

# DRAGON USER

International edition

*The independent Dragon magazine*

95p US\$3.25 June 1985

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classics**

**Machine code  
for beginners**

**Moon Miner**

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# DRAGON USER



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#### How to submit articles

The quality of the material we can publish in  
Dragon User each month will be a very great  
extent dependent on the quality of the  
information that you can make with your  
Dragon. The Dragon computer was launched  
on to the market with a powerful version of  
Basic, but with very poor documentation.

Articles which are submitted to Dragon  
User for publication should not be more than  
3000 words long. All submissions should be  
typed. Please leave wide margins and a  
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printed on plain white paper and be accom-  
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## Editorial

DRAGON SOFTWARE will become increasingly more difficult to find in  
the high street in the near future.

Webster's Software, one of the country's leading distribution compa-  
nies, has just taken the decision to pull out of the Dragon software  
market.

As more and more new micros appear in the shops, there will be less  
and less space to provide software for those machines that have been  
discontinued — even if, like the Dragon, they come back to life again.

Obviously Webster's — and other companies — no longer believe that  
there is sufficient demand for Dragon software to make it worth their while  
carrying it.

Similarly, it is becoming increasingly more difficult for people to find  
other forms of support for their Dragons — the main one being, of course,  
repair facilities.

A great many otherwise loyal Dragon owners will be forced to desert the  
machine of their choice if a new service network is not organised soon.

However reliable the Dragon and the 8800 chip is, machines do break —  
and if there is nobody who can mend them, they will stay broken.

Eurohard has announced plans for the future which include the promise  
of wonderful new machines. The Dragon MSX machine at least has  
actually appeared. But surely one major priority should be to make sure  
that the existing Dragon user base in the UK can survive by organizing a  
chain of repair agents?

There are still many people out there with Dragons. The circulation of  
this magazine alone should be proof of that.

There are still plenty of very impressive products being put out as well.  
It would be a shame — more, a tragedy — if the Dragon collapsed again  
because there was no one to put them back together again.

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# Letters

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

## Stopping I/O errors

I AM writing about the article "Diagnosing I/O Errors" in your August issue. I recently tried to alter my cassette recorder as shown, as I also have a Disc TR12. As I couldn't understand it, I took it along to my friendly TV repair man, as suggested.

He couldn't figure it out either, until he worked out that the point the writer called A was actually point B in his photograph, and point B was point A. The "wires" lead coming from the negative end of the motor was actually black on our recorder. Although the photograph shows a point B, you don't need to alter that at all.

The instructions given in the article are correct as long as you take note of the changes above. I have now had my recorder changed and it works perfectly.

S W Jones  
Epsom  
Surrey

## Moneybox corrected

THANK YOU for your excellent review of our Moneybox program. May I make two small points? Your reviewer feels that the keyboard delay time is too short. For some time now, copies of Moneybox have incorporated a routine to allow users to alter the keyboard response rate to suit themselves. This has been added to the section allowing users to change the screen background colour, and to save the drive(s) on continued run.

Secondly, I cannot agree that spreadsheet programs are more useful for this sort of work. While spreadsheets are more versatile, especially where "what if" scenarios are concerned, they do not provide any sort of transaction listing. This can be essential for checking statements, income tax, VAT and so on. I doubt if your reviewer would appreciate a bank statement that only gave a final balance,

without showing how this total was arrived at!

Bob Harris  
Harris Micro Software

## Coventry club?

WOULD ANY of your readers in the Coventry district be interested in forming a loose association of Dragon Users? I have searched all sources but no such group exists in this area.

I do not envisage a club, with club fees and so on, just a central address, where interested people with Dragons or CoCos could obtain other people's addresses and cross correspondence could take place. Perhaps if they indicated special interests and the initiator of correspondence enclosed an SAE, the costs to individuals would be kept to a bare minimum.

Horst S Jagozic  
Binley Village  
Coventry

## Manic Miner

I RECENTLY discovered that to get infinite lives on Manic Miner you should type `LOADM`, 1208 and load Manic Miner, then type `POKE 84250-4,518E`. Then save the game by typing `C S A V E` or `MINER`. `POKE 4487,250` + `POKE 498E, PEEK(126) * 250` + `PEEK(127) * 1`, `POKE(157) * 250` + `PEEK(158)`.

Once the game has a saved re-load it by typing `LOADM`, 64258.

The game will then load starting from the colour codes.

After trying out this new copy you will find there are two extra screens — Dragon Users Bonus and the End.

The Filly Cud Pod  
Birmingham

## Penguin

IF ANY internet readers who have bought the excellent Manic Miner by Software Projects that access to all the

screens is possible upon typing in the word, "PENGUIN".

The famous boot will appear bottom right of screen if successful (during the entry of the "P" is achieved — try not to press the enter).

Thereafter BREAK plus a letter from A-V will allow access to any screen.

William Swinford  
Andoverton  
Coventry

## Pokes!

I HAVE decided to put red head to paper and reply to two letters in the March issue. In answer to Mr J Harrington letter the location that controls the upper-lower case is 84148 or 329.255 gives upper case only.

Now the Manic Miner multi-life I am unable to help with, but I thought that it would be a good idea to start a regular Hackers column, so here are a few to start with. Dosey King `POKE 12914:n, Invasion Poke 7430:n, Invaders Revenge attack 84K1 POKES 10739:n, attack 84K1 Pokes 10739:n` where n can be up to 255 decimal.

One for all the readers who wish to slow listings: `Poke 359.50` will enable you to read a listing and `Poke 359.57` to return to normal. Try `Poking 359.78` and you get unpredictable results, but the program still works.

T O'Brien  
Banbury

## Charts

YOU ASKED for other readers' views in reply to the letter by W Miles (Dragon User, April, 1985) regarding the validity of Popularity Charts for Dragon games. I fully agree with the ideas put forward and endorse the view that a readers' poll would more accurately indicate the situation. The present system of assessment which even takes into account the direct sales of several leading software houses, plus shop sales fails to indicate the views of those amongst your 35,000 readers who acquire their games by means other than these outlined.

Anthony J Roddy  
Bolton

## Right on

THANK YOU for publishing my program, King of the Hill, in January's issue of your magazine.

Since publication I have received a few letters and telephone calls from your readers concerning a huge array of error calls.

I would like to assure your readers that the published listing is perfect and fully operational. I have personally typed in the game from the published listing and have found it to be correct.

Philip Thompson  
Sunderland Software

## Slapped wrist

I AM writing, in part, to agree with the slapped wrist you suffered at the hand of Compuserve. I have had a Dragon for over 2.5 years (a 32 when it was first hatched and more recently a 64) I also have a single drive and a printer, but then so do many other Dragon owners.

How could we possibly contact a comparison of our own when so many of us know so little of Flex or OS-07?

Yes Compuserve was right, your article was inadequate and not impartial, but Compuserve sell both operating systems and are very familiar with them. Instead of giving Dragon User slapped wrists why did they not offer an article explaining the features and differences of both OSes?

Dragon owners know they have an extremely powerful computer but it must be up to those with more knowledge to help the rest of us, if articles were donated from interested parties (they would probably sell more to a more enlightened user) then the pages of Dragon User would probably grow in number and make some attempt to justify the high price of 30s. As about half the contents of the magazine is devoted to advertisements, the price should be less.

Anthony P North  
Shipley  
West Yorkshire

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Circuit Adventure	Dragon Data	4-8 yrs	£7.99	£3.99
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Tiger Brand Pro	Tiger	7-14 yrs	£7.99	£4.99

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# Websters drops Dragon software

WEBSTERS' Software, one of the biggest distribution companies in the country, has stopped handling Dragon software.

This means that games for the 32 and 64 will become even more difficult to find in high street stores.

The situation from the high street stores point of view was summed up by Peter Frost, Book's Assistant Merchandise Controller, who said that his company would continue to sell software for the Dragon computer for as long as there

was sufficient demand to justify it.

"There is of course less room to carry software for discontinued machines, but we still have a limited range in our full specialist stores, which are the top 150 stores in the Boots group," he said.

Websters has sold its stocks of Dragon software to John Peen Software, which is offering it at reduced prices by post.

John Peen Software is at Dean Farm Cottage, Kingsley, Borden, Hants GU35 9NQ.

# Games group

THE DRAGON Games Users Group is a new organisation designed to appeal to Dragon owners who enjoy playing games, according to founders Oron Software.

The new club will offer substantial discounts on games from a number of well-known software houses. There will also be a bi-monthly news letter which will feature reviews, playing tips, and an adventure helpline.

Although Oron Software is a commercial company producing various products for the Dragon, Mark Blease, the company's founder, promises that the DGUG will be kept totally separate.

"We are not using DGUG costs (another commercial venture)," he said. "We aim to spend every penny of the membership fee on our members."

Membership of the DGUG costs £3.50 per year, and further information can be got from Oron Software, 64 Prince Street, Rochdale, Lancs OL16 5LJ.

# Printer Control

MACGOWAN Consultants is a newly formed software house with a word processing package for the Dragon 32 and 64.

Printer Control gives the user access to a wide range of commands, including the ability to design character sets, write over graphics, mix text and graphics (printing in the same line and such) mode.

William MacGowan, who set up the company with help from the Enterprise Allowance Scheme, has written software for various machines. He believes that the major selling price of Printer Control will be its price.

"At £15," he says, "it has all the commands of much more expensive word processing packages, and more besides."

MacGowan Consultants can be contacted at 8 Anheam Drive, Caythorpe, Nr Grantham, Leics NG32 3QJ.

# Diamond's return

SALAMANDER Software has two new releases for the Dragon — both text only adventures.

Franklin in Wonderland is the fourth in the Dan Diamond trilogy, according to Salamander spokesperson, Lucinda Parker.

The White Cells of Dover is a sequel to the Second World War adventure Wings of Mice.

Both games have apparently around 120 locations, and will cost around £5 from Salamander Software, 17 Norfolk Road, Brighton, East Sussex BN1 3AA.

# Dragon MSX

THE DRAGON MSX machine has finally made an appearance.

The machine, manufactured by Hong Kong based Republic for Eurohard, the Spanish company which now makes the Dragon, conforms to the usual MSX standards.

It will be marketed in Europe by Eurohard, who took over the MSX licence originally granted to Dragon Data and GEC. No details as price have been released yet.

As a standard MSX machine, it will of course use the Z80 processor and will be totally incompatible with existing Dragon machines.

# Dream

READERS who have been interested by the Dream editor-assembler mentioned in some of Pam d'Arcy's articles in past Dragon Users, might like to know that it is now available as Alderaan from Governor Software.

Alderaan includes a monitor and disassembler, and is available on tape or cartridge for the Dragon 32/64. It can also be bought on disk for Dragon Dos.

