: 10/10/80
21 REM: 10/10/80
22 REM: 10/10/80
23 REM: 10/10/80
24 REM: 10/10/80
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92 REM: 10/10/80
93 REM: 10/10/80
94 REM: 10/10/80
95 REM: 10/10/80
96 REM: 10/10/80
97 REM: 10/10/80
98 REM: 10/10/80
99 REM: 10/10/80
100 REM: 10/10/80

```







# Fault Line

Create a landscape with this program by P. Whittaker

BACK IN the February issue of Dragon User, I wrote an article on Three-Dimensional Graphics for the Dragon. Although I dealt with the equations needed for the rotation and manipulation of 3D objects, I did not cover the subject of hidden line removal. As a result, the objects drawn tended to look as though they were made of chicken-wire, and were often hard to understand. To draw more solid looking objects we need to devise a way of removing the lines which show through from the back of the object, and pass up the display. Such a technique is called Hidden-Line Removal.

## Flat surface

FAULT LINE (MACH-100) is a program which generates artificial landscapes from a flat surface, and demonstrates one easy method of 'Hidden Line Removal'. The program works by generating a number of random fault lines across the face of the landscape, and moving the opposite sides of the fault-line either up or down a small distance. After sufficient faults have been developed, a fully landscape will develop. If the process

several can be selected later. Pressing the [R] key will return to the menu screen, whilst any of the other keys will call the appropriate routines.

If the landscape has not developed sufficiently, press the [C] key, and you can generate a few more fault lines.

Once a landscape has been generated, it can be saved to disc by pressing the [S] key. It can be reloaded at a later date by pressing the [L] key. When the landscape data is saved, the first piece of data is the size of the arrays. This is so that the load routine can cope with different sized landscapes. Whenever the data is reloaded, the program will know what size of array it is dealing with.

The remaining functions all deal with the details of the landscape display. Pressing the [F] key will fill in the sea, at all locations below the baseline level of the landscape. The landscape will be redrawn using hidden-line removal, but this time the tide will have come in, and the deepest valleys will have disappeared. This will often make it easier to get a feel for the shape of the land. In a similar way, pressing the [B] key will also redraw the landscape using

64K mode, these arrays can be made bigger, which will allow for larger grids to be used. The X and Y arrays are used to store the landscape data, whilst the Z and Y2 arrays are used to store the modified landscape data used when drawing the display.

When a landscape is generated (R0) the program first asks for the grid size, and the number of faults. A flat surface is calculated to fill the grid (300-370), and then this surface is manipulated by each of the faultlines. This generated grid is calculated to hold the screen co-ordinates of the landscape, and these co-ordinates are directly manipulated by the program. This will give us having to make later perspective calculations. Each faultline is generated by randomly choosing two points on the surface. From these points (X1, Y1) and (X2, Y2) we can calculate the equation of the faultline,  $AX + B = Y$  (380-390). Then another couple of random numbers are picked to decide which side of the lines will be moved up or down. (390-430) The computer will then scan through the arrays and modify the vertical component of each point on the line to the appropriate side of the fault line.

The equation for a straight line uses the formula  $AX + B = Y$ . With two values for X and Y, we can calculate the values of A and B, and so derive the equation of the line itself.  $A = (Y1 - Y2) / (X1 - X2)$  and  $B = Y1 - AY1$ . Then, once we have this line equation, we can test all of the points on the grid surface to see if they fall above or below the line. Inserting the X value in the equation, we generate a Y value. If this is greater than the Y value of our co-ordinate, then we know that it is below the line. Similarly, if it is smaller, then the co-ordinate is above the line. In this manner, we can discover on which side of the fault line each co-ordinate is, and move it up or down accordingly.

The landscape is then drawn out on the PM0264 screen, and then displayed to the PM0264.1 screen (450-550). Whenever the landscape is drawn in as a wire frame, the programmer uses the main arrays (X) and (Y). When the landscape is drawn using hidden line removal the secondary arrays (Z) are used. This is because the [F] fill sea routine modifies the array data, and would not allow for the [R] redraw or [C] continue functions if it used the main arrays.

## Routines

The [F] fill routine reads through the data in the main arrays (850-900), and if it finds any co-ordinates which fall below the grid baseline, it sets them to that base line level. All of these co-ordinates are copied into the secondary arrays for display. The [R] redraw routine works by copying the original arrays into the secondary display arrays. Both of these routines load automatically into the 3D-solid display routine (580-680). This draws in the landscape starting with the furthest back parts, and working

Fig.1 Blank lines to point out a segment



Fig.2 Segment fully painted Any background obliterated



is continued, the landscape will continue to get more and more pointed and mountainous.

When RUN an options list will be displayed, press the [Q] key to generate a new landscape. The computer will then ask for grid size for the landscape. This can be up to about 35 on a Dragon 32, but can be higher if on a Dragon 1 or Dragon 50. Then the computer will ask for the number of faults to generate. The landscape is drawn on the PM0264.1 graphics screen, and displayed on the PM0264.1 screen. The display is updated each time the results of a new faultline are calculated. Whilst the landscape is being generated the display will be in green, but once the final landscape has been drawn, the display will change to white. However, at this stage, the display will still be in the usual 'wire frame' style, and will be seen through. The hidden-line

removal will be shown, but this time will draw it with the tide out.

If the landscape has developed in such a way that it is all either under the sea, or all above it, then it can be raised or lowered by pressing the [V] key, and then entering the vertical offset for the display. When this recalculation is finished, the programme will return to the menu screen. To draw in a new landscape, you will need to press either the [F] or [B] keys.

Once you are happy with the landscape, the display can be saved by pressing the [S] key. This is currently set up for disc, so tape users will need to change the command from SAVE AS 3000 3016, 4194 to SAVE AS 1036, 1060, 41194.

The program makes use of two sets of arrays (X) and (Y), and (Z) and (Y2). These are dimensioned at the start of the program. If you are using a Dragon without disc, or in

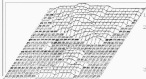


towards the front of the display. In this way the closer parts of the landscape are drawn over the areas behind, and any hidden lines get removed. To make sure that these hidden lines are indeed covered, the landscape is redrawn in a new frame, but as solid. The space between each line of the wireframe is filled with black lines, painting out anything underneath.

This is done by once again using the  $Y=AX+B$  equation. This time we use the

corner co-ordinates for the two points from which we generate the line equation (Fig. 1). The program will first calculate the equation of the line from corner 'A' to corner 'B'. Then it will draw a black line from each point on that line to corner 'C'. (This is done by inserting the range of possible X values between corners 'A' and 'B' into the line equation.) When this is done, the program will work out the equation for the line between 'C' and 'D' and then draw a black line from

each point on this line to corner 'B' (Fig. 2). Then finally, the program will close in the outline A-B-C-D in white. By doing this, and working from the back of the display object towards the front, we can make any object appear solid. We are in effect displaying a solid black object with white contour lines on its surface to make it visible. Using this technique, it should be possible to draw any object on screen, giving it a solid appearance.



```

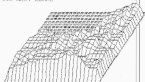
40 AA=INKEY$:IF AA="" THEN GO
50 IF AA="M" THEN 20
60 IF AA="0" THEN 160
70 IF AA="C" THEN PRODE4,0:INPUT"NU
  MBER OF EXTRA FAULTS":O:GOTO260
80 IF AA="S" THEN 970
90 IF AA="L" THEN 1060
100 IF AA="B" THEN 1160
110 IF AA="P" THEN 830
120 IF AA="R" THEN 940
130 IF AA="V" THEN 930
150 GOTO20
160 FORS=490,0
170 A=RPD(L-TIMER)
180 CLS:PRINTG260,"FAULT LINE MACH
  NE":PRINT
190 PRODE4,0:PCLS
200 INPUT"SIDE OF GRID":SIDE
210 INPUT"NUMBER OF FAULT LINES":O
220 FOR A=0 TO SIDE:FOR B=0 TO SIDE
230
240 W=120/(SIDE)
250 H=2*230/(SIDE*3)
260 Y(A,B)=100-B*W
270 X(A,B)=10+G*H+B*H/2
270 NEXT B,A
280 SCREEN1,0
290 FOR QU=0.5 TO 0
300 X1=RPD(SIDE-1):X2=RPD(SIDE-1):Y
  1=RPD(SIDE-1):Y2=RPD(SIDE-1)
310 IF X1=X2 THEN 300
320 IF Y1=Y2 THEN 300
330 IF X1=X2 THEN 300
340 *****EQUATION = AX+B=Y *****
350 A=(Y1-Y2)/(X1-X2)
360 B=Y1-(A*X1)

```

```

10 POLDRAW:DER X(25,25),Y(25,25),X2
  (25,25),Y2(25,25)
20 CLS:PRINTG6,"FAULT LINE MACHINE"
  :PRINT:PRINTG6,...GENERATE FAUL
  T LINES...:PRINTG6,...CONTINUE F
  AULT GENERATION...:PRINTG6,...SA
  VE LAND MASS DATA...:PRINTG6,...
  LOAD LAND MASS DATA...:PRINTG6,...
  FILL IN SEAS...
30 PRINTG6,...REMOVE SEAS...:PRINTG6
  ...SAVE DISPLAY...:PRINTG6,...V
  ERTICAL OFFSET...
370 ***** UP OR DOWN *****
380 C=RPD(2):IF C=2 THEN CONST=+3 E
  LSE CONST=-3
390 *** CALCULATE BATHYMETRY ***
400 FOR W=1 TO SIDE-1
410 FOR Z=1 TO SIDE-1
420 IF AA=B(2 THEN Y(W,Z)=Y(W,Z)+C
  ORST ELSE Y(W,Z)=Y(W,Z)-CONST
430 NEXT Z,W
440 ***** DRAW OCEAN LINE *****
450 PRODE4,0:PCLS
460 FOR Z=SIDE TO 1 STEP-1
470 FOR W=1 TO SIDE
480 LINE(X(W-1,Z),Y(W-1,Z)-1:X(W,Z)
  ,Y(W,Z)),PSET
490 LINE(X(W,Z-1),Y(W,Z-1)-1:X(W,
  Z),Y(W,Z)),PSET
500 NEXT W,Z
510 LINE(X(0,SIDE),Y(0,SIDE)-1:X(1,
  0),Y(0,0)),PSET
520 LINE(X(SIDE,0),Y(SIDE,0)-1:X(SI
  DE,0),Y(SIDE,0)),PSET
530 FOR A=1 TO 4:PCOPYA+4 TO A:NEXT
  A
540 PRODE4,1:SCREEN1,0
550 NEXT B,A

```

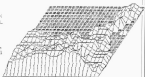