# Dragon 3" drives

CUMANA has announced the launch of a new range of 3½" disk drives for the Dragon.

The disk drives range from a single-sided 40-track drive to a dual-drive with two 80-track drives. Storage capacity ranges from 128 kilobytes at the bottom end of the range to two megabytes at the top end.

# Scott Adams

FOR ADVENTURE lovers, the name of Scott Adams ranks amongst the greats — so if you read Mike Gerrard's adventure trail first every month, you will be delighted to hear the news that all of Scott Adams' adventures are now available for the Dragon from Adventure International in Birmingham.

The Classic Adventure series from 1 to 10, plus Spelunker and THE WALK, the first two games in the Questprobe series, based on Marvel Comic characters, cost £7.95 and are first only.

In addition, adventure international is selling the entire Mysterious Adventure range, originally released by Channel 5. Adventure International UK is at 85 New Summer Street, Birmingham B16 3TE.

# Disk error

WE MADE an error in last month's Dragon DOS article by Phil Brooks. The first patch should read

Patch: +000F 9D  
The 9D was unfortunately missed out.



# NEW GAMES FROM BLABY COMPUTERS

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# Arcade addiction!

In a special review section Jason Orbaum looks at some classic arcade games for the Dragon

## The King of the arcade

Program: The King  
Supplier: Mirotelex

ANY SERIES of reviews of classic Dragon arcade games has to start with this, possibly the best Dragon game in the world.

The arcade game is Donkey Kong, a game in which you play Mario, the carpenter, who is trying to capture King-Kong himself by running along a series of walkways, climbing a series of ladders, and avoiding barrels, fireballs and the mega-monkey himself.

The King, released long ago in the middle of time has still never been graphically surpassed, and is quite simply the best version of Donkey Kong available for ANY micro-computer.

There is the usual choice of screen-choices, along with options for normal or slow speed, one or two player games, and three lives or tenative (with twelve lives the player's score is not eligible for the high score table, which, incidentally, is done in true arcade style).

The game looks great, and handles better than any other on the market. But then, I feel that I'm preaching to the converted as, judging by the number of months the game held the top of the software charts, every Dragon owner in Britain probably owns a copy!



## Manic Miner

Program: Manic Miner  
Supplier: Software Projects

THIS GAME never made an appearance in the arcades. The original (written for the apt, Spectrum) was written by Matthew Smith and has become one of the biggest sell-

ing games EVER released.

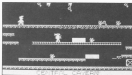
The recently released sequel, Jet Set Willy, is better than this game, and this game is of a very high standard indeed!

The object of the game, for those who have been fortunate enough not to come into contact with a Spectrum for prolonged periods, is to help Mister Willy (through 20 screens (actually, the Dragon version is reworked to have two extra screens, but I have never reached them)), collecting a variety of keys, diamonds, shoes, and other silly objects whilst avoiding a set of equally silly creatures (the most famous of which are the man-eating toiles).

The game would be good value with four or five screens; with 20 (20?) screens it's ridiculously good value.

But those amongst you (myself included) who can go from start to end on the Spectrum version, will find a much more difficult task on the Dragon. The game, whilst undergoing translation, has been made faster and more responsive. This, coupled with the fact that old Spectrum timings and patterns do not always apply, makes it almost like playing a new game!

The game, like its excellent successor, is almost sure to become a classic, and its sales on the Dragon prove that Roy Coates has taken Matthew Smith's formula and implemented it as well on the Dragon, as the later did on the Spectrum.



## Scramble

Program: Scramble  
Supplier: Mirotelex

ANOTHER Mirotelex release, and although not one of their best games, this is still the best version of Scramble available for the Dragon 32 and plays almost as well as the arcade version.

The graphics are smooth if not complex, and the scrolling landscape goes by at the "correct" rate. The controls (boom, fire, left, right, up and down) can be handled by joystick or keyboard, and the game, after the relatively short load, is gripping and addictive.

The only problem with this game is that some of the screens are disappointing copies, most notably were three (the missions which I found the most difficult in the arcades).

In this version of the game however, instead of many fiery meteors hurtling across the screen we are "treated" to two meteors at a time, lining up across the screen... gone is the need to stay low and forward, you can actually navigate between these fireballs with surprising ease!

All the waves are present though, the opening hills, the space-ships, the fireballs, the city and the maze to the final base. The trouble is that when you have mastered this game, it is no longer limitless, for, as difficulty increases and fuel disappears more rapidly, there is a run where it is 99% OOPS-BLE to survive, even if all fuel bases are shot!

All things considered though, it looks as though this is going to remain the best Scramble type game for the Dragon.



## Rommel's Revenge

Program: Rommel's Revenge  
Supplier: Design Design

YES FOLKS, this game was NOT written by Mirotelex, and yet it is excellent. It is a version, a very well executed version, of Battlezone, the 3-D tank simulation that caused such a stir in the arcades a few years ago.

This version has everything that the battlezone fanatic could ever ask for... superb 3-D graphics, variable difficulty, a massive high score table (that you can save to show to your friends), selectable control (even down to a choice of pause key!), and joystick option.

The on-screen play is identical to the arcade version of the same game although this version is in black on green, rather than green on black.

The only things missing are the two control joysticks that adorned the console in the arcade but this is a loss that can be lived with and the new controls are just as easily mastered.

The game supports tanks, super-tanks, flying saucers, and missiles (bouncing bombs) but the background is only a straight line instead of a series of mountains.

All the usual polygons line the landscape, and it is just as easy to bump into them as it was in the arcade! The radar tops, you can hear the enemy fire and your own, and when you're hit the screen cracks beautifully.

This is quite simply a superb game, excellently programmed.



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Unlike ordinary computer aided design programs C.A.D. 32 is really easy to use. The program is supplied on cassette with a printed overlay card for the 14b handset. Because the design functions are labelled and controlled from the handset, there is no

requirement for an on-screen menu which allows full use of the screen area for design work, you can now sit back and relax while your Dragon does the hard work. The screen dumps shown here were all produced with C.A.D. 32 using the delta 14b handset and interface. (Project X was designed and produced within 90 minutes). Finished or part finished designs can be saved to tape or disk and reloaded for printing or amendment. There is insufficient space here to describe fully everything C.A.D. 32 can do, so why not come along to the next 6809 show and see it for yourself.



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## Cuthbert

Program: Cuthbert in the Jungle  
Supplier: Microdeal

NO SELECTION of classic games could be complete without at least one mention of the fractile forest, grasses clad, hero of the Dragon ... I refer of course to Cuthbert.

This is the Microdeal (born take!) version of a game originally called Royal Perry and released by Acclaim for the Atari VCS. The game involves running a man around a jungle avoiding logs, snakes, scorpions, trees, and lots of other things in a quest for treasure.

During the game you are sure to jump across alligators' mouths, swing across pulsating pits of quicksand, and use the "secret" tunnels under the jungle.

The game is a dream for Mike Tray fanatics everywhere and, once again, there is no shooting!

The setting (MACOE 3) is beautifully drawn, so long as you have a colour television, and the main runs, jumps, dives and swings naturally



(even if he does tend to look like a stick insect on the left).

The play is superb, but be prepared for your joystick to take a hammering, especially on the bottom.

An elegant mix then of strategy and arcade, and as the game has a time limit (20 minutes, although my three lives have never lasted that long) once the game is finished, an attempt to beat your best time can be made — there is a timer in 10 minutes 40 seconds, or thereabouts.

If you don't have this rather aged game, then it is well

worth adding to the collection.



## Frogger

Program: The Official Frogger  
Supplier: Microdeal

YET ANOTHER Microdeal offering (I have a friend who believes that Microdeal are the only software house who produce games for the Dragon), which is definitely the best Frogger available for the Dragon.

Frogger was a game that

never really caught on in the arcades. I don't understand why, I mean, it's such a nice game, no shooting, no violent alien self destructing, no greeds materialising anywhere — hrrm, maybe that's the reason!

This version of Frogger in MACOE 1 and uses the mode better than any other I have seen. It is colourful, well retaining clarity and plays excellently on keyboard (I would not advise the joystick option without self containing joystick).

The object of the game is simply to hop a frog across a busy road, and then a busier river. To cross the road is simple, just avoid the cars, lorries, and so on. To cross the river isn't so simple ... you must ride on the backs of turtles, and on logs, and then time the jump into one of your five lornes at the top of the screen.

The game has progressive difficulty, a timer, five frogs per game, one or two player option, and can play more tunes than "Guan Duxin" (but then these aren't really that many).



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Once a clean bill of health is confirmed, save the program.  
**COMMANDS:** DELIST=12000, 12010, 12001.

Adjust the hex loader CLEAR (Line 3) and checking routine addresses (Lines 42, 47) if you wish to set up the program data at a lower address (you can always adjust its final loading position by CLEARING with offset) and CSAYEM from that point (see input). HERLOADER may be of use for other similarly set up hex dumps — but they may not be 10 bytes per checksum. Adjust B=10 (Line 3) as appropriate — the program will cope with a maximum of 13 bytes per line without needing further amendment. (Should the checksum value be given in hex (this dump has a decimal value), it can be entered using the standard BASIC facility

for hex starting addresses presented in hex) of prefixing it with &H.

### Using the disassembler

Now the 800 test by it out on itself EXERCISE.

The 'DISASSEMBLE PPOCM' address should be entered, as the S prompt suggests, in hex (no &H prefix required). It splits the program. Start with address \$2F08. It should present you with a screen commencing:

addr.	inst.	code	source	code
\$2F08	HEX#00	LDX	#0000	
\$2F09	HEX#	STX	\$-001#00	
\$2F0B	CO#00	LDX	#0000	
\$2F13	CO#1	STX	#- -	
\$2F14	BC#00	CMP	#0000	
\$2F15	BE#0	BNE	LABEL	

SP#1	SP	RTS	
\$2F16	CO#00	LDD	#0000
\$2F18	BE#00	STB	LABEL

As you may recognise, this is a 'clear text screen to spaces' routine. You can now see why I described a disassembler as an assembly source 'look-a-like' listing — gone are the helpful label names of a source listing; we are left with numbers alone.

### Paging facilities

Once a screen, or page, of disassembly is displayed, it remains on the screen pending keyboard input.

Q brings up the 'DISASSEMBLE PPOCM' S prompt allowing a new address to be entered.