```

560 PROCEDURE,1:SCREEN1,1:GOTO40
580 'DRAW IN AS 3D-SOLID
590 FOR Z=SIZE TO 1 STEP -1
600 FOR W=1 TO SIZE
610 X1=X2W-1,Z1=X2=X2W,Z1=X3=X2W
    ,Z-1,X4=X2W-1,Z-1
620 Y1=Y2W-1,Z1=Y2=Y2W,Z1=Y3=Y2W
    ,Z-1,Y4=Y2W-1,Z-1
630 A1=(Y1-Y2)/(X3-X2)+B1+Y1-A1+X1
    I
640 IF W=1 THEN IF Y1=Y2 AND Y1=150
    -2*Y THEN COLOR0,1 ELSE COLOR1,
    0
650 FOR X=1 TO X2
660 Y=A1+X*B1
670 LINE(X,Y)=(X3,Y3),PSET
680 NEXT X
690 A1=(Y4-Y3)/(X4-X3)+B1+Y4-(A1+X4
    )
700 FOR X=X4 TO X3
710 Y=A1+X*B1
720 LINE(X1,Y1)=(X,Y),PSET
730 NEXT X
740 LINE(X1,Y1)=(X2,Y2),PSET:LINE=(
    X3,Y3),PSET:LINE=(X4,Y4),PSET:L
    INE=(X1,Y1),PSET
750 NEXT W,Z
760 COLOR1,0
770 LINE(X1,0),Y1,0)=(X1SIZE,0),
    Y1SIZE,0),PSET:LINE=(X1SIZE,81
    26),Y1SIZE,SIZE),PSET
780 PEEKASPP4,0
790 SOUND00,1
800 SCREEN1,1
810 GOTO40
820 'MOVE LANDSCAPE
830 PRINT:INPUT"ENTER LAND SHIFT OF
    PSET":n
840 FOR W=1 TO SIZE-1:FOR Z=1 TO S1
    26-1+Y1W,Z1=Y1W,Z1=A:REST 2,W1G
    OTO20
850 'FILL IN THE SEA
860 SCREEN1,0:FOR W=0 TO SIZE
870 FOR Z=0 TO SIZE
880 IF Y1W,Z1>150-2*Y THEN Y21W,Z1=
    150-2*Y ELSE Y21W,Z1=Y1W,Z1
890 X21W,Z1=X1W,Z1
900 NEXT Z,W
910 K=1
920 PROCEDURE,1:POL5:SCREEN1,0:GOTO590
    'DRAW LAND MASS
930 'REMOVE SEA
940 SCREEN1,0:FOR W=0 TO SIZE:FOR Z
    =0 TO SIZE
950 Y21W,Z1=Y1W,Z1+X21W,Z1=X1W,Z1+M
    EXT 2,W1K=0
960 PROCEDURE,1:POL5:SCREEN1,0:GOTO590
970 CLS:PRINTG200,"GAME LANDSCAPE D
    ATA":PRINT:PRINT
980 INPUT "FILE TITLE":FILE#
990 WRITE FILE#SIZE
1000 FOR A=0 TO SIZE:FOR B=0 TO S12
    E
1010 WRITE FILE#,A,B
1020 WRITE FILE#,Y1A,B
1030 NEXT B,A
1040 CLOSE
1050 GOTO20
1060 CLS:PRINTG200,"LOAD LANDSCAPE
    DATA":PRINT:PRINT
1070 INPUT"ENTER FILE TITLE":FILE#
1080 READ FILE#SIZE
1090 FOR A=0 TO SIZE:FOR B=0 TO S12
    E
1100 READ FILE#,X1A,B
1110 READ FILE#,Y1A,B
1120 NEXT B,A
1130 CLOSE
1140 W=120/SIZE
1150 GOTO20
1160 PRINT:INPUT"GAME DISPLAY TITLE
    ":L#
1170 SAVE AS,1075,9255,48194:GOTO50
1180 '©1984 BY PETER WHITTAKER,

```









[illegible]



|      |      |       |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------|------|-------|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 7000 | DATA | ***** | +0F | 71 | 24 | 24 | 03 | 8D | 71 | 64 | 26 | 03 | 8D | 73 | 84 | 8D | 72 | 43 |    |
| 7010 | DATA | ***** | +00 | 70 | 31 | 12 | 12 | 12 | 12 | 86 | 7C | 03 | 27 | 93 | 8D | 73 | 8D | 1C |    |
| 7020 | DATA | ***** | +12 | 12 | 00 | 74 | 34 | 74 | 70 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7030 | DATA | ***** | +04 | 74 | 70 | 00 | 04 | 0F | 84 | 04 | 07 | 70 | 30 | 8D | 73 | 90 | 8D | 70 |    |
| 7040 | DATA | ***** | +0F | 6D | 72 | 03 | 39 | 0C | 00 | 40 | 30 | 1F | 26 | FC | 3F | 00 | 00 | 00 |    |
| 7050 | DATA | ***** | +20 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7060 | DATA | ***** | +0E | 1E | 00 | 8E | 4E | 00 | 10 | 0C | 10 | 00 | 0C | 01 | 00 | 01 | 31 | 3E |    |
| 7070 | DATA | ***** | +26 | 70 | 8D | 70 | 04 | 0D | 0F | 44 | 30 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7080 | DATA | ***** | +15 | 80 | 02 | 50 | 44 | 70 | 64 | 43 | 50 | 49 | 14 | 68 | 90 | 04 | 4F | 0C |    |
| 7090 | DATA | ***** | +72 | 40 | 0F | 70 | 00 | 04 | 70 | 12 | 07 | 70 | 02 | 74 | 00 | 00 | 74 | 70 |    |
| 7100 | DATA | ***** | +00 | F4 | 70 | 62 | 10 | 0C | 70 | 10 | 46 | 40 | 16 | 00 | 00 | 70 | 00 | A7 |    |
| 7110 | DATA | ***** | +04 | 30 | 00 | 20 | 12 | 12 | 52 | 14 | 24 | 03 | 7C | 70 | 00 | 7C | 70 | 00 |    |
| 7120 | DATA | ***** | +70 | 70 | 00 | 04 | 00 | 00 | 70 | 10 | 07 | 04 | 10 | 00 | 20 | 12 | 12 | 12 |    |
| 7130 | DATA | ***** | +50 | 24 | F0 | 74 | 70 | 00 | 10 | 0C | 70 | 03 | F4 | 70 | 02 | 30 | 04 | 00 |    |
| 7140 | DATA | ***** | +00 | 70 | 00 | 00 | 10 | A7 | 04 | 30 | 03 | 07 | 04 | 31 | 21 | 04 | 03 | 10 |    |
| 7150 | DATA | ***** | +1C | 47 | 04 | 30 | 00 | 07 | 04 | 3F | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7160 | DATA | ***** | +4F | 3E | 0E | 71 | 00 | A6 | 04 | 4F | 00 | 00 | 04 | 46 | 0C | 01 | A0 | 01 | 20 |
| 7170 | DATA | ***** | +0C | 0C | 01 | 07 | 04 | 3F | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 7F | 00 | 20 | 00 |
| 7180 | DATA | ***** | +FF | 07 | 10 | FF | 03 | 0F | 00 | 71 | 02 | 06 | 71 | 00 | 44 | 00 | 20 | 00 |    |
| 7190 | DATA | ***** | +0C | 60 | 20 | 07 | 71 | 21 | 07 | 71 | 20 | 44 | 04 | 03 | 70 | 71 | 20 | 00 |    |
| 7200 | DATA | ***** | +71 | 20 | 07 | 71 | 20 | 00 | 70 | 01 | 0C | 71 | 20 | FD | 20 | 01 | 00 | 70 |    |
| 7210 | DATA | ***** | +00 | 0F | 72 | 01 | 0C | 70 | 00 | 0F | 71 | 20 | 04 | 72 | 02 | 07 | 71 | 24 |    |
| 7220 | DATA | ***** | +3F | 20 | 03 | 10 | 70 | 71 | 40 | 14 | 3F | 04 | 03 | 07 | 71 | 40 | 00 | 71 |    |
| 7230 | DATA | ***** | +02 | 33 | 0F | 10 | 00 | 0C | 0F | 10 | 04 | 10 | 00 | 00 | 30 | 00 | 20 | 0C |    |
| 7240 | DATA | ***** | +04 | 00 | 04 | 70 | 71 | 20 | 07 | 11 | 00 | 71 | 43 | 10 | 00 | 70 | 00 | F4 |    |
| 7250 | DATA | ***** | +70 | 24 | 50 | 0C | A3 | 00 | 71 | 2C | 00 | 04 | 00 | 00 | 00 | F4 | 71 | 24 |    |
| 7260 | DATA | ***** | +10 | 0C | 70 | 00 | A6 | 03 | 07 | 04 | 3F | 70 | 71 | 10 | 12 | 00 | 00 | 00 |    |
| 7270 | DATA | ***** | +00 | 74 | 71 | 00 | 2F | 01 | 3F | 04 | 40 | 07 | 71 | 00 | 00 | 70 | 47 | 00 |    |
| 7280 | DATA | ***** | +71 | 01 | 33 | 4C | 10 | 01 | 70 | 03 | 26 | F0 | 02 | 37 | 0F | 00 | 71 | 01 |    |
| 7290 | DATA | ***** | +3F | 10 | 10 | 10 | 10 | 0C | 04 | 34 | 1C | FC | 44 | 24 | 0C | 04 | 00 | 00 |    |
| 7300 | DATA | ***** | +24 | 04 | 40 | 24 | 03 | 0C | 00 | 0C | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7310 | DATA | ***** | +00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7320 | DATA | ***** | +12 | 05 | 70 | 00 | 10 | 70 | 70 | 00 | 10 | 00 | 72 | 02 | 02 | 00 | 30 | 1F |    |
| 7330 | DATA | ***** | +01 | 3F | 00 | 00 | 00 | 4F | 40 | 20 | 46 | 34 | 36 | 00 | 0F | 40 | 02 | 30 |    |
| 7340 | DATA | ***** | +34 | A6 | 04 | 04 | 04 | 01 | 3D | 07 | 04 | 00 | 04 | 00 | 00 | 00 | 01 | 33 | 3F |
| 7350 | DATA | ***** | +04 | 60 | 04 | 0C | 10 | 20 | 24 | 03 | 2F | 07 | 07 | 0C | 04 | 00 | 0C | 50 |    |
| 7360 | DATA | ***** | +20 | 1F | 01 | 15 | 2F | 02 | 20 | 13 | 01 | 00 | 2F | 07 | 10 | 3C | 3C | 44 |    |
| 7370 | DATA | ***** | +04 | 20 | 00 | 01 | 01 | 2F | 0C | 2C | 12 | 04 | 04 | 07 | 70 | 37 | 37 | 12 |    |
| 7380 | DATA | ***** | +12 | 12 | 12 | 04 | 72 | 01 | 01 | 34 | 26 | 00 | 70 | 70 | 01 | 01 | 05 | 24 |    |
| 7390 | DATA | ***** | +03 | 70 | 72 | 01 | 04 | 7C | 0C | 01 | 10 | 26 | 03 | 70 | 72 | 00 | 01 | 03 |    |
| 7400 | DATA | ***** | +26 | 03 | 74 | 72 | 03 | 3F | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7410 | DATA | ***** | +00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7420 | DATA | ***** | +10 | 00 | 00 | 00 | 00 | 00 | 00 | 70 | 02 | 00 | 03 | 04 | 00 | FD | 7C | 00 | 04 |
| 7430 | DATA | ***** | +72 | 01 | 44 | 27 | 0E | 00 | 04 | 70 | 72 | 41 | 26 | 03 | 70 | 72 | 00 | 01 |    |
| 7440 | DATA | ***** | +04 | 1C | FC | 07 | 72 | 42 | 3F | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7450 | DATA | ***** | +7F | 44 | 00 | 00 | 0F | 24 | A6 | 03 | 44 | 04 | 46 | 4F | 12 | 12 | 12 | 12 |    |
| 7460 | DATA | ***** | +00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7470 | DATA | ***** | +00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7480 | DATA | ***** | +00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7490 | DATA | ***** | +00 | 20 | 05 | 02 | 74 | 73 | 02 | 34 | 44 | 04 | 03 | 07 | 71 | 02 | 0E | 71 |    |
| 7500 | DATA | ***** | +20 | 30 | 00 | 33 | 0F | 10 | 00 | 0C | 0C | 00 | 04 | 33 | 00 | 00 | 00 | 00 |    |
| 7510 | DATA | ***** | +00 | 0C | 04 | 0D | 04 | 74 | 71 | 20 | 07 | 03 | 00 | 71 | 43 | 10 | 00 | 7C |    |
| 7520 | DATA | ***** | +00 | F4 | 71 | 24 | 50 | 0C | 05 | 00 | 71 | 2C | 1D | 04 | 30 | 00 | 0C | F4 |    |
| 7530 | DATA | ***** | +71 | 24 | 10 | 0C | 72 | 10 | 04 | 05 | 07 | 04 | 3F | 70 | 71 | 10 | 10 | 00 |    |
| 7540 | DATA | ***** | +0C | 70 | 00 | 04 | 00 | 30 | 0F | 01 | 00 | 33 | 0F | 10 | 00 | 00 | 04 | 07 |    |
| 7550 | DATA | ***** | +04 | 00 | 00 | 00 | 00 | 24 | F2 | 04 | 00 | 30 | 0F | FC | 00 | 33 | 44 | 04 |    |
| 7560 | DATA | ***** | +00 | A6 | 04 | 04 | 07 | 04 | 30 | 00 | 00 | 00 | 04 | F2 | 00 | 7C | 30 | 10 | 1D |
| 7570 | DATA | ***** | +33 | 0F | 10 | 00 | 0C | 04 | 0D | 04 | 30 | 00 | 00 | 10 | 0C | 04 | 10 | 04 |    |
| 7580 | DATA | ***** | +3F | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7590 | DATA | ***** | +70 | 70 | 70 | 04 | 00 | 00 | 44 | 44 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7600 | DATA | ***** | +00 | 1C | FC | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7610 | DATA | ***** | +00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7620 | DATA | ***** | +00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |    |
| 7630 | DATA | ***** | +03 | 04 | 01 | 12 | 04 | 70 | 00 | 27 | 07 | 73 | 0C | 74 | 73 | 10 | 30 | 30 |    |
| 7640 | DATA | ***** | +06 | 73 | 01 | 01 | 7C | 02 | 00 | 00 | 70 | 70 | 01 | 00 | 7C | 0C | 7F | 73 |    |
| 7650 | DATA | ***** | +02 | 20 | 0F | 07 | 0C | 70 | 73 | 01 | 40 | 00 | 7C | 0C | 7F | 73 | 0C | 20 |    |
| 7660 | DATA | ***** | +01 | 47 | 40 | 00 | FF | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 00 | 07 | 73 | 00 |
| 7670 | DATA | ***** | +3F | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 7680 | DATA | ***** | +01 | 00 | 01 | 10 | 04 | 74 | 30 | 27 | 07 | 07 | 74 | 0C | 70 | 74 | 30 | 0F |    |
| 7690 | DATA | ***** | +06 | 74 | 31 | 01 | 7C | 01 | 13 | 00 | 30 | 74 | 31 | 00 | 7C | 01 | 7F | 74 |    |
| 7700 | DATA | ***** | +12 | 20 | 0F | 27 | 0C | 7C | 74 | 30 | 40 | 00 | 7C | 01 | 7F | 74 | 0C | 20 |    |











# Concealing Data

Dene Bobbington shows you how to encode and decode text files

THERE ARE times in computing when it is necessary or desirable to hold or transmit data in an encoded form so that unauthorized users cannot examine sensitive or personal data. For example, on the UNIX operating system users' passwords are stored in an encoded form so that even if somebody does get into the password file he will not be able to see them unless he knows the encoding technique and the keyword used. Data encryption methods can to some extent prevent the abuse of computer systems.

There are two main methods of coding, these being substitution and transposition. The substitution methods work by substituting each character by some other (being determined by the technique and keyword being used). Transposition methods work by changing the order of the characters in the text, so that all the characters are the same but are jumbled up to conceal the original text. Obviously if a technique uses both substitution and transposition then the code will be very hard to break compared to if just one method was used.

Here I present a program which allows users to encode and decode text files (stored on cassette) using a substitution method.

The method presented here is a more advanced version of the PLAYFAIR code which was used in the first world war to encode secret messages. It is based upon a matrix which contains all the available characters, but where the order depends on a keyword entered by the user. Thus as the encoded text depends on the keyword, different text will be obtained from different keywords.

The program (see Listing 1) works by typing up a 7 row by 8 column matrix, thus allowing 42 different characters. The characters that are allowed are "ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789", "?" (where "?" is a space), A keyword entered and is stripped of illegal

and repeating characters. For example, the keyword "ONCE UPON A TIME" would finally be "ONCEUPAIME". Theirs then go into the matrix along with the unused characters. Here the matrix would be:

```
ONCE U
PAIME
BDFGHJ
KLRQSV
WXYZ01
234567
89 , ' ?
```

Where again "" is a space.

Characters are encoded in pairs so that if a line has an odd number of characters a space is added at the end of the line, if the two characters being examined are in the same row then we add 1 to the columns, eg Pm would be encoded as QN, if we go off the end then we "wrap around", eg VJ would be encoded as QK. The same rule applies to characters in the same column except that we add 1 to the rows, so that AZ would be encoded as B3, if they are not in the same row or column then we take their characters at the opposite corners, so that BC would be encoded as HK.

## Modular

We apply the same principles decoding except that instead of adding 1 to the row or column we take away 1 from it, remembering to wrap around if necessary. We apply the same rule for characters that are not in the same row or column.

The program works by reading in a text file from cassette to be encoded or decoded, after processing the file is saved back onto cassette in the encoded or decoded form. The user must enter the name of the file and is prompted to press the cassette recorder when the file is to be read in or saved.

The program has been written in a modular manner and consists of several subroutines which are called from within the main body of the program, that is lines 2480 to 2680. This makes it easy to modify

to make use of a disc drive or allow more characters etc.

The important subroutine is the one at lines 1680 to 2380 as this actually encodes or decodes a message depending on the value of the variable BC, it does this by setting AD to 1 if encoding or -1 if decoding, this is then used to calculate the new row or column of pairs of letters.

The other two important subroutines are those to find the position of the two letters in the matrix (lines 1840 to 1960) and to strip illegal characters from a line of text (lines 1980 to 2080).

To set up a test file containing a message to be encoded use the program given in Listing 2. It allows up to 100 lines of text to be entered, and input is terminated when 100 lines have been input or when a full stop is entered on a new line.

As the program needs a keyword to encode and decode you may be wondering which is the best to use. Well, when a method such as this is being used which puts the keyword and remaining letters in a matrix the most effective way is to have a keyword which contains as few repeating characters as possible and contains at least as many characters as are allowed by the program. This makes it more difficult for the code to be broken. For example, the keyword "CONSTANTINOPLE 753094?" gives a better matrix than the keyword "ZORDEE".

It should be remembered that the same keyword must be used for both encoding and decoding otherwise all stage results will be obtained!

The ability to conceal data on a computer by encrypting techniques can be useful when the data being held is only to be seen by authorized users or when messages which are being transmitted are to be kept secret. This program could easily be modified to encode data stored in a database and on cassette or disk, or to decode messages sent from computer to computer over a network or telephone line.

## Listing 1

```
1  " = data encoding program "
2  "
3  " = (see 1680) subroutine "
4  "
5  "
680 SUB LINE
690 DIM MAT(7,8) AS STRING
700 FOR I=0 TO 25:FOR J=0 TO 7:MAT(I,J)=CHR(65+I+J*26)
710 NEXT J:I=I+1:NEXT I
720 MAT(0,7)=" "
730 MAT(1,7)=" "
740
750
760 " = (see 1840) subroutine
770 " = (see 1960) subroutine
780 " = (see 1980) subroutine
790 "
800
810 DIM C1(1)
820 FOR I=1 TO 10:FOR J=1 TO 10:
830 C1(I+J*10)=CHR(65+I+J*26)
840 NEXT J:I=I+1:NEXT I
850 MAT(0,7)=C1
860
870 MAT(1,7)=C1
```

```
1680 SUB LINE
1690 " = (see 1840) subroutine
1700 " = (see 1960) subroutine
1710 " = (see 1980) subroutine
1720 "
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2350
2360
2370
2380
```



[illegible]

## Listing 2

[illegible]



## News desk

If you have any new products for the Dragon — software or hardware — ring the News Desk on 01-437 4300.



## Current sponge

**INTEGRITY** Solutions have produced an alternative set for microcomputers. The set, which compresses file loads with pickup loads, running in a static sink unit, is in turn attached to an earth lead, costs £48.99 and seems to include an anti-static sponge and cleaning fluid. This might well be of interest to those using expensive computers in a high-stake (e.g. election) context. Low-compatibility environment like an office.

be improvised more cheaply with fine insulated wire run from a YDU screen or micro-connector to a reliable earth point like a steel radiator.

"Recent surveys indicate that some 70% of computer service calls are due to static electricity," state integrity, and our own electronic consultants confirm that this could, indeed, be the case. Enquiries to Integrity Solutions, 504 Macneven Road, Sudbury, Rockdale, Epsom, 011 644 6277.

## Extend the 64

**HAPPIS:** Micro Software, previously known for database applications programs for the Dragon 32 and 64, is offering **BLADE** v2, designed solely for the Dragon 64, which, the makers claim, beats its rivals in compatibility.

The program comes on disk, for DragonDOS, through other formats may be available in due course), and makes use of the 64's ability to operate in "Bios type 1" with 64K of RAM. The components into the car-

bridge area, about 505, and that takes no memory from BASIC. The existing 10K of BASIC, and 8K of DOS, are retained, but modified.

Basic 42 allows printing on the hi-res screen with standard PPIII commands, using 24 lines of 40 characters per line, redefinable character sets, redefinable keys up to eight, redefined windows plus one fixed, but non-destructive window, inverted video, underlines, some extra bold colors.

manipulate and functions, commands in lower case, and automatic startup of a BASIC program.

The save program occupies some 6K of memory, and allows other utilities to be loaded in from disk as required. Three such utilities are already written: a program that "patches" the known bugs in Dragonsoft 1.0, a print "spooler" which allows the computer to be used while the printer is spending, and a "help" utility which interprets some of the features of BASIC 63, with BASIC 63 disabled, scroll disables, pause listing, improved TRON (including single-stepping, plus expand and print and error messages).

Harris Micro Software hope to extend the range of utilities to cover extra disk commands, graphics utilities such as icons and sprites, extra sound capabilities, "subject" program, communications software, and more. The "open-ended" nature of BASIC 42 means that it is possible to ex-

test the Dragon's capabilities  
almost indefinitely.

The price for the core program BASIC-42, including alternative character sets, character drawing program, and Japanese games, is \$2495. The HELP utility, and the SPACK utility, will sell for \$5 each. The programs will be available from October 1st.

## Micro Show

THE East and West Computer Show is being held at the Park Hotel, Cardiff on 15th November from 10.00-6.00.

We have no news as to whether any of the Dragon suppliers will be able to attend, but there should be something of interest multi-micro users.

For more information contact  
Preston Exhibitions, Kings Hall  
Court, St. Enoch's Major, 100  
Glamorgan CF22 0QH. Tel:  
01446 333333

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**Editor's Note:** Performance in four past seasons. Most games played: Scott Jorgensen, 1; Mark T. Black, 2; 2004, 2005, 2006, 2007, 2008.

Available only from: **Shishikawa, Ben-  
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Chapman, W. J., 1990. *Journal of the American Water Resources Association*, 26: 103-114.

| Company   | Revenue | Profit | Assets |
|-----------|---------|--------|--------|
| Company A | \$100M  | \$10M  | \$50M  |
| Company B | \$200M  | \$20M  | \$100M |
| Company C | \$300M  | \$30M  | \$150M |
| Company D | \$400M  | \$40M  | \$200M |
| Company E | \$500M  | \$50M  | \$250M |

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**Diagrams:** [6-4](#) [Diagrams](#) [ECCS](#) [Diagrams](#)

[illegible]



# Mode 24

*Paul Wicks raises lower case characters and hi res graphics.*

THIS PROGRAM gives the user true lower case characters on the screen, underlining, reverse text, limited user defined graphics capabilities, 64x160 pixel resolution and still allows at the Dragon's eight colours to be displayed on the screen simultaneously - all from Basic.

The program is written in relocatable machine code, and occupies less than 1k of memory (although it uses the default value of four graphics pages for display).

The hex loader in listing 1 can be used to enter the data in listing 2. The addresses shown in listing 2 place the program at the very end of available RAM although if you wish to leave this memory free of other machine code programs then a lower start address can be used.

To save the program once it is in memory type **CS&WM "filename"**, start address, start address+51020, start address (ENTER) or for the addresses given: **CS&WM MODE24 &H0C00 &HFFFF &H0C00 (ENTER)**

To reload and run the program first type **CL&AR 100**, start address-1 (ENTER) then **CL&C&B "filename"** (ENTER) then **EXEC (ENTER)** or with the given addresses: **CL&AR 100 &H0C00 (ENTER)** **CL&C&B MODE24 (ENTER)** **EXEC (ENTER)**

On running the screen clears to amber text on a black background (reverse video, amber screen). BASIC commands including **PRINT** is and **CLS** in etc. all work as normal with the following additions:  
**PRINT CHR\$(37)** inserts to the normal text screen (not mode 24).  
**PRINT CHR\$(38)** causes the text to be inverted.  
**PRINT CHR\$(39)** switches the underlining on and off.  
**PRINT CHR\$(30)** switches between the amber and green screen display.

These control codes are given in table 2 and an example of how they work is given in listing 6.

**(GIRF) (3)** is used as normal to get lower case text except that lower case is now displayed as true lowercase and not as inverse text (to get inverse text use **PRINT CHR\$(28)**, "text here", **CHR\$(28)**...). An example of the type of graphics which can be obtained and of how to set points and draw circles in any colour using BASIC is given in listing 5. To find which character is displayed at a particular point on the screen the functions in listing 4

**DEF FN(P)=PEEK&H800+(32\*INT(P/32))+P** can be used which returns the **PEEK** value given in table 3 of the character at **PRINT** is position **H** on the screen.

Finally, an example of how to define your own characters for use with **MODE24** is given in listing 3 which when used in conjunction with table 1 allows you to redefine any of the lower case characters, **CH-PR(38)** and **AS&C** characters 123 to 127 in a 6x7 matrix.

Listing 1 — Hex Loader