### Listing 2

#### DISASSEMBLE HEX DUMP

12001	34	77	00	25	67	00	00	00	00	1201	00	00	25	67	00	00	00	00	00
12002	0F	46	00	27	30	00	00	00	00	1202	00	25	66	45	00	00	00	00	00
12003	44	4F	33	41	33	00	00	00	00	1203	02	04	44	00	41	09	00	00	00
12004	00	00	00	00	00	00	00	00	00	1204	00	07	00	00	00	00	00	00	00
12005	67	00	00	00	00	00	00	00	00	1205	00	00	00	00	00	00	00	00	00
12006	00	00	00	00	00	00	00	00	00	1206	00	00	00	00	00	00	00	00	00
12007	00	00	00	00	00	00	00	00	00	1207	00	00	00	00	00	00	00	00	00
12008	00	00	00	00	00	00	00	00	00	1208	00	00	00	00	00	00	00	00	00
12009	00	00	00	00	00	00	00	00	00	1209	00	00	00	00	00	00	00	00	00
12010	00	00	00	00	00	00	00	00	00	1210	00	00	00	00	00	00	00	00	00
12011	00	00	00	00	00	00	00	00	00	1211	00	00	00	00	00	00	00	00	00
12012	00	00	00	00	00	00	00	00	00	1212	00	00	00	00	00	00	00	00	00
12013	00	00	00	00	00	00	00	00	00	1213	00	00	00	00	00	00	00	00	00
12014	00	00	00	00	00	00	00	00	00	1214	00	00	00	00	00	00	00	00	00
12015	00	00	00	00	00	00	00	00	00	1215	00	00	00	00	00	00	00	00	00
12016	00	00	00	00	00	00	00	00	00	1216	00	00	00	00	00	00	00	00	00
12017	00	00	00	00	00	00	00	00	00	1217	00	00	00	00	00	00	00	00	00
12018	00	00	00	00	00	00	00	00	00	1218	00	00	00	00	00	00	00	00	00
12019	00	00	00	00	00	00	00	00	00	1219	00	00	00	00	00	00	00	00	00
12020	00	00	00	00	00	00	00	00	00	1220	00	00	00	00	00	00	00	00	00
12021	00	00	00	00	00	00	00	00	00	1221	00	00	00	00	00	00	00	00	00
12022	00	00	00	00	00	00	00	00	00	1222	00	00	00	00	00	00	00	00	00
12023	00	00	00	00	00	00	00	00	00	1223	00	00	00	00	00	00	00	00	00
12024	00	00	00	00	00	00	00	00	00	1224	00	00	00	00	00	00	00	00	00
12025	00	00	00	00	00	00	00	00	00	1225	00	00	00	00	00	00	00	00	00
12026	00	00	00	00	00	00	00	00	00	1226	00	00	00	00	00	00	00	00	00
12027	00	00	00	00	00	00	00	00	00	1227	00	00	00	00	00	00	00	00	00
12028	00	00	00	00	00	00	00	00	00	1228	00	00	00	00	00	00	00	00	00
12029	00	00	00	00	00	00	00	00	00	1229	00	00	00	00	00	00	00	00	00
12030	00	00	00	00	00	00	00	00	00	1230	00	00	00	00	00	00	00	00	00
12031	00	00	00	00	00	00	00	00	00	1231	00	00	00	00	00	00	00	00	00
12032	00	00	00	00	00	00	00	00	00	1232	00	00	00	00	00	00	00	00	00
12033	00	00	00	00	00	00	00	00	00	1233	00	00	00	00	00	00	00	00	00
12034	00	00	00	00	00	00	00	00	00	1234	00	00	00	00	00	00	00	00	00
12035	00	00	00	00	00	00	00	00	00	1235	00	00	00	00	00	00	00	00	00
12036	00	00	00	00	00	00	00	00	00	1236	00	00	00	00	00	00	00	00	00
12037	00	00	00	00	00	00	00	00	00	1237	00	00	00	00	00	00	00	00	00
12038	00	00	00	00	00	00	00	00	00	1238	00	00	00	00	00	00	00	00	00
12039	00	00	00	00	00	00	00	00	00	1239	00	00	00	00	00	00	00	00	00
12040	00	00	00	00	00	00	00	00	00	1240	00	00	00	00	00	00	00	00	00
12041	00	00	00	00	00	00	00	00	00	1241	00	00	00	00	00	00	00	00	00
12042	00	00	00	00	00	00	00	00	00	1242	00	00	00	00	00	00	00	00	00

-up arrow returns you to the page starting from the last time it was address was entered.

-> sets a "ray marker" so that ...  
left arrow returns you to the page starting from the last time -> was pressed any other (including the response to ->) displays the next page of disassembly.

Unless you need it specifically to mark an intermediate place, by using -> when speedily paging forward, the previous page can be recalled when you realize that you have just passed the page you wanted to study!

#### The disassembler display

The disassembler display above demonstrates three of the special considerations to avoid machine coders.

#### Direct address (direct page) mode (Line 2270B)

One of the easiest slips to make when coding (or entering) Assembler source is to omit the # sign when loading fixed values into registers. If the # is omitted, the instruction is assembled as a DIRECTLY ADDRESSED instruction instead of the intended IMMEDIATE MODE type, meaning that (Line 2270B) **LDI #0000** loads a value of zero into Register D, whereas **LDI 0000** loads the contents of memory location zero into Register D.

Some assemblers allow it to be overridden (when it is ever easy!) but generally, when the operand value is <256, it is actually tagged on to the DIRECT PAGE

REGISTER (abbreviated to DP or DPP) to form a 16-bit address, for example:

DP contains 0 and value 5 = memory address \$0005

DP contains 8 and value 5 = memory address \$0005

If never touched by programs, the DP register remains at zero.

You can quite happily machine code for ever without using such powerful options as the direct page facility. However, when you use something in BASIC's workspace, such as the text screen pointer at location \$80, you use it without realising it. To attract your attention to potential program errors (accidentally omitted #) and the true constitution of the address in DIRECT ADDRESSING mode, the disassembler display precedes the operand value with the letters "DP" in inverted screen when round brackets.

**Relative branch instructions (Line 2271B).** The operand of branch instructions may take a number of different forms. The most usual form is simply a label name. The disassembler display tells you this by displaying the word LABEL. Here below it gives the address of the instruction branched to.

**Program counter relative addressing (PC) (Line 2271B).** As with the RELATIVE BRANCH instructions, the disassembler display for such instructions is as you would actually write the source code, LABEL.PC. The address of the

location referred to is displayed on the line below.

Other display considerations are:

**Extended addressing.** The DIRECT ADDRESSING item above mentioned the accidental omission of # signs from IMMEDIATE MODE instructions turning them into DIRECTLY ADDRESSED mode. As an aid to programmers, this disassembler appends BA in inverted screen to extended addressing operands to quickly alert you to cases of inadvertently omitted # signs on double byte operands. (Example: 22707, a JBR to an extended address location.)

**Indirect addressing.** Another case where you can quite happily machine code for ever without using such an option ... The operands of such instructions (including calculated addresses for JPCP instructions) are enclosed within Meteorites square bracket notation. (Example: 2269C — some preset data — disassembles as an INDIRECT ADDRESS mode instruction.)

**Constant offset instructions.** Those with offsets 0 to +15/-16 are displayed in decimal (example 22705B) offsets outside this range are less common and are displayed as hex values, preceded by a \$ to remind you of this. The offset is in signed value (i.e. negative if the most significant bit is set). We need BASIC PROM for an

```
12381 50 20 02 84 20 00 00 02 20 00 738
12391 80 50 57 4F 52 20 00 43 00 50 849
12401 60 20 00 43 00 50 50 20 00 43 852
12411 40 50 40 20 81 20 43 00 50 20 862
12421 81 00 40 50 94 20 00 43 00 50 872
12431 51 20 00 43 00 50 44 20 00 43 882
12441 40 20 00 20 8F 41 44 50 20 20 894
12451 84 4C 44 50 20 20 81 53 54 50 904
12461 20 20 81 4C 44 50 20 86 53 451
12471 54 54 20 20 84 4C 44 50 20 20 908
12481 8F 53 54 50 20 20 8F 4C 44 53 918
12491 20 20 80 4C 44 53 20 20 81 93 949
12501 50 51 20 20 81 4C 44 53 20 20 933
12511 86 53 54 53 20 20 86 44 44 53 950
12521 20 20 8F 53 54 53 20 20 8F 53 977
12531 57 4F 53 20 8F 45 40 50 20 20 984
12541 84 40 50 51 20 84 45 40 50 992
12551 50 20 81 43 45 50 53 20 81 43 995
12561 40 50 20 20 84 43 40 50 53 20 998
12571 84 43 40 50 20 20 8F 43 45 50 1008
12581 20 20 8F 4C 43 53 45 20 8F 4C 540
12591 45 4F 40 50 80 4C 43 4C 50 50 999
12601 88 4C 43 43 43 20 80 4C 43 43 937
12611 55 20 80 4C 43 4C 43 20 80 4C 934
12621 43 40 43 20 80 4C 43 54 43 20 956
12631 80 4C 43 54 53 20 80 4C 43 50 987
12641 4C 20 80 4C 43 43 49 20 80 4C 958
12651 43 47 45 20 80 4C 43 43 43 980
12661 80 4C 43 47 54 20 80 4C 43 4C 984
12671 43 20 80 4C 43 47 20 20 81 20 998
12681 20 20 20 20 81 20 20 20 20 996
12691 81 43 4F 40 20 20 81 4C 53 932
```

```
12701 20 20 81 20 20 20 20 20 20 81 937
12711 4F 52 20 20 81 41 53 52 20 20 938
12721 81 41 52 4C 38 20 81 52 4F 4C 937
12731 20 20 81 43 43 43 20 20 81 20 937
12741 20 20 20 20 81 4F 4C 43 20 20 942
12751 81 54 53 54 38 20 81 44 40 540
12761 20 20 81 43 4C 52 20 20 81 20 948
12771 20 20 20 20 20 20 20 20 20 950
12781 20 4C 4F 50 20 20 80 55 4F 4C 956
12791 43 20 80 20 20 20 20 20 80 20 967
12801 20 20 20 20 80 43 43 43 43 964
12811 80 43 43 52 20 20 80 20 20 994
12821 20 20 80 44 41 41 20 20 80 4F 455
12831 53 43 43 20 81 20 20 20 20 975
12841 82 45 46 46 43 80 52 43 50 989
12851 20 20 80 43 50 47 20 20 85 94 990
12861 43 20 20 80 43 43 41 20 20 994
12871 85 43 46 45 20 20 83 43 43 971
12881 20 20 83 43 54 43 20 20 83 43 977
12891 56 50 20 20 83 43 50 43 20 932
12901 83 43 40 49 20 20 83 42 47 472
12911 20 20 83 42 54 20 20 83 42 477
12921 47 54 20 20 83 42 4C 45 20 978
12931 83 4C 45 40 50 20 84 4C 45 978
12941 99 20 84 4C 45 43 43 20 84 4C 984
12951 45 43 55 20 84 50 46 50 987
12961 84 50 52 4C 52 20 84 50 46 999
12971 50 50 54 50 55 4C 53 20 84 50 994
12981 20 20 20 80 55 4C 53 20 84 50 992
```

```
12991 80 43 43 50 20 20 80 52 94 977
13001 20 20 80 43 57 41 41 20 81 46 967
13011 50 4C 20 20 80 20 20 20 20 158
13021 80 53 57 4F 20 20 80 43 43 47 525
13031 41 20 20 20 20 20 20 20 20 967
13041 20 20 20 20 80 47 40 41 20 988
13051 50 52 53 41 20 80 41 20 20 932
13061 20 20 20 80 4F 52 41 20 80 41 992
13071 52 52 40 20 80 41 52 40 20 983
13081 80 53 4F 4C 20 80 44 43 43 936
13091 40 20 80 20 20 20 20 20 80 4F 995
13101 40 43 43 20 80 54 53 54 40 999
13111 20 20 20 20 20 20 20 43 4C 958
13121 40 20 80 45 43 47 43 20 20 950
13131 20 20 20 20 80 44 43 20 20 985
13141 80 47 47 43 43 20 80 4C 53 50 942
13151 43 20 20 20 20 20 20 20 20 945
13161 20 20 20 80 41 43 43 42 20 896
13171 4F 52 43 20 80 41 53 52 43 987
13181 46 53 43 20 80 52 4F 50 999
13191 43 20 80 44 43 43 20 80 4C 945
13201 80 54 54 54 43 20 80 20 20 984
13211 20 20 80 43 4C 43 43 20 80 4C 991
13221 45 47 20 20 86 20 20 20 20 930
13231 50 20 80 4C 43 43 43 43 47 948
13241 86 20 20 20 20 20 20 20 20 934
13251 20 20 86 4C 53 51 20 20 86 20 936
13261 20 20 20 20 20 20 86 47 52 20 942
13271 45 43 43 20 86 52 4F 43 20 944
13281 45 43 43 20 86 50 46 50 946
13291 45 43 43 20 86 50 46 50 946
13301 45 43 43 20 86 50 46 50 946
13311 20 20 20 86 55 4C 53 20 86 54 945
13321 86 49 4C 43 20 86 54 53 949
13331 20 20 86 46 40 50 20 86 43 958
```

example of this — by \$0000 \$12.5 = 18.5 in decimal.

**Invalid codes.** Variable storage (PMS) and presents (PDS/POC/PDB) can occur anywhere amongst the code (as long as you don't try to obey it as it is quite a different kettle of fish to BASIC that kindly dodges round D0H0A.TA statements interspersed with instructions), so the disassembler may well come across "invalid" instruction codes. In such instances, the "offending" byte of "object code" is displayed as normal and the character equivalent (or blank) if it is an unprintable character) is displayed in the operand column. (Examples: \$0E9F shows a printable, invalid code; \$0070 for an unprintable character.)

### Miscellaneous points

When you disassemble, you will find odd variations may occur. For example, to assist in logical coding and understanding, most Assemblers allow you to PSH/PUL Register D as its double-byte unit. As far as the machine is concerned in a PSH/PUL, Register D is always treated as the individual Registers A and B, which is what an Assembler translates a PSH/PUL D as. A disassembler is unaware of the logic of the program at the point of the PSH/PUL, so inevitably, this one being so different, disassembles as if they were the individual registers A and B.

A zero offset instruction, such as LDA B,X would, according to published Motorola data sheets, be expected to have

object code \$A000. In practice, many Assemblers generate the alternative "comma register" form for zero offsets. DREAM is no exception, generating object code \$A00A. Thus the disassembler will show **LEAH A,BH LDA X**.

Motorola, possibly for technical reasons but it does differ (later program logs), also recommend that in a few cases, two different mnemonics be provided that in fact generate identical machine code instructions. This disassembler prints the alphabetically lower mnemonic of the two, so may occasionally look slightly at variance with a published source code listing. The pairings are:

Object code	Mnemonic	ASL/SL
1004	LRCC/MPHS	
1006	LRCS/MLP	
34	SCC/BS	
95	SO/SLO	
48	ASL/SLA	
56	ASL/SLA	
68/70	ASL/SL	

### The machine code sleuth

It is extremely difficult to hide machine code.

Artists usually tell you the EXEC address, so start from there.

Disassemble the disassembler from the beginning. It will display:

\$0001 3A0F	PSHS	CC,ALDR,K,Y,U
\$0002 6020	BSR	LABEL
\$0005 6F0000AF	CLR	LABEL_PCR
\$0008 20B200	LEAX	LABEL_PCR

\$000C A600	LDA	X,
\$000E F700	BSG	LABEL
		\$0F10
\$001F 000000	JBR	\$0000,cc
\$002F 20FF	BFA	LABEL
		\$0000

(page forward)

\$0070 44	LBR4	
\$0071 50	BSLA	
\$0072 30	COMB	
\$0073 41		A

Invalid or unlikely looking program instructions (for example, lots of COMs/NEGs/EGFs) give you the clue that an area of "program" is in fact a variables/constant data area. \$0070 is in fact the DISASSEMBLE FROM \$ program pre-set start address (as loaded into Register X at \$000E). However, further program instruction addresses have been revealed — \$000E BSG to the label at address \$0F10. ← and disassembly from \$0F10 reveals more code etc. This way, you can track down the program code despite it being interspersed with non-program code areas. To disassemble (and security copy) auto-ran programs, CLOADM with an offset to load at graphics page 1 or higher in memory and locate them from there.

### Too much of a challenge?

Should entering the program data seem too daunting rather than a challenge, as with previous articles, for instant usage, I shall happily supply the programs on cassette for £3.00 including p&p (21 Wycombe Lane, Woodburn Green, High Wycombe, Bucks HP10 0HD).

\$0381 4C 32 38 28 86 42 43 47 39 28	518	\$4650 84 53 53 43 44 28 86 42 42 44	557	\$4941 28 28 81 53 34 42 38 28 81 43	632	
\$0383 8F 20 20 8F 43 20 20 8F 20 20	519	\$4664 41 28 86 42 4F 54 41 28 86 42	560	\$4957 4F 52 42 28 81 43 44 42 28	558	
\$0385 20 20 8F 43 47 40 38 28 8F 42	520	\$4678 44 41 28 28 86 53 34 40 28	589	\$496D 81 52 42 28 28 81 43 44 44	604	
\$0387 53 28 28 8F 38 28 28 28 28	563	\$4680 84 45 4F 52 41 28 86 42 44	622	\$497E 42 28 81 42 44 44 28 81 53	650	
\$0389 8F 52 4F 53 28 28 8F 41 53 53	552	\$4694 41 28 86 4F 52 41 28 28 86	641	\$498E 54 34 28 28 81 42 44 53 28	518	
\$0393 38 28 8F 41 53 42 38 28 8F 53	553	\$4706 44 44 41 28 86 43 40 58 28	560	\$49A1 81 53 34 53 28 28 81 53 53	632	
\$0395 4F 4C 38 28 8F 44 43 43 28 28	676	\$4718 84 46 53 52 38 28 86 42 44	587	\$49B2 42 28 86 43 58 43 28 86 53	515	
\$0397 8F 20 20 20 28 8F 45 42 43	560	\$4732 28 28 86 53 34 58 28 28 86	542	\$49C0 42 43 42 28 86 41 44 44 28	558	
\$0399 38 28 8F 54 53 34 28 28 8F 44	471	\$473C 53 42 41 28 8F 43 40 58 41	528	\$49C6 86 41 42 41 28 86 42 4F 34	544	
\$03A3 40 58 28 28 8F 43 42 53 28 28	588	\$4744 8F 53 43 43 41 28 8F 53 53	622	\$49D0 42 28 86 42 44 42 28 28 86	557	
\$03A5 8F 53 53 42 41 28 82 43 40 58	564	\$4752 44 28 86 41 46 44 41 28 8F	622	\$49D6 42 28 28 86 42 4F 52 42 28	540	
\$03A7 42 28 82 52 42 42 41 28 82 53	487	\$4764 4F 54 43 28 8F 42 44 41 28	556	\$49E1 86 41 44 42 42 28 86 4F 53	627	
\$03A9 53 42 44 28 86 43 44 41 28	587	\$4776 4F 54 54 41 28 28 8F 45 4F	524	\$49E9 28 28 86 41 44 44 42 28 86	621	
\$03AB 82 42 4F 54 41 28 82 42 44 41	523	\$4788 40 38 8F 41 41 43 41 28 8F	491	\$49F1 44 44 38 28 86 53 34 44 28	582	
\$03AD 38 28 82 28 20 28 20 82 43	562	\$479A 52 41 28 28 8F 41 44 44 41	28	510	\$49F6 86 44 44 53 28 28 86 53 53	557
\$03AF 52 41 28 82 42 44 42 41 28	557	\$4804 8F 43 40 58 28 8F 49 44 53	522	560	\$49F8 1511 28 28 86 53 53 42 28 8F	438
\$03B1 8F 52 41 28 28 82 41 44 44	494	\$4812 28 28 40 42 44 58 28 28 8F	521	442	\$49F9 42 28 86 42 38 8F 52 42 42	28
\$03B3 41 28 82 43 40 58 28 86 42	518	\$4824 34 28 28 28 8F 53 53 42 42	28	517	\$49FA 81 41 44 44 44 28 8F 41 42	44
\$03B5 53 53 28 28 82 42 44 58 28 28	528	\$4832 82 43 40 58 43 58 82 53 43	543	543	\$49FB 41 42 28 86 42 4F 34 44 28	622
\$03B7 20 20 20 20 20 20 44 58	512	\$4844 42 38 82 41 44 44 44 28 86	41	436	\$49FC 44 42 28 28 8F 53 34 42 28	28
\$03C1 38 28 81 43 40 58 41 28 81 53	478	\$4856 82 44 42 38 82 41 44 34 28	28	567	\$49FD 1501 8F 45 52 42 38 41 44 42	546
\$03C3 42 42 41 28 81 53 53 42 44 28	545	\$4868 42 42 42 28 28 82 39 20 28	413	413	\$49FE 1501 42 28 8F 42 4F 34 28 8F	41
\$03C5 81 42 44 41 28 81 52 4F 54	504	\$487A 28 20 82 43 4F 52 42 28 82	41	487	\$49FF 44 44 42 28 8F 4C 44 44 28	28
\$03C7 42 28 81 42 44 41 38 28 81 53	455	\$4884 44 43 42 28 82 4F 52 42 28	28	536	\$4A01 1511 8F 53 34 44 28 28 8F 4C	53
\$03C9 54 41 28 28 41 45 4F 52 41 28	541	\$4896 82 41 44 44 42 28 82 4C 44	44	515	\$4A03 1501 28 8F 53 34 53 28 8F	4F
\$03DB 81 41 44 42 41 28 81 4F 53 41	525	\$48A8 28 28 86 28 20 20 20 20 42	286			
\$03DD 28 28 81 41 44 41 28 81 45	431	\$48B4 44 53 28 28 86 20 20 20 20	432			
\$03DF 48 58 28 28 81 44 53 52 28 28	581	\$48C2 20 53 53 42 42 38 81 43 40	58	683		
\$03E1 81 4C 44 58 28 28 81 53 54 58	553	\$48D0 42 38 81 53 42 42 41 44 41	41	679		
\$03E3 38 28 81 53 52 42 40 28 86 43	449	\$48DE 44 44 44 28 81 41 44 44 28	546			
\$03E5 40 58 42 28 86 52 42 42 41 28	573	\$48E2 81 42 4F 34 42 28 81 4C 44	42	523		

DISASM CHECKSUM TOTAL, 22414F

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TRIPRO



# Loony Lunar lunchtime

This month's star game is Moon Miner from Steve Gathercole — so get your jet pack on, lunch break is about to start

THIS MONTH'S Star Game is a race against time. You are a hard-working miner, digging dusty diamonds deep beneath the lunar surface. As lunch-time approaches, you realise to your horror that you have left your lunchbox at the top of the mine — even worse, you have forgotten all your workmates' lunches as well and they are getting hungry.