```
10 'HELLOADER
20 CLS
30 C=0:CH=0
40 INPUT "START ADDRESS (HEX) ";A$
50 A=VAL("&H"+A$)
60 PRINT "ADDRESS ";HEX$(A)
70 INPUT "BYTE ";P$
80 IF P$="X" THEN END
90 P=VAL("&H"+P$)
100 POKE A,P
110 CH=CH+P
120 C=C+1:IF C=8 GOSUB 140
130 A=A+1:GOTO 50
140 PRINT "CHECKSUM OF LAST 8 BYTES ";HEX$(CH)
150 C=C+1:CH=0:RETURN
```

Listing 2 — Mode 24 Hex Dump

| ADDR  | HEX | POINT | CHARACTER | ADDR | HEX | POINT | CHARACTER |
|-------|-----|-------|-----------|------|-----|-------|-----------|
| 00000 | 20  | 8C    | 50        | 87   | 41  | 10    | 10        |
| 00001 | 30  | 87    | 87        | 41   | 10  | 10    | 10        |
| 00002 | 40  | 84    | 84        | 41   | 10  | 10    | 10        |
| 00003 | 50  | 81    | 81        | 41   | 10  | 10    | 10        |
| 00004 | 60  | 7E    | 7E        | 41   | 10  | 10    | 10        |
| 00005 | 70  | 7B    | 7B        | 41   | 10  | 10    | 10        |
| 00006 | 80  | 78    | 78        | 41   | 10  | 10    | 10        |
| 00007 | 90  | 75    | 75        | 41   | 10  | 10    | 10        |
| 00008 | A0  | 72    | 72        | 41   | 10  | 10    | 10        |
| 00009 | B0  | 6F    | 6F        | 41   | 10  | 10    | 10        |
| 00010 | C0  | 6C    | 6C        | 41   | 10  | 10    | 10        |
| 00011 | D0  | 69    | 69        | 41   | 10  | 10    | 10        |
| 00012 | E0  | 66    | 66        | 41   | 10  | 10    | 10        |
| 00013 | F0  | 63    | 63        | 41   | 10  | 10    | 10        |
| 00014 | 00  | 60    | 60        | 41   | 10  | 10    | 10        |
| 00015 | 10  | 5D    | 5D        | 41   | 10  | 10    | 10        |
| 00016 | 20  | 5A    | 5A        | 41   | 10  | 10    | 10        |
| 00017 | 30  | 57    | 57        | 41   | 10  | 10    | 10        |
| 00018 | 40  | 54    | 54        | 41   | 10  | 10    | 10        |
| 00019 | 50  | 51    | 51        | 41   | 10  | 10    | 10        |
| 00020 | 60  | 4E    | 4E        | 41   | 10  | 10    | 10        |
| 00021 | 70  | 4B    | 4B        | 41   | 10  | 10    | 10        |
| 00022 | 80  | 48    | 48        | 41   | 10  | 10    | 10        |
| 00023 | 90  | 45    | 45        | 41   | 10  | 10    | 10        |
| 00024 | A0  | 42    | 42        | 41   | 10  | 10    | 10        |
| 00025 | B0  | 3F    | 3F        | 41   | 10  | 10    | 10        |
| 00026 | C0  | 3C    | 3C        | 41   | 10  | 10    | 10        |
| 00027 | D0  | 39    | 39        | 41   | 10  | 10    | 10        |
| 00028 | E0  | 36    | 36        | 41   | 10  | 10    | 10        |
| 00029 | F0  | 33    | 33        | 41   | 10  | 10    | 10        |
| 00030 | 00  | 30    | 30        | 41   | 10  | 10    | 10        |
| 00031 | 10  | 2D    | 2D        | 41   | 10  | 10    | 10        |
| 00032 | 20  | 2A    | 2A        | 41   | 10  | 10    | 10        |
| 00033 | 30  | 27    | 27        | 41   | 10  | 10    | 10        |
| 00034 | 40  | 24    | 24        | 41   | 10  | 10    | 10        |
| 00035 | 50  | 21    | 21        | 41   | 10  | 10    | 10        |
| 00036 | 60  | 1E    | 1E        | 41   | 10  | 10    | 10        |
| 00037 | 70  | 1B    | 1B        | 41   | 10  | 10    | 10        |
| 00038 | 80  | 18    | 18        | 41   | 10  | 10    | 10        |
| 00039 | 90  | 15    | 15        | 41   | 10  | 10    | 10        |
| 00040 | A0  | 12    | 12        | 41   | 10  | 10    | 10        |
| 00041 | B0  | 0F    | 0F        | 41   | 10  | 10    | 10        |
| 00042 | C0  | 0C    | 0C        | 41   | 10  | 10    | 10        |
| 00043 | D0  | 09    | 09        | 41   | 10  | 10    | 10        |
| 00044 | E0  | 06    | 06        | 41   | 10  | 10    | 10        |
| 00045 | F0  | 03    | 03        | 41   | 10  | 10    | 10        |
| 00046 | 00  | 00    | 00        | 41   | 10  | 10    | 10        |
| 00047 | 10  | F5    | F5        | 41   | 10  | 10    | 10        |
| 00048 | 20  | F2    | F2        | 41   | 10  | 10    | 10        |
| 00049 | 30  | F7    | F7        | 41   | 10  | 10    | 10        |
| 00050 | 40  | F4    | F4        | 41   | 10  | 10    | 10        |
| 00051 | 50  | F1    | F1        | 41   | 10  | 10    | 10        |
| 00052 | 60  | EE    | EE        | 41   | 10  | 10    | 10        |
| 00053 | 70  | EB    | EB        | 41   | 10  | 10    | 10        |
| 00054 | 80  | E8    | E8        | 41   | 10  | 10    | 10        |
| 00055 | 90  | E5    | E5        | 41   | 10  | 10    | 10        |
| 00056 | A0  | E2    | E2        | 41   | 10  | 10    | 10        |
| 00057 | B0  | DF    | DF        | 41   | 10  | 10    | 10        |
| 00058 | C0  | DC    | DC        | 41   | 10  | 10    | 10        |
| 00059 | D0  | D9    | D9        | 41   | 10  | 10    | 10        |
| 00060 | E0  | DE    | DE        | 41   | 10  | 10    | 10        |
| 00061 | F0  | DB    | DB        | 41   | 10  | 10    | 10        |
| 00062 | 00  | D8    | D8        | 41   | 10  | 10    | 10        |
| 00063 | 10  | C5    | C5        | 41   | 10  | 10    | 10        |
| 00064 | 20  | C2    | C2        | 41   | 10  | 10    | 10        |
| 00065 | 30  | C7    | C7        | 41   | 10  | 10    | 10        |
| 00066 | 40  | C4    | C4        | 41   | 10  | 10    | 10        |
| 00067 | 50  | C1    | C1        | 41   | 10  | 10    | 10        |
| 00068 | 60  | BE    | BE        | 41   | 10  | 10    | 10        |
| 00069 | 70  | BB    | BB        | 41   | 10  | 10    | 10        |
| 00070 | 80  | B8    | B8        | 41   | 10  | 10    | 10        |
| 00071 | 90  | BD    | BD        | 41   | 10  | 10    | 10        |
| 00072 | A0  | BA    | BA        | 41   | 10  | 10    | 10        |
| 00073 | B0  | B7    | B7        | 41   | 10  | 10    | 10        |
| 00074 | C0  | B4    | B4        | 41   | 10  | 10    | 10        |
| 00075 | D0  | B1    | B1        | 41   | 10  | 10    | 10        |
| 00076 | E0  | AE    | AE        | 41   | 10  | 10    | 10        |
| 00077 | F0  | AB    | AB        | 41   | 10  | 10    | 10        |
| 00078 | 00  | A8    | A8        | 41   | 10  | 10    | 10        |
| 00079 | 10  | AD    | AD        | 41   | 10  | 10    | 10        |
| 00080 | 20  | AA    | AA        | 41   | 10  | 10    | 10        |
| 00081 | 30  | AF    | AF        | 41   | 10  | 10    | 10        |
| 00082 | 40  | AC    | AC        | 41   | 10  | 10    | 10        |
| 00083 | 50  | A9    | A9        | 41   | 10  | 10    | 10        |
| 00084 | 60  | 9E    | 9E        | 41   | 10  | 10    | 10        |
| 00085 | 70  | 9B    | 9B        | 41   | 10  | 10    | 10        |
| 00086 | 80  | 98    | 98        | 41   | 10  | 10    | 10        |
| 00087 | 90  | 9D    | 9D        | 41   | 10  | 10    | 10        |
| 00088 | A0  | 9A    | 9A        | 41   | 10  | 10    | 10        |
| 00089 | B0  | 97    | 97        | 41   | 10  | 10    | 10        |
| 00090 | C0  | 94    | 94        | 41   | 10  | 10    | 10        |
| 00091 | D0  | 91    | 91        | 41   | 10  | 10    | 10        |
| 00092 | E0  | 8E    | 8E        | 41   | 10  | 10    | 10        |
| 00093 | F0  | 8B    | 8B        | 41   | 10  | 10    | 10        |
| 00094 | 00  | 88    | 88        | 41   | 10  | 10    | 10        |
| 00095 | 10  | 85    | 85        | 41   | 10  | 10    | 10        |
| 00096 | 20  | 82    | 82        | 41   | 10  | 10    | 10        |
| 00097 | 30  | 87    | 87        | 41   | 10  | 10    | 10        |
| 00098 | 40  | 84    | 84        | 41   | 10  | 10    | 10        |
| 00099 | 50  | 81    | 81        | 41   | 10  | 10    | 10        |
| 00100 | 60  | 7E    | 7E        | 41   | 10  | 10    | 10        |
| 00101 | 70  | 7B    | 7B        | 41   | 10  | 10    | 10        |
| 00102 | 80  | 78    | 78        | 41   | 10  | 10    | 10        |
| 00103 | 90  | 75    | 75        | 41   | 10  | 10    | 10        |
| 00104 | A0  | 72    | 72        | 41   | 10  | 10    | 10        |
| 00105 | B0  | 6F    | 6F        | 41   | 10  | 10    | 10        |
| 00106 | C0  | 6C    | 6C        | 41   | 10  | 10    | 10        |
| 00107 | D0  | 69    | 69        | 41   | 10  | 10    | 10        |
| 00108 | E0  | 66    | 66        | 41   | 10  | 10    | 10        |
| 00109 | F0  | 63    | 63        | 41   | 10  | 10    | 10        |
| 00110 | 00  | 60    | 60        | 41   | 10  | 10    | 10        |
| 00111 | 10  | 5D    | 5D        | 41   | 10  | 10    | 10        |
| 00112 | 20  | 5A    | 5A        | 41   | 10  | 10    | 10        |
| 00113 | 30  | 57    | 57        | 41   | 10  | 10    | 10        |
| 00114 | 40  | 54    | 54        | 41   | 10  | 10    | 10        |
| 00115 | 50  | 51    | 51        | 41   | 10  | 10    | 10        |
| 00116 | 60  | 4E    | 4E        | 41   | 10  | 10    | 10        |
| 00117 | 70  | 4B    | 4B        | 41   | 10  | 10    | 10        |
| 00118 | 80  | 48    | 48        | 41   | 10  | 10    | 10        |
| 00119 | 90  | 45    | 45        | 41   | 10  | 10    | 10        |
| 00120 | A0  | 42    | 42        | 41   | 10  | 10    | 10        |
| 00121 | B0  | 3F    | 3F        | 41   | 10  | 10    | 10        |
| 00122 | C0  | 3C    | 3C        | 41   | 10  | 10    | 10        |
| 00123 | D0  | 39    | 39        | 41   | 10  | 10    | 10        |
| 00124 | E0  | 36    | 36        | 41   | 10  | 10    | 10        |
| 00125 | F0  | 33    | 33        | 41   | 10  | 10    | 10        |
| 00126 | 00  | 30    | 30        | 41   | 10  | 10    | 10        |
| 00127 | 10  | 2D    | 2D        | 41   | 10  | 10    | 10        |
| 00128 | 20  | 2A    | 2A        | 41   | 10  | 10    | 10        |
| 00129 | 30  | 27    | 27        | 41   | 10  | 10    | 10        |
| 00130 | 40  | 24    | 24        | 41   | 10  | 10    | 10        |
| 00131 | 50  | 21    | 21        | 41   | 10  | 10    | 10        |
| 00132 | 60  | 1E    | 1E        | 41   | 10  | 10    | 10        |
| 00133 | 70  | 1B    | 1B        | 41   | 10  | 10    | 10        |
| 00134 | 80  | 18    | 18        | 41   | 10  | 10    | 10        |
| 00135 | 90  | 15    | 15        | 41   | 10  | 10    | 10        |
| 00136 | A0  | 12    | 12        | 41   | 10  | 10    | 10        |
| 00137 | B0  | 0F    | 0F        | 41   | 10  | 10    | 10        |
| 00138 | C0  | 0C    | 0C        | 41   | 10  | 10    | 10        |
| 00139 | D0  | 09    | 09        | 41   | 10  | 10    | 10        |
| 00140 | E0  | 06    | 06        | 41   | 10  | 10    | 10        |
| 00141 | F0  | 03    | 03        | 41   | 10  | 10    | 10        |
| 00142 | 00  | 00    | 00        | 41   | 10  | 10    | 10        |
| 00143 | 10  | F5    | F5        | 41   | 10  | 10    | 10        |
| 00144 | 20  | F2    | F2        | 41   | 10  | 10    | 10        |
| 00145 | 30  | F7    | F7        | 41   | 10  | 10    | 10        |
| 00146 | 40  | F4    | F4        | 41   | 10  | 10    | 10        |
| 00147 | 50  | F1    | F1        | 41   | 10  | 10    | 10        |
| 00148 | 60  | EE    | EE        | 41   | 10  | 10    | 10        |
| 00149 | 70  | EB    | EB        | 41   | 10  | 10    | 10        |
| 00150 | 80  | E8    | E8        | 41   | 10  | 10    | 10        |
| 00151 | 90  | E5    | E5        | 41   | 10  | 10    | 10        |
| 00152 | A0  | E2    | E2        | 41   | 10  | 10    | 10        |
| 00153 | B0  | DF    | DF        | 41   | 10  | 10    | 10        |
| 00154 | C0  | DC    | DC        | 41   | 10  | 10    | 10        |
| 00155 | D0  | D9    | D9        | 41   | 10  | 10    | 10        |
| 00156 | E0  | DE    | DE        | 41   | 10  | 10    | 10        |
| 00157 | F0  | DB    | DB        | 41   | 10  | 10    | 10        |
| 00158 | 00  | D8    | D8        | 41   | 10  | 10    | 10        |
| 00159 | 10  | C5    | C5        | 41   | 10  | 10    | 10        |
| 00160 | 20  | C2    | C2        | 41   | 10  | 10    | 10        |
| 00161 | 30  | C7    | C7        | 41   | 10  | 10    | 10        |
| 00162 | 40  | C4    | C4        | 41   | 10  | 10    | 10        |
| 00163 | 50  | C1    | C1        | 41   | 10  | 10    | 10        |
| 00164 | 60  | BE    | BE        | 41   | 10  | 10    | 10        |
| 00165 | 70  | BB    | BB        | 41   | 10  | 10    | 10        |
| 00166 | 80  | B8    | B8        | 41   | 10  | 10    | 10        |
| 00167 | 90  | BD    | BD        | 41   | 10  | 10    | 10        |
| 00168 | A0  | BA    | BA        | 41   | 10  | 10    | 10        |
| 00169 | B0  | B7    | B7        | 41   | 10  | 10    | 10        |
| 00170 | C0  | B4    | B4        | 41   | 10  | 10    | 10        |
| 00171 | D0  | B1    | B1        | 41   | 10  | 10    | 10        |
| 00172 | E0  | AE    | AE        | 41   | 10  | 10    | 10        |
| 00173 | F0  | AB    | AB        | 41   | 10  | 10    | 10        |
| 00174 | 00  | A8    | A8        | 41   | 10  | 10    | 10        |
| 00175 | 10  | AD    | AD        | 41   | 10  | 10    | 10        |
| 00176 | 20  | AA    | AA        | 41   | 10  | 10    | 10        |
| 00177 | 30  | AF    | AF        | 41   | 10  | 10    | 10        |
| 00178 | 40  | AC    | AC        | 41   | 10  | 10    | 10        |
| 00179 | 50  | A9    | A9        | 41   | 10  | 10    | 10        |
| 00180 | 60  | 9E    | 9E        | 41   | 10  | 10    | 10        |
| 00181 | 70  | 9B    | 9B        | 41   | 10  | 10    | 10        |
| 00182 | 80  | 98    | 98        | 41   | 10  | 10    | 10        |
| 00183 | 90  | 9D    | 9D        | 41   | 10  | 10    | 10        |
| 00184 | A0  | 9A    | 9A        | 41   | 10  | 10    | 10        |
| 00185 | B0  | 97    | 97        | 41   | 10  | 10    | 10        |
| 00186 | C0  | 94    | 94        | 41   | 10  | 10    | 10        |
| 00187 | D0  | 91    | 91        | 41   | 10  | 10    | 10        |
| 00188 | E0  | 8E    | 8E        | 41   | 10  | 10    | 10        |
| 00189 | F0  | 8B    | 8B        | 41   | 10  | 10    | 10        |
| 00190 | 00  | 88    | 88        | 41   | 10  | 10    | 10        |
| 00191 | 10  | 85    | 85        | 41   | 10  | 10    | 10        |
| 00192 | 20  | 82    | 82        | 41   | 10  | 10    | 10        |
| 00193 | 30  | 87    | 87        | 41   | 10  | 10    | 10        |
| 00194 | 40  | 84    | 84        | 41   | 10  | 10    | 10        |
| 00195 | 50  | 81    | 81        | 41   | 10  | 10    | 10        |
| 00196 | 60  | 7E    | 7E        | 41   | 10  | 10    | 10        |
| 00197 | 70  | 7B    | 7B        | 41   | 10  | 10    | 10        |
| 00198 | 80  | 78    | 78        | 41   | 10  | 10    | 10        |
| 00199 |     |       |           |      |     |       |           |



**Listing 3 — User defined graphics**