You only have a short lunch break, so you must use your jetpack to manoeuvre your way to the top, and collect all the lunches, then jump down the lift shaft, lunches, then jump down the lift shaft back to the bottom.

Unfortunately each of the levels are connected by openings which keep on closing due to seismic activity deep within the Moon. You must be careful jumping through the openings, otherwise you will lose points by bumping your head.

Full instructions to playing the game are included in the listing. Good luck!

## Program notes

### Arrays:

SL — Jet man flying left  
SR — Jet man flying right  
NO — Number 10  
CB — Lunch box  
BL — Blank

### Variables:

SC — Score  
HC — High score  
DX — X position of jet man  
DY — Y position of jet man  
BX — No of lunch boxes  
LD — Position for lunch boxes  
AS — Draw string for letters and numbers on high res screen  
ZL, BS, CL, DS, ES, FS, A1, A2, A3, A4, A5, A6

Are all string and score variables used in the full of time

### Program structure:

Lines 40-170 Read and Poke machine code data and error check

Lines 170-440 Instructions  
Lines 440-540 Installation  
Lines 540-600 Move instructions  
Lines 600-800 Set up and draw screen  
Lines 800-1000 Main loop

### Subroutines:

1040 — Decrease score if bump head  
1070 — Time up (lunch break over)  
1210 — Bonus routine  
1360 — Go again routine  
1450 — Pick up lunch box  
1510 — Come down lift routine  
1610 — Move right  
1660 — Move left  
1680 — Move up and left  
2100 — Graphics poke routine  
2310 — Draw string routine and data  
2410 — Actual draw routine

### Machine code routines

EREC 20000 Screen invert  
EREC 20100 Noise  
EREC 20150 Scroll screen clear  
EREC 20010 Platform scroll routines

```

10 REM****MINER*****
20 REM**STEVE GATHERCOLE**
30 REM***1985*****
40 POCLEAR 0
50 CLEAR 200,25555:G=30000:S=0
60 REM**READ R/C DATA
70 FOR N=0 TO 177:READ H#:POKE A+N
,VAL,"SH"+H#
80 S=S+VAL("SH")+H#
90 NEXT N
100 IF S=10777 THENCLS:PRINT" R/
C DATA ERROR":SOUND 250,6:END
110 DATA 0E,04,00,06,04,00,40,A7,0
0,0C,04,00,25,F5,39
120 DATA 0E,0C,00,0E,00,34,04,C6,1
D,06,00,A7,1E,50,26,F9,25,04,E7,1F
,10,0E,01,0C,00,00,25,E7
130 DATA 0E,13,1E,0E,02,34,04,C6,1
D,06,02,A7,01,50,26,F9,25,04,E7,04
,10,0E,00,0C,12,00,2C,E7
140 DATA 0E,10,00,0E,00,34,04,C6,1
D,06,00,A7,1E,50,26,F9,25,04,E7,1F
,10,0E,01,0C,10,00,25,E7,39
150 DATA 30,32,06,FF,23,04,00,07,F
F,23,00,00,01,06,FF,07,FF,20,00,17
,7F,FF,20,00,12,20,01,0C,00,A7,25,
0D,04,FF,23,04,F7,07,FF,23,25,32,3
9,1F,12,31,0F,26,FC,39
160 DATA 0E,04,00,0E,00,34,04,C6,1
F,06,00,A7,1E,50,26,F9,25,04,C6,0F
,E7,1F,0C,04,00,25,00,39
170 CLS:PRINTG10,"MOON MINER"
180 PRINTTAB,STRING$(16,"*")
190 PRINT:PRINT"YOU ARE A MINER IN
THE MINE"
200 PRINT"WORKINGS DEEP DOWN IN TH
E MOON."
210 PRINT:PRINT"IT IS NEARLY DINNE
R TIME AND "
220 PRINT"YOU HAVE LEFT BOTH YOUR
OWN AND"
230 PRINT"YOUR WORKMATES LUNCH BOX

```

```

65 UP "
240 PRINT"ON THE FIRST LEVEL!!"
250 PRINT:PRINT"YOU MUST GET TO THE
TOP OF THE"
260 PRINT"WORKINGS AS QUICK AS POSS
IBLE"
270 PRINT"USING YOUR JET PACK"
280 EXEC 30000
290 PRINT$99,"PRESS ANY KEY";
300 AB=INKEY$:IF AB="" THEN 300
310 CLS:PRINT:PRINT"UNFORTUNATELY T
HE OPENINGS IN"
320 PRINT"EACH OF THE LEVELS KEEPS
MOVING"
330 PRINT"AND YOUR DINNER BREAK DO
ES NOT"
340 PRINT"LAST VERY LONG!!"
350 PRINT:PRINT"USE THE RIGHT JOYS
TICK TO MOVE"
360 PRINT"LEFT,RIGHT, AND USE THE
FIRE"
370 PRINT"BUTTON TO JUMP THROUGH T
HE"
380 PRINT"SMALL OPENINGS YOU MUST
NOT "
390 PRINT"SHUP YOUR HEAD ,YOU LOSE
POINTS"
400 PRINT:PRINT"ONCE YOU HAVE COLL
ECTED A BOX"
410 PRINT"QUICKLY RETURN DOWN THE
"
420 PRINT"LIFT SHAFT TO THE RIGHT
OF THE"
430 PRINT"THINE WORKINGS"
440 EXEC 30000
450 REM=INITIALISE
460 DIM BL(8),BR(8),RD(2),LB(2)
470 DIM SL(8),RL(2),RL(2)
480 XX=10:YY=10
490 JB=JOYSTK(0):JL=JOYSTK(1)
500 SC=0:DIM DD(12):BN=4
510 LD=101:SC=0:HI=0
520 GOTO 1070
530 PRINT$99,"PRESS ANY KEY";
540 AB=INKEY$:IF AB="" THEN 540
550 CLS:PRINT$16,"NEARLY READY"
560 PRINT$99,STRING$(6,"*")
570 PRINT:PRINT"IF YOU COLLECT ALL
THE LUNCH"
580 PRINT"BOXES BEFORE THE LUNCH B
REAK"
590 PRINT"IS OVER YOU WILL RECEIVE
A BONUS"
600 PRINT"DEPENDING ON HOW MUCH TI
ME IS"
610 PRINT"LEFT AND ADDED TO YOU SC
ORE"
620 PRINT:PRINT"GOOD LUCK....."
630 EXEC 30000
640 GOSUB 2320
650 PROC 3,1:POL
660 REM=SET UP SCREEN
670 COLOR 4:LINE 0,0 - (254,14),PSE
T,0F
680 GET 00,1) - (90,16),00,0
690 COLOR 3:LINE 0,20 - 162,20 ,PSE
T,0F
700 COLOR 3:LINE 0,50 - (230,50),P
SET,0F
710 COLOR 3:LINE 0,100 - (140,100) ,
PSET,0F
720 COLOR 3:LINE (166,100) - (230,100
),PSET,0F
730 COLOR 3:LINE 0,140 - (54,140),P
SET,0F:LINE (72,144) - (230,140),PSET
,0F
740 COLOR 3:LINE 0,180 - (254,180) ,
PSET,0F
750 COLOR 3:LINE (230,54) - (230,190)
,PSET
,PSET
760 COLOR 3:LINE 0,80 - (254,190),PS
ET,0
770 S=4:R=33
780 FOR R=33 TO 48 STEP 5
790 PUT (S,R) - (S+13,R+5),LB,PSET
800 NEXT R
810 R=33
820 PUT (0X,0Y) - (0X+13,0Y+21),0R,PS
ET
830 PCOPY 1 TO 5:PCOPY 2 TO 6:PCOPY
Y 3 TO 7:PCOPY 4 TO 8
840 PRINT$99,"PRESS ANY KEY";
850 AB=INKEY$:IF AB="" THEN 850
860 TB="STEVE":DB="DONALD":DB="MIC
KY":EB="WINNIE":PB="PROLET":A1=0:
A2=72:A3=0:A4=0:A5=0:A6=0
870 XX=0:YY=3:AA="SCORE":DRAW"C250
":GOSUB 2410
880 XX=160:YY=3:AA="HIGH":DRAW"C250
":GOSUB 2410
890 XX=60:YY=3:AA=STR$(SC):DRAW"C2
60":GOSUB 2410
900 XX=215:YY=3:AA=STR$(HI):DRAW"C
250":GOSUB 2410
910 SCREEN 1:0
920 PLAY"V21T203L06L0004L00L00L06L
06L0003L06L06L0004L00L00L0003L06L4
06L06004L4003L0L6L06L06L06L06L0
"
930 REM MAIN LOOP
940 TIMER=0
950 JB=JOYSTK(0)
960 EXEC 30015
970 TI=TIMER
980 IF JB>33 THEN GOSUB 1620
990 IF JB>31 THEN GOSUB 1010
1000 IF 0Y>50 AND 0X>25 THEN GOSUB
1460
1010 IF TI>=6000 THEN 1000
1020 IF LD=141 THEN GOSUB 1320

```

```

1030 GOTO 950
1040 IF SC=0 THEN RETURN
1050 PUT (GX, Y) - (Y0, Y5), (GX, Y5) : PSET: SC =
SC - 1 : XX=GX: YY=3: AA=STR$ (GX) : DRAW"C
250":GOSUB 2410
1060 RETURN
1070 REM#TIME UP
1080 XX=35:YY=65:AA="LUNCH BREAK O
VER":DRAW"C250":GOSUB 2410
1090 FOR G=0 TO 4:EXEC 30100:NEXT
G
1100 FOR T=0 TO 500:NEXT T
1110 A1=SC:CLS:RND 63:PRINT309,"FI
NAL SCORE WAS":SC:
1120 IF A1>A6 THEN PRINT305,"":IN
PUT "YOUR NAME":Z4 ELSE 1150
1130 IF A1>A2 THEN A6=AS:AS=AA:A4=
A3:A3=A2:A2=A1:PA=EA:EA=DA:DA=CA:C
B=TB:TB=Z0:GOTO 1150 ELSE IF A1>A3
THEN A6=AS:AS=AA:A4=A3:A3=A1:PA=E
A:EA=DA:DA=CA:CA=Z0:GOTO 1150 ELSE
IF A1>A4 THEN A6=AS:AS=AA:A4=A1:PA
=EA:EA=DA:DA=Z0:GOTO 1150
1140 IF A1>A5 THEN A6=AS:AS=A1:PA=
EA:EA=Z0:GOTO 1150 ELSE A6=A1:PA=Z
0
1150 PRINT170,A2"BY "TB:PRINT2
24,A3:"BY "CA:PRINT230,A4:"BY
":DA:PRINT350,A5:"BY ":EA:PRI
NT420,A6:"BY ":FA:
1160 PLAY"O2T5V15CV10CV5CP200V150V100V
10V50FP200V150V150V50P200V150V100V
50V150V10V50FP200V150V100V50P100
V150V10CV5CV2C"
1170 PRINT400,"ANOTHER GAME (Y/N)
?":
1180 AA=INKEY$:IF AA="Y" THEN FOR
M=1 TO 32:EXEC 30150:NEXT M:PROD0
,1:GOTO 1000
1190 IF AA="N" THEN CLS:END
1200 GOTO 1180
1210 REM ***BONUS
1220 FOR G=1 TO 3
1230 XX=45:YY=65:AA="BONUS BONUS":
DRAW"C450":GOSUB 2410
1240 EXEC 30100
1250 XX=45:YY=65:AA="BONUS BONUS":
DRAW"C180":GOSUB 2410
1260 NEXT G
1270 GO=INT (6998-TD /50)
1280 FOR T=1 TO 50
1290 SC=SC+1
1300 EXEC30100
1310 PUT (GX, Y) - (Y0, Y5), (GX, Y5), PSET
1320 XX=60:YY=3:AA=STR$ (GX) :DRAW"C
250":GOSUB 2410
1330 NEXT T
1340 IF SC>HI THEN HI=SC:GOTO 1360
1350 GOTO 1000
1360 PUT (217, 1) - (247, 15), (60, PSET
1370 XX=215:YY=3:AA=STR$ (GX) :DRAW"
C250":GOSUB 2410
1380 GOTO 1000
1390 REM#GO AGAIN
1400 PCOPY 5 TO 1:PCOPY 6 TO 2:PCO
PY 7 TO 3:PCOPY 8 TO 4
1410 IF SC>HI THEN HI=SC
1420 DX=10:DY=165:SC=0:L=0:Z=0:R=0
3:LD=101
1430 TIMER=0
1440 GOTO 970
1450 REM#PICK UP LUNCH BOX
1460 IF L=0 THEN PUT (5, 0) - (5+13, R)
5, (0, PSET: SOUND 250, 3:PUT (5, 0) - (
5+13, R+5), (L, PSET:R=R+5:PUT (60, 1) - (
90, 15), (60, PSET
1470 IF L=0 THEN SC=SC+10:XX=60:YY
=3:AA=STR$ (GX) :DRAW"C250":GOSUB 24
10
1480 PUT (GX, DY) - (GX+13, DY+21), (BL, P
SET
1490 L=1:OX=25
1500 RETURN
1510 REM#DOWN LEFT
1520 PUT (GX, DY) - (GX+13, DY+21), (BL, P
SET
1530 OX=OX+14
1540 PUT (GX, DY) - (GX+13, DY+21), (BL, P
SET
1550 DY=DY+4
1560 PUT (GX, DY+4) - (GX+13, DY+17), (BL
, PSET
1570 IF DY>=165 THEN 1590
1580 GOTO 1540
1590 IF DY>=165 THEN PUT (GX, DY) - (
GX+13, DY+21), (BL, PSET:DX=DX+10:DY=16
5
1600 IF SC=0 AND L=1 THEN PUT (5, LD
1) - (5+13, LD+4), (LB, PSET:LD=LD+5:Z=1:
L=0:RETURN
1610 REM#MOVE RIGHT
1620 PUT (GX, DY) - (GX+13, DY+21), (BL, P
SET
1630 DX=DX+9
1640 IF DX>=222 AND (DY+21)<50 THEN
N OX=222
1650 IF DX>=222 AND (DY+21)<50 THEN
N OX=225:GOSUB 1520
1660 PUT (GX, DY) - (GX+13, DY+21), (BL, P
SET
1670 IF PEEK 665200=126 OR PEEK 665
200=254 THEN 1700
1680 RETURN
1690 REM UP RIGHT
1700 PUT (GX, DY) - (GX+13, DY+21), (BL, P
SET
1710 FOR T=0 TO 1:EXEC 30015:NEXT
T
1720 PUT (GX, DY-15) - (GX+13, DY+6), (BR
, PSET
1730 IF PPOINT (GX, DY-18) <=1 THEN
GOSUB 1040:PUT (GX, DY-15) - (GX+13, 0