```

10 CLS
20 LET A=96 'ASCII code of character to define.
30 DATA 76,112,77,88,112,84,93
40 ' data to define character (see table 1).
50 GOSUB 100 ' call user define routine.
60 PRINT"This is the character":PRINT"you defined: ";CHR$(A)
70 END
90 '
100 'define character
110 IF A<96 OR A>127 THEN PRINT"CHR$(":A:") OUT OF RANGE":STOP
115 A=INT(A)
120 AD=PEEK(160)*256+PEEK(161)+496+7*(A-96)
130 FOR N=AD TO AD+6
140 READ D
150 POKE N,D
160 NEXT
170 RETURN

```

**Listing 4**

```

10 DEF FNP(P)=PEEK(48600+352*INT(P/32)+P)
20 'replace PEEK(48400+P)
30 'lower case characters return code of upper case equivalents'
40 '
50 CLS
55 FOR I=0 TO 1
60 FOR N=12 TO 255
70 PRINTN+1*224,CHR$(N);
80 PRINT0,USING"###";FNP(N+1*224);
90 FOR E=1 TO 50:NEXT
100 NEXT
110 PRINTCHR$(28);
120 NEXT

```

**Listing 5 — Demonstration of plotting coloured circles in MODE 24**

```

10 'circle routine
20 'MODE MODE 24
30 '
40 CLS
50 R0=8:VC=0 'centre of circle
60 FOR C=1 TO 8 'colours
70 R=R0-R*C 'radius
100 '
110 'circle routine
120 FOR N0=N-R TO N+R
130 R0=SQS(R*R-SC*SC)
140 IF ABS(R0-0.1) > 0 THEN GOSUB 120
150 R=VC+R0/4:Y=VC-0.5*SC*SC/R0
160 R=VC+R0/4:Y=VC+0.5*SC*SC/R0
170 GOTO 100
180 NEXT
190 NEXT
200 END
210 '
220 FOR N=R0 TO R0 STEP 4*SC*SC/32-0.1
230 X=SC+R0/4:Y=SC-R0*SC/32
240 X=SC+R0/4:Y=SC+R0*SC/32
250 NEXT
260 RETURN
270 '
280 'Max R0=511, Y0=191, C10=8
290 IF X0 OR Y0 OR X10 OR Y10 OR C10 OR C11 THEN GOTO 110
300 AD=48600+INT(1/31*255*(N)*43)
310 B=PEEK(AD)
320 IF B(127 THEN B=128
330 IF C=8 THEN B=8 AND (4870-1*(C1-10 AND 1))-(2000-134)
340 B=B AND 128
350 B=B OR (255-(1)-1)
360 B=B OR (Y-C1-10 AND 1)
370 POKE AD,B
380 RETURN

```



# Listing 8 — Demonstration