```

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```

Y+63 ,BL,PSET:PUT (DX,DY) - (DX+13,DY+
211) ,SR,PSET:RETURN
1740 PUT (DX,DY) - (DX+13,DY+211) ,BL,P
SET
1750 DY=DY-15
1760 PUT (DX,DY-30) - (DX+13,DY+21) ,SR
,PSET
1770 PUT (DX,DY) - (DX+13,DY+211) ,BL,P
SET
1780 DY=DY-30
1790 RETURN
1800 REM MOVE LEFT
1810 PUT (DX,DY) - (DX+13,DY+211) ,BL,P
SET
1820 DX=DX-8:IF DX<=0 THEN DX=0
1830 IF Z=1 AND DY>144 AND DX=-10
THEN DX=18
1840 PUT (DX,DY) - (DX+13,DY+211) ,BL,P
SET
1850 IF PEEK(163200) =126 OR PEEK(163
280) =254 THEN 1870 ELSE RETURN
1860 REM UP LEFT
1870 PUT (DX,DY) - (DX+13,DY+211) ,BL,P
SET
1880 PUT (DX,DY-15) - (DX+13,DY+21) ,BL
,PSET
1890 FOR T=0 TO 1:EXEC 30015:NEXT
T
1900 IF PPOINT (DX+7,DY-230) <1 OR P
POINT (DX+7,DY-230) <1 THEN GOSUB
1910:PUT (DX,DY-15) - (DX+13,DY+6) ,BL
,PSET:PUT (DX,DY) - (DX+13,DY+211) ,BL
,PSET:RETURN
1910 PUT (DX,DY) - (DX+13,DY+211) ,BL,P
SET
1920 DY=DY-15
1930 PUT (DX,DY-30) - (DX+13,DY+21) ,BL
,PSET
1940 PUT (DX,DY) - (DX+13,DY+211) ,BL,P
SET
1950 DY=DY-30
1960 RETURN
1970 GOSUB 2100
1980 GET (5,6) - (13,21) ,BL,G
1990 PCLS:GET (5,6) - (13,21) ,BL,G
2000 GOSUB 2100
2010 GET (5,6) - (13,21) ,SR,G
2020 PCLS:GET (5,5) - (13,13) ,PL,G
2030 GOSUB 2100
2040 GET (6,6) - (13,5) ,NO,G
2050 PCLS:GET (6,6) - (13,5) ,NL,G
2060 GOSUB 2100
2070 GET (6,6) - (13,5) ,LB,G
2080 GOTO300
2090 REM GRAPHICS
2100 PMODE 3,1:PCLS
2110 FOR N=0 TO 2
2120 A=1536+N
2130 FOR D=1 TO 24
2140 READ S:POKE A,S
2150 A=A+32
2160 NEXT D
2170 NEXT N
2180 RETURN
2190 DATA 0,1,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
2200 DATA 16,88,85,253,253,101,102
,153,85,85,85,150,20,20,20,20,20,2
0,20,88,88,4,0,0
2210 DATA 0,0,0,0,64,64,64,64,64
,64,64,64,0,0,0,0,0,0,0,0,0,0,0,0
2220 DATA 0,0,0,0,0,0,1,1,1,1,1,1,
1,0,0,0,0,0,0,0,0,0,0,0,0,0,0
2230 DATA 4,21,85,127,127,89,153,1
92,85,85,85,150,20,20,20,20,20,20,
20,21,21,16,0,0
2240 DATA 0,0,64,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
2250 DATA 34,34,34,34,34,34,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
2260 DATA 160,32,32,32,32,160,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
2270 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
2280 DATA 5,21,101,140,85,85,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
2290 DATA 0,64,144,144,80,80,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
2300 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
2310 REM DRAW STRING ROUTINE
2320 DIM L$(24)
2330 FOR K=0 TO 26:READ L$(K):NEXT
K
2340 FOR K=0 TO 9:READ N$(K):NEXT
K
2350 DATA BR2,ND4R3D2NL3ND2BR2,ND4
R3D3NL2PDL3BU4BR2,NR3D4R3BU4BR2,N
D4R2PD2NL2BR4BR2,NR3D2NR2D3BU4BR2
2360 DATA NR3D2NR2D2BR4BR2,NR3D4R3D
3LBR2BR2,D4BR3D2NL3D2BR2,ND4BR2,SD4
REU3L2R3BR2,02ND2NF2R2BR2
2370 DATA D4R3BU4BR2,ND4PBRND4BR2,
ND4P3BU4BR2,NR3D4R3BU4BR2,ND4R3D2NL
3BR2,NR3D4R3BU4BR2
2380 DATA ND4R3D3L2P2BU4BR2,SD4R3D
3L3U2BR2,RND4BR2,D4R2U4BR2,D3PF
U3R2,D4PUBR2
2390 DATA 0P2D3L2L3U2BR2,0PND2DUBR
2,R3D3D3R3BU4BR2
2400 DATA NR3D4R3D4BR2,SDEN4BR2,R
2D2L2D2R2BR4BR2,NR3D2NR2BR2D3R2U4BR
2,03R2D3U4BR2,NR2D2R2D2L2BR4,D4R2D
3L2D2R2BR2,R2ND4BR2,NR3D4R3D2NL2DUB
R2,NR2D2R2D2U4BR2
2410 DRAW "BM"+STR$(D)+", "+STR$(Y)
2420 FOR K=1 TO LEN$(M)
2430 M=RIGHT$(M,K,1)
2440 IF M="9" AND B<="9" THEN 0
REM NUM(VAL$(M)):GOTO 2470
2450 IF M=" " THEN N=0 ELSE N=ASC
$(M)-64
2460 DRAW L$(N)
2470 NEXT
2480 RETURN

```



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## Jet Set Willy

**Program:** Jet Set Willy, Software Projects, Gibraltar Complex, Alerton Road, Wootton, Liverpool, 26 28P. Price: £7.95

I **HAVE** never before felt the computer urge to have about a game to everybody, but not...

Jet Set Willy, is simply the best thing since The King in fact, it's better. The game is a work of art, and epic, and any other great praise that I can think of.

There are several reasons for buying this game. It is a better follow-up to the brilliant BASIC follow than anyone could have assumed possible: it is challenging, combining beautiful elements of adventure (strategy and planning) and arcade (simple controls, everything graphical). The graphics are the best I have ever seen in PMODE 4; there is one Demon who is simply brilliant. It gives a great chance to gloss at your Spectrum owning friends. Ring them up and invite them round to play the game. When they arrive have the game already loaded but leave the title page



going, allowing them to see the joystick option (STRIKE ONE). Start playing and soon they will pop up with "But it's only in Black and White! That's not up to snuff is it?"

At this point proceed to "The Guest Room", "The Games Room", and the rest of the fifteen extra rooms that the Dragon version has, being careful to point out that these rooms have all been fitted into 32K as opposed to the 48K I took to write their smaller version.

Take them to be done somewhere — due to the small size of their brains, which have been numbed by the fact they haven't programmed anything since they

bought their Spectrum, they will almost definitely be frustrated and confused.

If we all buy this one, then Software Projects will write another one, and another one, and another one...

There's no point in trying to copy it, it contains the best set of anti-dirty devices I have ever seen (including a chart that would surely take months to copy out).

The game has an annoying bug — when the player dies the new life starts at the plate that the old one finished, which can occasionally be directly under a creature (ie chessman, mad man, giant, ice-cream, spinning robot, silicon chip, etc...), causing the loss of all eight lives (yes, you need them all).

If you don't have a copy of Hutchback then don't panic, you'll find four screens (open it on the roof of the house, along with lovely screen names one of which sounds like an extract from Juddisworld, but isn't).

What else can I say? Big, neat, fun, so anything but get enough money for this game... you will never regret it.

Jason Odaum



## Spygy

**Program:** Spygy, Microdeal, 41 Tulse Road, St Austell, Cornwall. Price: £8.00

If **NOTHING** else, this qualifies as the software with the silliest title, though it does offer a little more than that — in fact 250 pictures which cover 300 locations in an attempt to produce a kind of graphics adventure. The setting is the Deathbar where you are trapped with one Dark Lord Vader, who sounds vaguely familiar. You don't want to get too familiar with him, though, as if you encounter him you can be sure he won't be offering you cups of tea and cucumber sandwiches. You need your Light Saber to see him off, and to do that you need to find something that will deal with the "villain" alien that's guarding it.

As you can see, the adventure elements are here, and the graphics side complex, for the most part, a 3-D maze of corridors and rooms a little like Salamander's Red Menace or Microdeal's own earlier Phantom Slayer. The pictures, which are simple but convincingly done, take up one quarter of the screen, leaving room for an inventory alongside with the bottom half of the screen given over to the text. You move along the corridors using the up arrow key, and turn with the left and right arrows, movement being instantaneous and very impressive. Doors open automatically when you come to them... which is not necessarily a good thing as some lead to instant death as you may step into a pit that's guarded by some kind of toxic field, or into another corridor where there's no air. The spacesuit I've found has holes

in it, and this didn't do me a great deal of good. Another door leads to a room with a star in it, so I tried EXAMINE POOR, to be given the helpful information "It's wet." I'd also apparently forgotten how to swim so that wasn't a great success either.

There are plenty of other rooms to explore, and objects to slowly amuse, and despite the difficulty of mapping out the maze of corridors which all look so similar, I liked the blend of graphics and adventure — not the easiest thing to do on the Dragon, and by simplifying the graphics they can squeeze in a vocabulary of 62 words. Not bad, and as long as you don't expect a conventional adventure Spygy shouldn't disappoint.

Mike Gerrard



## Jigsaw

**Program:** Jigsaw, Wdpps, 125 Occupation Road, Croydon, Northants. Price: £3.95

WDPPE is a name new to me amongst Dragon software companies. Even if they have been around for quite a long time, I do not see their chances of survival for much longer as being very high.

The fault with this piece of software is the same as that of so many that we reviewers receive: the programming quality may be of a very high standard, but the idea is simply unworkable.

The programming in this game is superb (excluding the bugs mentioned below) but the game suffers from the fact that there are very few people who want to use a computer to do a jigsaw, even one of their own design!

So, what do you receive for your money when you buy this game? Basically (I'm not intended — the program is mainly in BASIC), you get three routines, a jigsaw routine, a very simple drawing routine, and a screen dump routine for a fair selection of printers.

The jigsaw routine is the main part of the program. This takes the graphic screen and divides it up into squares (no, not jigsaw like pieces, just identical squares) and you have to get them into the right places to complete the jigsaw.

The drawing program has several bugs, not least of which is the program's seeming inability to allow you to move the cursor, despite following the clear instruction to the letter.

If you don't like jigsaws, or you don't like computer logic games, then steer clear of this game. If you like both, then steer clear of this game.

It is a shame that I have to write such a scathing review as the programming is really rather good in parts, but I'm afraid I'd just need a new debugger, preferably one who knows something about market demand.

Jason Odaum



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### BLAST V

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### BLAST VII

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### BLAST VIII

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YET ANOTHER international journey this month, headed by Moshe Pelegov of Golan 40, Golan 5227, Israel, who apologizes for his poor English, though not for your he hasn't been able to finish off Black Sanctuary, on which he offers a few clues, including what to do with the door that's boarded up (clues being printed backwards): ROM MAHWA LD HTHW LMAN LLUP. Thanks for that clue, Moshe, and I can assure you that your English is much better than my Hebrew.

Mind you, I think even my Hebrew is better than my Norwegian, so just as well reader Robert Brunk of Skoleinneset in Norway speaks good English, too. How Norway might be famous for fjords and parrrots, but samaras are a little thin on the ground so Robert's having trouble getting out of Level One of Tattaykuzian Tower from Richard Shepherd. I've asked Robert to be a bit more specific as this 3-D graphics maze can be negotiated with a mixture of plotting and plotting... though only to the even harder second level. I made it to the top of the tower but the crazy Count saw me off with no bluffin. If all else fails I shall hand Robert over to the man with the parrot, Richard Shepherd himself.

A recent letter from Touchmaster confirmed that they'll soon be extending their range to take in the Adventure International "Mysterious Adventures" series, recently taken over by A.I. from Chameleon II, with a welcome reduction in price at the same time to £7.95. Touchmaster will also be handling adventure titles from smaller software houses, such as Nemesis's The Foot of Annot Bloodwood an adventure I do recommend, and if you've sampled the Annot style of humour and liked it then you'll be pleased to hear that Nemesis is currently converting another from the Annot to the Dragon. More details when it's been done.

Ken High of 62 Littlemore, Eltham, London SE8, offers help to anyone with the Dan Diamond trilogy or Ring of Darkness, though he himself can't get on of the cases in The Dark Spectrum. He says he's broken the minor several times, to no effect, and can't think of any other possible exit. My advice is: DMEITRWH OPHR MOKSO TYHT. Letters from Ian and others show that there's no such thing as an easy or difficult adventure, because what puzzles one

person seems to be a doddle to someone else, while another title might have the opposite effect.

A common problem is how to cross the water and the mountains in Ring of Darkness, which I've asked this month by Wesley Curtis of 4 Kings Drive, Gravesend, Kent DA12 5BS. Wesley should obviously write to Ian High, while less lesser-known adventures are puzzling Quentin Webb Pevsner and Castle of Doom in the former Quentin's on a ledge with a rope (but can't make use of it), while in the latter he's having trouble with the monster. Typical adventurer's troubles, so if you can help Quentin out write to him at Glen Oak, East Cowan, Northairton, North Yorkshire.

Yes, the scapies we adventurers get ourselves into. Gillian Brigham sounds like quite a straightforward person, living at the typically English address of "Inglebrugg", Ash Tree Close, Southwell, Notts, and yet here she is chasing secret agents in her spare time, thanks to Operation Defeat from Steeds. Gillian has managed to rescue the agent in Manchester, and earned herself lots of money in Southampton (no, nothing to do with all those sailors there), but she's stuck on the following: Where to find the code for the Wash computer in Quince, where to find the antidote for the agent in Plymouff, where to find the one who is dead, dumb and blind, where to find the son of the agent in a certain university town, and how to enter the shed near York Minster without being broken up. And you thought you had problems. If you can help Gillian with hers then contact her at the address above.

Philp Stoddell of Jail Lane in Biggin Hill, an appropriate address for an adventure player, thinks I ought to be writing four pages every month, including a full-page adventure helpline. Well I'm very flattered, but it might be hard to fill four pages every month in Dragon adventures, though I used Philip's letter to DRPC HAT in the editor, who has agreed to extra space when possible. Philp also kindly sent me a copy of Dragon Data's help sheet on Madness and the Minotaur, which in fact is of limited help but I will happily pass a copy on to anyone who wants it provided they enclose a.s.e.

Having dealt with several old problems, on to an adventure that's sure to create

some new ones, and that's Caverns of Doom from Microcad, a machine code text-only adventure of over 100 locations, being sold at the low price of £4.99, though that's no reflection at all on its quality. The story is that you are in a network of tunnels in a mine complex, and all you have to do is find your way out. You begin just inside the entrance, with the south tunnel behind you collapsed and your only safe route being to the north. A seasoned adventurer never goes anywhere without having a quick INVENTORY, and this reveals you to be carrying a flashlight. At least we won't have to waste time looking for our old friend, the torch. The screen is split into three sections, the top two-thirds being description, what you can see plus inventory, and at the bottom right is a mini-compass which displays your available exits — a neat idea. Alongside that is room for your inputs and the responses.

Venturing into the mine proved at least one of my assumptions wrong straight away, for in a small one-room prospector's shack is a tool chest, a jar, a broken lamp and an oil drum. Obviously the flashlight isn't going to last forever, so how do we fix the lamp? The tool chest is locked, so perhaps there's a key in the jar (EXAMINE JAR, "It contains pickles.") So much for that, though I did try picking the lock just in case. In a dead-end I found some beams, which cheered me up, and elsewhere a skeleton, which didn't... well, not at all. Further tramping around uncovered some other familiar objects, the good old rope and the good old matches for instance, along with signs that an earlier player was the good old real heroing — no, not a pickled herring. By now I was running out of hands, and my flashlight was growing dim, then before you know it: total darkness. Well all know what happens if you move round in the dark, too, don't we? Wrong again here you can continue to move, so if your map is accurate survival might be possible, as indeed might a little more light.

For a liver Caverns of Doom is definitely worth grabbing, with its quite extensive vocabulary, SAVE and LOAD routines, GET (EVERYTHING) and DRPC (EVERYTHING) commands, SCORE (out of 80) and an inventory that actually takes account of the weights of different objects. Let's just hope I can get a good way into the caverns. ■

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# Dragon Answers

## Oh Brother!

Q&A I owned a Dragon 64 to a Brother EP-22 Typewriter printer via the PDB22 ports (that is do they both have the same standard)?

K S Adams  
Portland

A I DON'T see any problems in connecting the PDB22 ports together, providing you can obtain, or make a suitable lead. You will need to set up the head unit of the Dragon's port to the correct value, given in the printer manual. Use the PDBE given in the Dragon 64 supplement. To print out on the PDB22 port, rather than the extension port, type PDBE 0020.1. You may also need to type PDBE 002.2, if the printer does not function correctly.

## SN error

I'VE GOT a Dragon 64 and recently I bought a game called 7th Level's Cricket by Pegasus. After loading it I got an SN error line 0620. Is this line there in a user document. Could you please tell me how to correct this line?

Karlton Houslin  
Bedford

THIS HAS come up before, but again a number of letters have come in regarding this problem on various games running on the 64, written for the 32. The syntax error is caused by the line having an extra character in the user number — eg X—SDP0(A). This was necessary on the 32 but on the 64 it should read X=SDP0(A). You can simply edit the offending line and re-run the program in most cases.

Software programmers might like to use the following lines to test whether the program is running on a 64 or a 32.  
100 VMS—CMSG(104+1000)  
—CMSG(104+1000)  
110 IF WMS—64 THEN (Dragon 64) ELSE (Dragon 32)

## INKEY

I'WOULD like to find out properly how to enter the keyboard arrow keys. I know that it has something to do with INKEY but would like to know if there are any standard lines for all programs.

V Edwards  
Preston



THE FOLLOWING few lines can be inserted to check for the four arrow keys; the command following the THEN can either be a goto or a direct command(s) to handle the key press.

```
100 IF INKEY=CURR THEN (go down arrow)
110 IF INKEY=LEFT THEN (go left arrow)
120 IF INKEY=CRS(10) THEN (go down arrow)
130 IF INKEY=CRS(20) THEN (go right arrow)
```

You can also check for the arrow keys plus shift being pressed by substituting these numbers in the above CUR; statements, 25, 64, 65, 95.

## Double up

I HAVE a Dragon Solo Single disk drive and I would like to ask you if you could possibly suggest somewhere that I could have a second drive fitted to it.

Ideally I would like to have the upgrade done as soon as possible as I am constantly using the Disk for Word Processing and the like.

Peter Collins  
Dorset  
Dorset

COMPUSOFT, the new Dragon distributors can supply a second disk drive upgrade kit for £100. Fitting a second drive is a simple enough task for just about anyone at home with a torx-driver. If just involves removing the cover from the drive and pulling five plugs into the second drive, it requires no soldering.

## ?FM error

I AM having trouble with a Basic program that was saved to tape

using EXEC=75M. As it was a basic program, I tried to LOAD it. This, and CLOAD, resulted in an FM ERROR. Trying to load it as a file also failed. Could you tell me how to load it as it is the only copy of the program I have?

Robert Gowing  
Ayles  
Aylesbury

I AM afraid the program has probably been saved incorrectly, as the correct address for the Basic save routine is AC757, not 40756. You could use the following assembly routine to load in the file as it was saved, and providing the Basic is not corrupted, you can then save the file using CSARE. It is a good idea to use IBM routines to do things like save programs when the SAVE command is adequate.

```
JSR (SAR04) (READY FOR INPUT)
LDR #434
STX 106
JSR (SAR06) (SET HEADER)
LDR 26
LOOP STX 126
PDB# 8
JSR (SAR08) (READ A BLOCK)
LDR 104
INCA
BGT 60F
LEAR 256,X
BVM LOOP
BFI LDR 126
LEAR -1,X
STX 97
JSR 3583
JSR 33773
PDB
```

## Semigraphics

COULD you please inform me how to obtain the additional screen graphic modes not supported by Dragon Basic by join-

ing, as I don't possess an assembler.

Joe Lee  
20 Whitstone Avenue  
Aylesford 1989 624

IT WOULD take up most of this page to describe all the additional graphic modes which the VDG is capable of, but which Basic does not support. However, a mode called Semi-graphics 20 is generally regarded as the most useful and is described here. This mode allows all nine colours to be used, as well as text and 64 by 192 graphics. The simplest way to enter this mode from Basic is with the following lines:

```
10 PDB00 4.1 SCREEN 1.0 Use Basic to set up PDB start with 0.
20 PDB# 00022.4
30 PDB# 00055.0 PDB# 00055.0
```

The pages in line 20 are not actually necessary with the PDB00 4 statement, but are included for completeness. All access in this mode must be by going to the screen (starting at 1000). Basic cannot plot or plot on the screen in this mode. You might like to take a look at a program called Mousesprite II, which adds commands to the basic to control some of these extra modes, details in our Pegasus Software, 35 Parker Street, Preston, Lancs PR2 2AH.

## SAVE

I HAVE had my Dragon Dos since Christmas. When saving one of my test programs, I accidentally pressed enter when only typing SAVE. I have found a way to load SAVE. I have found a way to load SAVE. I have found a way to load SAVE. I have found a way to load SAVE.

Simon Butler  
75 Queens Head Way  
Aylesford  
Nottingham NG15 2SU

IT IS an interesting point you have raised here. The only way to kill off a program saved with SAVE is to change its name by direct access to the directory track — track 20. If you do attempt this using SRAAD and SRAWT I suggest you use a backup copy of the disk as you mistake could corrupt the directory and lose all your files. What you really need is a 'Disk Doctor' type program, but I have yet to see one for DragonDOS. It is worth noting that programs saved with SAVE can be loaded and run, but alternatively not killed. This does have its uses.

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# Enter competition or Hulk smash!

Gordon Lee sets the competition, *Adventure International* provide the prizes

**READERS** who regularly attempt the competition in *Dragon User* will have found instances where the standard mathematical function of the *Dragon* is inadequate. For example, in the March competition it was necessary to compute the exact value of factorial 52, and the following month the solution relied on calculating successive powers of 2 and 5 accurately in order to determine which of these powers contained any zeros.

In the case of the powers of 5, to obtain the values up to  $5^{10}$  it is clearly not sufficient to write a program such as:

```
10 LET T=1
20 FOR N=1 TO 100
30 LET T=T*5
40 PRINT T
50 NEXT N
```

If this program were to be run it would work satisfactorily for a few steps and then two things would happen. Firstly, when  $T$  reached a value of 10 the computed value of  $T$  would be given as 1.22070313E+09. This is due to the computer switching to an exponential form of notation now that the value being handled has exceeded nine digits — in other words, is greater than 999999999.

The second thing that will happen if the program is left to run is that an *OV* (overflow) error will occur after step 34, due to the number being calculated being too large for the computer to handle. We also have the additional problem that the computer is also only able to hold a space or so significant digits in the calculation, and so although it keeps a record of the absolute magnitude of the number, the precise value of the minor digits is lost forever. It is a sad fact that the mathematical capability of the *Dragon* (and other micros) is little better than that of a cheap pocket calculator!

However, rather than admit defeat, we can easily devise a method to overcome the difficulty. In the case of the problems mentioned, the full value of the powers of 5 up to  $5^{10}$  can be handled using the program listing given. A quick examination of this listing should make its mode of operation clear. Note how the powers of 5 are stored in strings rather than as numeric variables, which, as has been shown, are inadequate for numbers of this magnitude. Each step is the extracted in turn from the string, a simple mathematical operation performed, and the resulting value returned to string form. Note the use



of the 'Carry' variable, where necessary. In this way the full value of  $5^{10}$  with its 70 digits is easily manipulated, and there is no reason why even greater powers could not be calculated by modifying the program

to accommodate hundreds, or even thousands, of digits. One way would be to utilize a string array, each variable containing, say, 200 digits.

This month's competition is to devise a program along the lines of the one already mentioned, which will compute square roots. The program should allow an input of any number of up to nine digits, and should be able to calculate the square root of that number to a high degree of accuracy, the limitations only being the amount of memory available for storing the numbers generated, the length of time that the calculator takes, will also, presumably, have a bearing on the extent to which the competition can be carried out.

The method of calculation chosen should be at the competitor's own choice, and should be outlined briefly. The program should be written in BASIC and a full listing enclosed, together with an attached list of program notes, where appropriate. Apart from accuracy, which will be tested for by calculating a known value, entries will be assessed for brevity, clarity, and speed of operation.

Good luck!

## Prize

**THIS MONTH'S** prize is something rather special — the person who sends in the best solution, in the opinion of our quiz expert Gordon Lee, will win not one but 15 games!

*Adventure International* are donating one copy of each of the Scott Adams adventures as a prize for the most perspicacious participant — that's *Classic Adventures 1 to 13* inclusive, plus *Spiderman* and *The Hulk*.

In addition, the 25 runners-up will be receiving a copy of *Classic Adventure 13 — Claymorgue Castle*.

That's a grand total of 40 games to be won!

## Rules

**ENTRIES** for this competition should be clearly marked *Competition Corner June* on the envelope, and should include your

name and address in block capitals.

Your entry must arrive at *Dragon User* by the last working day in June. The winners will be named in the September issue of the magazine.

## March Winners

**THE WINNERS** of our March competition were Zhiveli Chen of Bristol, Steve Worsley of Ilford, Raymond Woods of Barkingville, M. Layland of Grantham, C. Jones of Llanerch, T. Potter of Chisleton, Robin Telfman of Sale, Ian Mitchell of Llanfairpwll (etc), P. Beaumont of Largs, M. Fecher of Maidenhead, Ned Skelton of Thornbury, Steve Haines of Croftfoot, J. Hewitt of Hixon, P. Bennington of Strood, and H. van Gestel of the Netherlands. Each of them will be receiving a copy of *Microdeal's Worlds of Flight*.

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