```
10 CLS
20 US=CHR$(39)
30 IS=CHR$(28)
40 PRINT" Upper and lower case test."
50 PRINT
60 PRINT" ";US;"Underlining";US
70 PRINT
80 PRINT" ";IS;"Inverse video";IS
90 PRINT
100 PRINT" Special characters: ";CHR$(96);
110 FOR N=123 TO 127:PRINTCHR$(N);:NEXT
120 PRINT:PRINT
130 PRINT" And all 8 colours ";
140 FOR N=0 TO 7:PRINTCHR$(114+16*N);:NEXT
150 PRINTCHR$(128)
160 PRINT
```

Table 1 — Poke Numbers for user-defined graphics

|       |     |     |     |     |     |     |     |
|-------|-----|-----|-----|-----|-----|-----|-----|
| 00000 | 96  | 96  | 96  | 96  | 96  | 96  | 96  |
| 00001 | 74  | 74  | 74  | 74  | 93  | 92  | 92  |
| 00010 | 124 | 105 | 126 | 0   | 126 | 105 | 124 |
| 00011 | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| 00100 | 65  | 84  | 84  | 84  | 84  | 84  | 84  |
| 00101 | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| 00110 | 0   | 0   | 0   | 115 | 0   | 0   | 0   |
| 00111 | 93  | 0   | 0   | 0   | 0   | 0   | 93  |
| 01000 | 126 | 104 | 124 | 0   | 124 | 104 | 126 |
| 01001 | 0   | 68  | 68  | 68  | 68  | 68  | 0   |
| 01010 | 99  | 99  | 116 | 86  | 86  | 99  | 99  |
| 01011 | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| 01100 | 112 | 122 | 122 | 123 | 122 | 122 | 112 |
| 01101 | 0   | 0   | 0   | 84  | 0   | 0   | 0   |
| 01110 | 120 | 94  | 106 | 120 | 106 | 0   | 120 |
| 01111 | 0   | 100 | 0   | 131 | 0   | 0   | 0   |
| 10000 | 76  | 76  | 76  | 76  | 76  | 76  | 76  |
| 10001 | 85  | 85  | 85  | 85  | 85  | 85  | 87  |
| 10010 | 0   | 112 | 112 | 112 | 112 | 112 | 0   |
| 10011 | 0   | 0   | 0   | 71  | 0   | 101 | 101 |
| 10100 | 0   | 102 | 75  | 0   | 75  | 0   | 0   |
| 10101 | 0   | 0   | 77  | 77  | 64  | 64  | 0   |
| 10110 | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| 10111 | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| 11000 | 0   | 0   | 0   | 108 | 108 | 0   | 0   |
| 11001 | 101 | 101 | 0   | 0   | 0   | 0   | 0   |
| 11010 | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| 11011 | 0   | 77  | 99  | 0   | 99  | 87  | 0   |
| 11100 | 91  | 0   | 0   | 0   | 0   | 0   | 91  |
| 11101 | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| 11110 | 66  | 0   | 117 | 69  | 0   | 106 | 66  |
| 11111 | 69  | 0   | 123 | 107 | 125 | 0   | 69  |

Table 2 — control codes

```
CHR$( 27 ) -
Return to normal
(mode24) test
screen
CHR$( 28 ) -
Inverse / true video
toggle
CHR$( 29 ) -
Underline on/off
toggle
CHR$( 30 ) -
Green / amber screen
toggle
```

| Table 3 — code for Fh(F) |     |        |         |
|--------------------------|-----|--------|---------|
| CHR\$                    | CHR | normal | inverse |
| 32                       |     | 96     | 32      |
| 33                       | !   | 97     | 33      |
| 34                       | "   | 98     | 34      |
| 35                       | #   | 99     | 35      |
| 36                       | \$  | 100    | 36      |
| 37                       | %   | 101    | 37      |
| 38                       | &   | 102    | 38      |
| 39                       | '   | 103    | 39      |
| 40                       | (   | 104    | 40      |
| 41                       | )   | 105    | 41      |
| 42                       | *   | 106    | 42      |
| 43                       | +   | 107    | 43      |
| 44                       | ,   | 108    | 44      |
| 45                       | -   | 109    | 45      |
| 46                       | .   | 110    | 46      |
| 47                       | /   | 111    | 47      |
| 48                       | 0   | 112    | 48      |
| 49                       | 1   | 113    | 49      |



| continued |     |        |         | 74  | J | 74  | 10 | 101 | e | 69 | 5  |
|-----------|-----|--------|---------|-----|---|-----|----|-----|---|----|----|
| CHR4      | CHR | Normal | inverse | 75  | K | 75  | 11 | 102 | f | 70 | 6  |
| 50        | 2   | 114    | 50      | 76  | L | 76  | 12 | 103 | g | 71 | 7  |
| 51        | 3   | 115    | 51      | 77  | M | 77  | 13 | 104 | h | 72 | 8  |
| 52        | 4   | 116    | 52      | 78  | N | 78  | 14 | 105 | i | 73 | 9  |
| 53        | 5   | 117    | 53      | 79  | O | 79  | 15 | 106 | j | 74 | 10 |
| 54        | 6   | 118    | 54      | 80  | P | 80  | 16 | 107 | k | 75 | 11 |
| 55        | 7   | 119    | 55      | 81  | Q | 81  | 17 | 108 | l | 76 | 12 |
| 56        | 8   | 120    | 56      | 82  | R | 82  | 18 | 109 | m | 77 | 13 |
| 57        | 9   | 121    | 57      | 83  | S | 83  | 19 | 110 | n | 78 | 14 |
| 58        | a   | 122    | 58      | 84  | T | 84  | 20 | 111 | o | 79 | 15 |
| 59        | b   | 123    | 59      | 85  | U | 85  | 21 | 112 | p | 80 | 16 |
| 60        | c   | 124    | 60      | 86  | V | 86  | 22 | 113 | q | 81 | 17 |
| 61        | d   | 125    | 61      | 87  | W | 87  | 23 | 114 | r | 82 | 18 |
| 62        | e   | 126    | 62      | 88  | X | 88  | 24 | 115 | s | 83 | 19 |
| 63        | f   | 127    | 63      | 89  | Y | 89  | 25 | 116 | t | 84 | 20 |
| 64        | g   | 64     | 0       | 90  | Z | 90  | 26 | 117 | u | 85 | 21 |
| 65        | A   | 65     | 1       | 91  | [ | 91  | 27 | 118 | v | 86 | 22 |
| 66        | B   | 66     | 2       | 92  | \ | 92  | 28 | 119 | w | 87 | 23 |
| 67        | C   | 67     | 3       | 93  | ] | 93  | 29 | 120 | x | 88 | 24 |
| 68        | D   | 68     | 4       | 94  | ^ | 94  | 30 | 121 | y | 89 | 25 |
| 69        | E   | 69     | 5       | 95  | _ | 95  | 31 | 122 | z | 90 | 26 |
| 70        | F   | 70     | 6       | 96  | ` | 96  | 0  | 123 | + | 91 | 27 |
| 71        | G   | 71     | 7       | 97  | a | 97  | 1  | 124 | = | 92 | 28 |
| 72        | H   | 72     | 8       | 98  | b | 98  | 2  | 125 | - | 93 | 29 |
| 73        | I   | 73     | 9       | 99  | c | 99  | 3  | 126 | _ | 94 | 30 |
|           |     |        |         | 100 | d | 100 | 4  | 127 | ! | 95 | 31 |

[illegible]







2000

\*Information on the availability of individual components can be obtained by contacting the following:

**Keywords:** child sexual abuse; disclosure; self-blame; social support

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# Quick CLS

*A Daniel clears semigraphics the fast way with machine code.*

THIS LITTLE programme is a simple machine code routine that can quickly clear any part of the low or high resolution screens or even the semigraphics screen which can only be cleared very slowly in Basic.

It is really a "must" for all basic users and no knowledge of machine code is required except, as with all machine code programmes you must save it before you try it as a typing mistake may cause an irretrievable crash.

You do, however, need to know the memory addresses of the screen locations. To remind you, the low resolution screen starts at 1024 and continues through 5414 to 6553. The High Res. screen starts at 16384 and uses a variable address number of pages according to the mode (see Manual), each page containing 1638 locations. The semigraphics 24 screen starts at 1024 and ends at 7679.

The listing below gives a free running

demonstration of blocks of colour being placed on areas of high res. and low res. screens on which a much slower basic pattern has been drawn. The semigraphics 24 screen is then cleared completely and a blue squiggle added to prove that it really is semigraphics! However I hope you will have realized by now that the potential of this routine is enormous.

To incorporate the first half of the listing in your own programme you must give values to 3 variables — S1, S2 and S3 as in the PBASIC line 50. S1 is the start address of the area to be cleared and must not be less than 1024. S2 is the end address of the area and S3 is the clearing colour. Of course you must also set up the mode and screen for high res. graphics or poke the appropriate numbers (as in line 346) for semigraphics.

To produce a uniform colour in lines, or semigraphics you can just enter the normal number (0-8) of the colour you require as the variable S3 in line 55. In highres, any number bet-

ween 0 and 255 will produce screen patterns but only 8 numbers will give uniform shades. These are 0 which produces the normal background colour, 255 - the normal foreground, and 85 and 193 which give the two remaining colours. The other two numbers 167 and 238 produce a composite colour which on my television set will give as a useful 50% shade! When using high res. (or if you wish to make patterns on low res.) you must delete lines 80 and 180 as otherwise the value of S3 will be corrupted.

The machine code pokes are contained in a subroutine so the programme proper ends at line 50. You can go from here to whenever you want and to operate the clearing just write EXOC50000.

If your programme needs a lot of string space increase the 200 in line 10. If you are using other machine code routines you may wish to lower the 20000 figure in line 10 or alter the start address in line 50.

```
30 REM INPUT ENTER START POINT, END P
G=INT, COLOUR (S1,S2,S3
40 GOSUB888
50 GOTO330
60 A=38888
70 IF S=1 THEN 110
80 IF S=2 THEN S3=1 ELSE S3=52810
90 IF S3=128 THEN S3=128: REM THIS L1
NE AND LINE 188 NOT REQUIRED IN HIGH RES
. MODES. VALUES FOR S3 CAN BE FOUND IN L
INE 230
100 S3=S3+127
110 POKEA,S388
120 IF S1=S2 AND S1=1823 AND S2=1823 A
ND S1=7681 AND S2=7681 THEN GOSUB188 CLS
E POKEA+1,B#0:POKEA+2,B#0: POKEA+3,B#0
5: POKEA+5,B#0
130 POKEA+3,B#85
140 POKEA+4,S3
150 POKEA+5,B#0: POKEA+6,B#85: POKEA+
7,B#85
160 POKEA+8,B#85: POKEA+11,B#F5: POKE
A+12,B#33
170 RETURN
180 S3=INT(S1/255): S8=S1-S3*255
190 S2=INT(S2/255): S8=S2-S2*255
200 POKEA+1,S3: POKEA+2,S8: POKEA+3,S3
POKEA+5,S8
210 RETURN
220 REM THIS IS A DEMONSTRATION ONLY:
TO CONSTRUCT YOUR OWN PROGRAMME YOU CAN
```

```
QUIT ALL THE FOLLOWING LINES
230 S4=80+8*54(1+85+54(2))-170: S4(3)=
187: S4(4)=238: S4(5)=235
240 D=0: ON D GOSUB348,318,358
250 GOSUB68
260 EXOC50000
270 IF S=3 THEN FOR J=1 TO 1823: NEXT J
FOR J=3888 TO 6553 STEP 33: POKEJ,175:
NEXT
280 FOR J=1 TO 1823: NEXT
290 IF S=3 THEN D=8:PRINT#180,"THAT WA
S SEMIGRAPHICS 24": FOR J=1 TO 1823: NE
XT
300 GOTO348
310 CLS:FOR B=288 TO 323: PRINT#88,C#B
END(223)+S8:1: NEXT B
320 S1=1184: S3=1530: S3=END(3)-1
330 RETURN
340 PHOC3,1= SCREEN1,8: PCLS
350 FOR B=1 TO 15: CIRCLEEND(158)+198,
END(128)+S81,END(48),R#S3+1: NEXT
360 S1=1530: S3=5888
370 S3=S4(S3): S3=S3+1: IF S3=5 THEN S
3=0
380 RETURN
390 POKE54473,8: POKE54475,1: POKE5447
7,1
400 FOR J=1 TO 1823: NEXT
410 S1=1824: S2=7679: S3=END(3)-1
420 RETURN
```



# Expert's Arcade Arena

Write to 'The Expert' at Dragon User  
12-13 Little Newport St, London WC2H 7PP,  
with all your arcade tips and hints.

JUST a shortish column this month because of its accompaniment, yes, for those of you newly acquainted with the term, masterpiece, here's a map of the opening section of *Coptic Smash*, together with some VERY helpful advice. Trust and enhance chances of getting past that line that goes up and down ONLY THREE GUINIS need be taken out. They are marked on the Map as 1, 2, and 3 for pretty obvious reasons. Can one must be taken out to enable a 100% success rate on take off if one should be while trying to take-out pairs two and three. These are the pairs that hinder you while trying to get past the up and down things!! Right, that's the diagram explained, now then, who'd care to send me a map of the second stage. Plus a few tips on how to get there!!

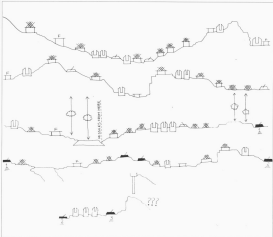
The winner of the "Who is the Expert?" Competition this month is a certain Andrew McLaughlin from Woking in Surrey, who suggests that I am in fact Brian of Nazareth. Nice try Andy, wrong, but a nice try, and your prize number three, two abstract and one material. Firstly, two pieces of totally

worthless but sensible pieces of advice... 1) Keep away from girls with spiky hair! and 2) Stop watching so much Monty Python. And your material Prize, which you should have received about a month ago, is a Photograph, taken by my own fair hand, of a clump of grass from my back garden. I know, words tell you, you've been wondering who sent you that Photo for about a month haven't you?

Now then, some games news... Smithsonian are producing a game called *Frankie* about which I shall reveal no more but looks like being very good indeed. Keep reading this column for more news. New release from Microdeal soon looks like being a version of *BoulderDash*, with 28 screens (I think), a random choice (a-la *Screening Adoles*), and some wicked screens involving slime; this one looks like a must!

Your letters are still arriving, by the crate load, oh yes, and by the way, the Luminous pen crisis is getting beyond a joke!! This month I have received two letters in Luminous Pen from a Helen Marsdon in

Canterbury, and an Andrew Ridgely in Wales (surely not the Andrew Ridgely I saw at Andrew Wise Guy Yellow Pen Ridgely and Helen Hymphreusiac (you should read her letter — I'll send a copy to the first person who... no, what am I thinking about?) Pink Pen Marsdon, I've informed Norman Bates of your addresses and he'll be round for your conservative party membership fees very soon... Heh Heh Heh. Anyway, your letters, a cry from one Peter Martin from Llanvachin, "Dear Expert, please provide a map for at least the start of *Coptic Smash* as I think this would be a great help to many people" — Another say I never answer requests! — and also have you got around to maps for *Fantasy Rider* and *Brick's Kingdom* yet? — These I leave to you dear reader(s)! — "Please, some help with *GoAuto*" — "In working and!" — "Finally, to explain how you convinced that this is the part of the magazine I am to find... You should be allocated a lot more space! Do you write for any other magazines?" — No! — "Please, keep up the great work!" Thank you and good night!





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

## Dragon Answers

### Baud rate

I AM thinking of buying a Modem, but want to know if I would need a Dragon 64 as I only have a 32 at the moment. Could you explain baud rate and Modem bits when used with modems?

S.J. Scofield  
17 Oakdale Rd  
Downend  
Bristol

MOST modems talk to the computer via an RS232C serial interface which is built in on the 64 but not on the 32. Therefore, you either need to buy a new Dragon 64 or get one of the many RS232C cartridges available for your 32. Some company's such as Commodore and Petabyte will sell you an all in one package consisting of modem, RS232C cartridge and software ready to run.

The 'baud rate' is the speed at which data is sent down the serial interface. It's actually the number of times the signal line changes state in a second, but is often simply referred to as the number of bits sent per second.

Start bits are special bits sent before a byte of data to 'wake up' the computer at the other end and allow it to synchronise to the incoming data. stopbits simply inserts a gap between bytes of data and are sent after a byte of data.

### Keyboard

I HAVE a Dragon 32 and my problem is that I don't use the keyboard. They say the CLEAR, ENTER and SHIFT keys. Can you tell me what's wrong and how to mend it?

R. Hardy  
16 Grosvenor  
Museum  
Glasgow  
Glasgow W10 5JN

YOUR problem is almost certainly caused by a failing keyboard unit, controlled by the CPU or other components. The keys you mention (plus the BREAK key which you'll probably find doesn't work either) are all on the same input line from the keyboard



matrix and so are likely to fail together. This means that the keyboard 'keys' are probably fine and there is simply a loose connection between keyboard and ribbon cable or ribbon cable and CPU board.

Alternatively, try contacting one of the repair services found on the pages of Dragon User for a quote on a new keyboard — you should be able to fit this yourself.

### Music

I AM in the process of writing a game on my Dragon 64 and would like to know if it is possible to produce 'Interrupt Driven Music'. I know this is possible on the Commodore, Amstrad etc., but they have a different hardware.

Paul Nicholson  
Stokeley  
Ponsonby

THE DRAGON is certainly not famous for its tremendous sound capabilities, this is due to the fact that unlike almost every other decent home computer it does not contain a dedicated sound chip. Hence, when the Dragon wants to make a noise the 6809 must do all the work and cannot do anything else.

Therefore, it is not possible to produce true 'interrupt' sound. However, one huge used in some games (the Microsoft's 'Crazy Painter') is to have a routine which produces very short 'beeps' and call this routine from within the main game loop. You're limited to up tempo music but the results can be quite effective.

### Sequel

THE OTHER day I was playing a game called 'The Ring of Darkness' on a friend's machine. He said he had had the game for a couple of years, now I am interested in buying the game but I can't find where to buy it. Could you tell me who produces the game and where I can get it from?

Ryan Allison  
27 St. Marys Park  
Crowth  
Lincs LN11 3GF

THE RING of Darkness was produced by Winterson who have since released the sequel called 'Return of the Ring'. Both can still be obtained direct from Winterson at 38 Uplands Park Road, Enfield, Middlesex, priced at £8.99 each.

### Stacked

I AM in the process of writing an assembler for Basic for my Dragon 32. The program is menu driven and I want a 'status' mode available, where the status of the flags register is shown.

The problem is where is the 'CC' stored? My reference manual says it is stored on the stack, but any attempt to push the CC will result in a different address.

Martin Owen  
43 Church Road  
Crowth  
Crowth

IGATHER from your problems regarding the 'CC' (condition codes) register that you are actually writing a dis-

assembler rather than an assembler. The CC register is internal to the 6809 and is not 'stored' in memory at any physical address. You can access it in machine code by pushing it onto the stack with a PUSH CC command and getting it back into the accumulator with a PULS A command, followed by STA to store it in memory.

Of course, the CC is not relevant to a disassembler anyway and would only be referred to by a 6809 simulator which would be rather difficult to run in BASIC.

### Sorting

I HAVE written a Mailing Address program for my Dragon with disc drive. It has many functions such as word search and list all addresses of same type etc. The problem I have is with sorting. The only way I know of sorting a file is to load it all into memory, sort it and rewrite it disc. This limits the number of records to around 200 (there's a way of being able to sort the file without having this limitation).

Robin Smart  
40 Chaucer House  
Chaucer Gardens  
Barton  
Surrey

THE solution to your problem seems to be to use random access files rather than load all the data into memory at once. You'll need to use the FREAD and FWRITE commands and decide on a fixed record length (108 characters should cover the longest name and address). There is a particular record 'N' in the file can be retrieved into A0 using:

```
FREAD "FILENAME",A0  
N-1/108,  
FOR 128,65
```

Most sort routines include lines to compare two strings and, if necessary, swap the two strings. All you need to do is read in the current records from disc before the comparison is made and write them back out if they are swapped over (you could use the SWAP command for this).





**ROLL UP** roll up, roll up, get your free-solution here folks, guaranteed, non-faltering and with no harmful additives. As there's no adventure which causes more questions in my mailing than *Winterspell's* *Juxtaposition*, I've decided it's about time to give a solution to the game, as it's been out long enough now for this not to spoil the adventure so much—being a solution, I have to print everything forwards rather than backwards, so I suggest you read only as far as the point you've reached in the adventure and see how to get past the problem there that's stumping you. If you read further and see something you didn't ought to, then you're only got yourself to blame.

Several readers have sent in solutions and part-solutions to this game, and thanks in particular to Richard Head of Manchester for his notes, but the one that was most detailed, being a step-by-step guide, came from adventure connoisseurs, Simon Hargrave of Gloucestershire, thanks to Simon then for the following, though note that you'll still need to map out the various areas.

#### In Baron White's City

Look at the bed and get everything, then left-to-blue and red sheets together to make a rope, press button on telephone to unlock door, wait till the droid is going away then open the door and get in-e-v-e-n-t-o the cat. Tie the rope to the cat and go down. Get the sleeping pits from the table and go to the shower rooms. **LOOK TAP and TURN UP** then wait for the droid to arrive and short-circuit it. Get the blue keycard out. Leave via the door, go to-a-a-a-a, untie the door and go down to ground level. Go to the elevator platform (don't go into the endless eye cone!), wait for the car and board it when the doors open. Get the camera from the photo gallery. Only take the food from the droider droid when you need to eat. Go to the ante-room and put the sleeping pits in the caretaker's coffee. Get the white key card and the cup from the caretaker and unlock the door. Get the beeper mask, sticky tape and soldering iron. Go back to the silver area and wear the mask to enter the antechamber. When outside drop all but the mask, overalls, white ID tag and white key card. Though you'll need to return for some items later. Go to Baron White's fort.

#### To Enter a Building

To do this you need to be exactly at the landing, i.e. standing so that you cannot

see it no matter which way you look, and then type **ENTER**.

#### Eating

At any time when you need to eat, enter a city and get the food from the food droid simply by asking it.

#### Nightfall

When night falls enter the reprint building and consume strength this way. Night falls every twenty pages.

#### In Baron White's Fort

Give the white key card to Baron, take the red ID tag and go to Baron Red's fort.

#### In Baron Red's Lands

Get the brown ID tag from Baron Red's fort, then go to the shaft which contains the mine. Mine the eight-eye droid by using the camera, take his space and go through the door. Dig for the red catfish. Take the one to Baron Red and he will give you the green ID tag. Go to Baroness Green's fort.

#### In Baroness Green's Lands

Go to the fort and get the inner tube from the shelf. Repair it with the sticky tape. Go to a power pyramidal and open the valve, then inflate the inner tube. Go to Baroness Green's fort.

#### In Baroness Brown's Lands

Go to the fort, then go north-east to a shaft by the mountains. Wear the inner tube and swim the river. Get the dead cat from the skeleton and use the sender to go to Baroness Brown's fort.

#### In Baroness Green's Lands

Get the totes, then go the minerals and use the sender unit to escape. Give the minerals to Baroness Green in exchange for the blue ID tag. Go back to the river in Baroness Brown's lands and cross the river to Baron Blue's lands.

#### In Baron Blue's Lands

Go to the fort and get the thief. Go to the green river in Blue's lands and repair the panel with the soldering iron and the flux. Load the camera with the film and photograph the VDU message. Take this to Baron Blue for the yellow ID tag.

#### In Baron Yellow's Lands

Go to the fort and get the vacuum box. Go to the power pyramidal, which has a shut-off droid. Wear the overalls, mask and cyborgnet. Carry the vacuum box and descend the shaft. Get the phoenix egg from beside the lava stream and put it in the vacuum box. Go back to Baron Yellow and give him the egg in exchange for the pink ID tag.

#### In Baroness Pink's Lands

Go to the Hydroponics Dome, wear the magnetic boots and go up the ventilator shaft and get the olive the cup. Get the seed from behind the panel. Oil the rusty droid and ask him to go west then unlock the door. Go to Baroness Pink's fort and get the seedkiller then go through the door which the droid unlocked. When you are entered by the weeds then spray them with the weedkiller. Plant the seed in the ground. Take the orchid to Baroness Pink in exchange for the black ID tag.

#### In Baroness Black's Lands

Go to the fort, open the door and diffuse the bomb by pressing the buttons in order: blue-red-green-red-blue. Take the sheet of music and give it to the music droid, whereupon he will play the musical notes which unlock the door. Enter the room containing the Juxtaposition! Do what the sign on the wall says and type **SPELL**.

#### Congratulations!

At least this is what you should now be told, along with the information that the adventure will be continued in Part II, *The Keeper of Dune*. You remember Part Two, it was the one that was going to be released by Easter, Easter 1990, that is, never mind, I'm sure it will be with us eventually, and very welcome to, judging by the numbers of people who want to have bought *Juxtaposition*.

The above solution, incidentally, isn't the only way of solving the game, as obviously there are a few things that can be done in different orders, so don't write in and say that your solution is better! On the other hand, if you can explain where the bones fog is, which a member asked about in the April issue of *Dragon* User, but which Simon 'The Solver' Hargrave couldn't find anywhere, then by all means write in and tell us.

Simon is contactable at Chawley Hill Farm, Iley, Dudley, Glos. GL11 5BN, and he also has lots of information to add to last month's details about *Masterpigs* and the *Minotaur*, where he's trying to get his score up from 210 to the maximum 240. He advises against using the save routine as this only saves your current location and not your character status, as well as apparently rendering the 'alchemy' ineffective against the hydra.

And that's it—that's all I could!



# Adventure Contact

**Adventure: Return of The Ring.** Problems: How to bind the six units for the time ring? How to use the copper ring, tacker, money sack and white pass? Name: Philip Callaghan, Address: 16 Penrhyn Road, Moss Pt, Staines, Staffs ST17 9EY.

**Adventure: Williamsburg 3.** Problems: Has anyone got a map? I need one. Name: Colin Mills, Address: 34 Leabank Drive, Northwick, Worcester WR10 7TA, Adventure: Roman Faction Problems: I need help. Name: Stuart Scott, Address: 65 Ventnor Crescent, Melton Mowbray Leics LE13 3LN.

**Adventure: 3/5/8/10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100/101/102/103/104/105/106/107/108/109/110/111/112/113/114/115/116/117/118/119/120/121/122/123/124/125/126/127/128/129/130/131/132/133/134/135/136/137/138/139/140/141/142/143/144/145/146/147/148/149/150/151/152/153/154/155/156/157/158/159/160/161/162/163/164/165/166/167/168/169/170/171/172/173/174/175/176/177/178/179/180/181/182/183/184/185/186/187/188/189/190/191/192/193/194/195/196/197/198/199/200/201/202/203/204/205/206/207/208/209/210/211/212/213/214/215/216/217/218/219/220/221/222/223/224/225/226/227/228/229/230/231/232/233/234/235/236/237/238/239/240/241/242/243/244/245/246/247/248/249/250/251/252/253/254/255/256/257/258/259/260/261/262/263/264/265/266/267/268/269/270/271/272/273/274/275/276/277/278/279/280/281/282/283/284/285/286/287/288/289/290/291/292/293/294/295/296/297/298/299/300/301/302/303/304/305/306/307/308/309/310/311/312/313/314/315/316/317/318/319/320/321/322/323/324/325/326/327/328/329/330/331/332/333/334/335/336/337/338/339/340/341/342/343/344/345/346/347/348/349/350/351/352/353/354/355/356/357/358/359/360/361/362/363/364/365/366/367/368/369/370/371/372/373/374/375/376/377/378/379/380/381/382/383/384/385/386/387/388/389/390/391/392/393/394/395/396/397/398/399/400/401/402/403/404/405/406/407/408/409/410/411/412/413/414/415/416/417/418/419/420/421/422/423/424/425/426/427/428/429/430/431/432/433/434/435/436/437/438/439/440/441/442/443/444/445/446/447/448/449/450/451/452/453/454/455/456/457/458/459/460/461/462/463/464/465/466/467/468/469/470/471/472/473/474/475/476/477/478/479/480/481/482/483/484/485/486/487/488/489/490/491/492/493/494/495/496/497/498/499/500/501/502/503/504/505/506/507/508/509/510/511/512/513/514/515/516/517/518/519/520/521/522/523/524/525/526/527/528/529/530/531/532/533/534/535/536/537/538/539/540/541/542/543/544/545/546/547/548/549/550/551/552/553/554/555/556/557/558/559/560/561/562/563/564/565/566/567/568/569/570/571/572/573/574/575/576/577/578/579/580/581/582/583/584/585/586/587/588/589/590/591/592/593/594/595/596/597/598/599/600/601/602/603/604/605/606/607/608/609/610/611/612/613/614/615/616/617/618/619/620/621/622/623/624/625/626/627/628/629/630/631/632/633/634/635/636/637/638/639/640/641/642/643/644/645/646/647/648/649/650/651/652/653/654/655/656/657/658/659/660/661/662/663/664/665/666/667/668/669/670/671/672/673/674/675/676/677/678/679/680/681/682/683/684/685/686/687/688/689/690/691/692/693/694/695/696/697/698/699/700/701/702/703/704/705/706/707/708/709/710/711/712/713/714/715/716/717/718/719/720/721/722/723/724/725/726/727/728/729/730/731/732/733/734/735/736/737/738/739/740/741/742/743/744/745/746/747/748/749/750/751/752/753/754/755/756/757/758/759/760/761/762/763/764/765/766/767/768/769/770/771/772/773/774/775/776/777/778/779/780/781/782/783/784/785/786/787/788/789/790/791/792/793/794/795/796/797/798/799/800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000/1001/1002/1003/1004/1005/1006/1007/1008/1009/1010/1011/1012/1013/1014/1015/1016/1017/1018/1019/1020/1021/1022/1023/1024/1025/1026/1027/1028/1029/1030/1031/1032/1033/1034/1035/1036/1037/1038/1039/1040/1041/1042/1043/1044/1045/1046/1047/1048/1049/1050/1051/1052/1053/1054/1055/1056/1057/1058/1059/1060/1061/1062/1063/1064/1065/1066/1067/1068/1069/1070/1071/1072/1073/1074/1075/1076/1077/1078/1079/1080/1081/1082/1083/1084/1085/1086/1087/1088/1089/1090/1091/1092/1093/1094/1095/1096/1097/1098/1099/1100/1101/1102/1103/1104/1105/1106/1107/1108/1109/1110/1111/1112/1113/1114/1115/1116/1117/1118/1119/1120/1121/1122/1123/1124/1125/1126/1127/1128/1129/1130/1131/1132/1133/1134/1135/1136/1137/1138/1139/1140/1141/1142/1143/1144/1145/1146/1147/1148/1149/1150/1151/1152/1153/1154/1155/1156/1157/1158/1159/1160/1161/1162/1163/1164/1165/1166/1167/1168/1169/1170/1171/1172/1173/1174/1175/1176/1177/1178/1179/1180/1181/1182/1183/1184/1185/1186/1187/1188/1189/1190/1191/1192/1193/1194/1195/1196/1197/1198/1199/1200/1201/1202/1203/1204/1205/1206/1207/1208/1209/1210/1211/1212/1213/1214/1215/1216/1217/1218/1219/1220/1221/1222/1223/1224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# Adding Anagrams

*Gordon Lee takes a number of letters and sums them up.*

IN THE letters section of the July issue of *Dragon User*, reader Denis O'Malley (who describes himself as an avid fan of the competition page (Thanks, Denis!), asks for further details regarding the correct method to be used in solving the competition problems.

From time to time on the competition page, general remarks on problem-solving — either generally or related to specific problems — have been given. Readers with back numbers will be able to check these out; readers without — tough luck!

Some historical problem-solving were given in the January '84 issue, and points relating to some specific competition questions were outlined in the February '84 and October '84 issues. The June/July competition pages contained information on competitions involving large numbers of digits. The November '85 page had some digital forecasts, while problem solving by the use of algorithms was covered in the March '86 *Dragon User*.

The *Dragon*, in common with other computers has its own specific peculiarities which can result in errors creeping in if precautions are not taken during programming. In May '84, exponential notation was mentioned, while problems of mathematical accuracy, another unexpected feature of the *Dragon*'s DTRM, commented were noticeable September '84 issue. Some general comments on the pitfalls associated with the use of the trigonometric and random number functions appeared in the January '85 and June '86 issues respectively.

Mr O'Malley's term 'correct method' is a tougher nut to crack, since there may well be a number of different ways of reaching the correct answer and, as long as that answer is the correct one, which is the correct method? In one recent competition, the program listings included by competitors ranged from one or less than half a page at one extreme, to a sixfold long program at the other! No doubt both were 'correct' in that they produced the required answer, but the one was certainly more concise than the other. Perhaps, as a rule of thumb, a program which provides the correct answer, and in which the total programming time and running time is the shortest, should be regarded as the best.

Achieving this is really a matter of knowing your computer, and being aware of any short cuts which can speed up running times without affecting accuracy. This is best gained by experience, and in this respect I would recommend attempting the weekly competition which appears in *Dragon User*'s sister paper, *Popular Computing Weekly*. The solutions, and a working listing are usually given, so even if readers do not actually submit solutions, they can

always use these problems as tests of technique.

For readers who wish to delve more deeply into the field, I would recommend *Adventures with your Computer* by Lemnart Flade and David Nelson (Penguin Books). And how to this month's competition: Professor Otto Hex was dining with two of his colleagues, Professor Bumble, the famous multi-logologist, and the mathematician Dr Brown.

"I remember you saying," muttered Hex to Bumble, "that you once remarked that an anagram of Elgar was 'negal', an apt description of much of that composer's work. Well, I've found some more anagrams and have constructed them into an alphabetic puzzle."

He passed a slip of paper to Dr Brown on which was written:

ELGAR  
REGAL  
LARGE

## Prize

In keeping with the high intellectual tone set by our competitors, this month's prize-winners will each receive a copy of *Boulder Chess*, by Mike Computer Games, of whom our reviewer said "It is really unfair of you to send me a game ... that I spend so much time playing it I don't get round to solving it!" and, further, "the slower ... Oh god, the slower!"

So get calculating for one of those twenty slower chesses. One clue: the answer is not LULLS.

## Rules

Send all your answers, accompanied by a printout, or a handwritten copy, of the program you used to calculate it. Occasionally, please, please mark the envelope OCTOBER COMPETITION to ensure it arrives at the right drawer, and remember send all the envelopes to include your name and address — if you must put it in the printout, how about upper case?

Remember you have so brilliant, we need a crushingly thrillingly slower first out the final twenty. This month's phrase is "Look out for falling rocks, but don't worry ...". Complete that in any way you like — we might like it too.

## July Winners

All who are entered here will receive a copy of our title *Moore Chess*, by Incentive Software: Simon Aubrey of Winton, A Russell of Clevedon, Michael Graham of Mangan, D. J. James of Swansea, J. Leyland of Gwent, M. J. Bennett of Kingskerswell, Mike Hales of Sheffield, Nils Lindgren of Sweden, Robert Margrave of

## LARGER GLASS

"It's a simple addition sum, and what you have to do is to find suitable values for the letters B, L, G, A, and R, such that the result is a six-digit sum, as represented by the row of stars. However, each of the digits in this sum must be found in the substitution above, so that they can all be re-substituted for letters to obtain a six-letter sequence, it need not represent an actual word, so you could have, for example, sequences such as LAABGL or even GERNLLG.

There are many answers possible, but can you find the one that I am thinking of? I tell you that the two examples given above are as far wrong as you can get, in that neither of these has a single letter in its correct place (the first letter cannot be an 'L' or a 'G'), and so on.

Professor Bumble looked for help to Dr. Brown. Can you help?



## Boulder Chess

Leamington Spa, Graham Smith of Bristol, Christopher James of Malta, E. C. Hasted of Exeter, Jonathan Harrop of Wantage, G. R. Barber of Sutton Coldfield, M. Owens of Pontypool, Justin Hewitt of Houn, P. J. Winters of Arnhem, G. J. Gray of Cleveland, John A. Pollock of Stoke-on-Trent, and Phil Savage of Liverpool. Favorites saying this month: "The *Dragon* takes a giant step — the giant falls through a gap in the stairs." Solution

## Solution

The solution to the problem if you follow all the instructions carefully is: the first grey starboarded square is "West edge, 4th star from the north west corner", or, of course, "West edge, 4th star from the south west corner" — depending which way you counted.



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