

DRAGON

USER



December 1987

The independent Dragon magazine

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STOP PRESS • STOP PRESS • STOP PRESS

Sourcebit Software's story now available
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Editorial

ON 5th December 1987, the new-look, comfy chairs and carpets version of the 8008 Show falls London in the Covent Garden area — see the ad, on the back page for details. Do come. The Dragon shows need your support, and if you need tempting, you can always combine it with a bit of Christmas shopping in one of the old town's nicest bits. If G Anderson will be offering C64 it at an even further reduction, just for the day of the show, so it's worth the trip just on that count.

If you have ideas, prepare to spin your wheels. Next month we are starting one of the longest programs ever run in IDUG, a set of extensions for Music Maker by David Martin. Bring your best reading glasses, tea, as well as your ear trumpets, because we'll either have to make it small, or re-name ourselves Dragon Music.

I observe that Paul Grade of NUG has been appealing for help with Dragon Update, pondering his nervous breakdown, and he hasn't been getting a lot of response. Now come on! Some of you out there must have the odd evening, even if you can't help regularly or often. I don't know what Paul's life is degenerating, but he's beginning to sound like a winner at overworking. It doesn't matter if you're not close by, give it a try. Contact Paul at Marvino Road, Worthing, Sussex, or tel. 0902 287585.

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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 disclosures 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 wide margins and a double space between each line. Programs should, whenever possible, be computer 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 wish to have your program returned you must include a stamped addressed envelope.

Letters

Pulser praise

I must write to tell you of the excellence and prompt service that I received from Pulser Software.

Having just recently acquired a disc drive and DelinDOS and having used Magbase tape version I phoned Brian O'Connor on Tuesday evening with a view to purchasing a copy only to be informed that they did not have a DelinDOS interface but would I phone back after six.

I phoned back and was told that to would get one and would supply me a copy with Dragon User and Update file (with 40 + 6850chip). I posted my cheque on the Sunday and received the disc first post Thursday.

Well done Pulser for an excellent product and service.

Many thanks to Dave Mullis and Peter Goodwin at O'Dell and Stuart Mills and Paul Grade of Update for the help and advice given to get up the system.

Terrance Wiley
Sheffield

Merth Lane
Gallhampton
Faversham
BA22 7AY

Hi how was some DelinDOS advice? Thanks for a great magazine. Keep up the good work.

Dream saves faster

SCall of you readers may find the following tip useful, especially if like me they only have a 20M machine with no disc drive, and are into assembly language programming on the 8086.

The DREAM assembler uses a very clever method of saving its source files to tape, by using the ASCII version of the CSAVE command. Basically it saves (I think) a new file header to be written for every 255 bytes of whatever. You can hear the motor rattling/gasps/click click ... at the time during the program saving!

Every month we will be shelling out a game or two, courtesy of Microsoft, to the readers who send the most interesting or entertaining letters. So send us your hints and your opinions, send us your hi-scores and suggestions. Send us your best Dragon stories. What if you think you are a mind reader?



Lost lament

I'M surprised not to receive any longer the issue "Dragon User". I didn't get the September issue. I started to be yours in February '87 (I was ill and missed it in February '86, I can't remember why you stopped sending me your issue).

Gérard Bels
101 Avenue St. Emery
Entre-A-Appartement 7
31400 Toulouse
France

WELL, a great many people said it, but none more gracefully. The only readers who have problems now are those whose copies are lost in the post, because, as I said last month, we have no extra copies. I don't mean no spare copies, I mean... (apart from one closely guarded file copy) ... no copies.

Inevitably some copies will drift back, duplicates, taped members, etc., and we shall keep these for people whose September never arrived. But I suspect — especially when overseas readers are concerned — that a few copies are still trying to get through.

Again from slowing down the saving of the file, it can lead to a non-recoverable file if the cassette motor doesn't get up to speed quickly enough after every switching of the relay.

After a bit of searching through memory, I discovered that the control field in locations SHSPBA and SHSPBB contains the start of symbol-table address.

In order to save a source file safely, simply cut from the Dream editor via BREAK and ENTER and type the following Basic:

```
CSAVE"FILENAME",  
255*PEEK(SHSPBA)+  
PEEK(SHSPBB), SHSPBB,  
SHSPBB
```

Then press PLAY and RECDON on your cassette player, and ENTER.

This saves the source code as a straight memory dump which is a heck of a lot quicker and safer than the way Dream does it. To reload, simply load in Dream, then load in the file with a CLOAD "FILENAME" and type REBC and you should

of course reply "Y" to the "Old test?" prompt.

P.A. Daghast
Melles, W. Fries

ReaDD RightTT

MAH! thanks to P.D. Smith for his letter in the October 1987 issue of DU. These certainly was some confusion between "users" and "segment allocation size". I fully agree that the default value of 8 in the standard device descriptors should be left alone. The most significant difference between using a value of 1 and a value of 8 is the time taken to write to the disc. If a value of 1 is used (as I wrongly suggested) lots of time is taken up allocating a new segment once 256 bytes have been written to the file. A value of 8 reduces this work by a factor of eight (in most cases). In practical tests I have found that it takes about twice as long to write a long file using a

segment allocation size of 1 as compared to a value of eight. I "copy" is a special case which is not affected because it allocates space for the full file before any writing starts. This is probably much more important to the average user than a possible "segment list full error" as described by Mr. Smith.

Having looked more closely at the problem of reading non-CS-8 discs under OS-8 I have found the main reason to be the way the OS-8 drivers rely on information read from sector zero of the disc inserted into the drive. Normally this contains information as to the density, number of sides, and track density (as well as the number of sectors/cylinder). Every time track zero happens to be read by the driver it updates its internal tables using this information. Some drivers allow this information to be frozen since read, and thus the disc can be changed later for a non-CS-8 disc. Unfortunately this is not possible with Dragon/OS-8 drivers and so if by bad luck the Dragon/OS-8s damaged by ReaDD happen to have some of its contents in the first sector of the disc, then thereafter the driver tables will contain junk information and the rest of the disc will not be able to be read properly. Should this problem occur the easiest way around it is to copy the file (under Dragon/OS-8) to a newly formatted disc which will then be unlikely to use logical sector zero of the disc. This new disc can then be used to copy the file to OS-8 using ReaDD without any problem.

It is most important to tell OS-8 the format of the disc in the drive by accessing an OS-8 disc in the same format as the Dragon disc using "dir". This is especially true for double density (9600). Remember that on double density discs there are 36 sectors per track so the Dragon/OS-8 directory starts at logical sector 127 for OS-8 this means that whatever "position" is calculated in ReaDD the value 18 should be changed to 36.

Hope this will help to explain any problems some may have had with ReaDD.

Paul A. Daghast
The Ridings
Le Garanger
38810 CHARENTÉ, France

Word comes from Spain

THE next letter was written on 21st September, and echoes a lot of other bits of news we have had previously, so I am reproducing it more or less as seen, minus one or two unverifiable comments on Burghard's present position. The prose of mineian convey the blend of pride and regret in the following report from Spain.

All the love about Burghard SA

BURGHARD began to sell Dragons at the end of 1984. They made 500 every day.

It was a great industry and it had a lot of projects for the Dragon. It was supported by the Spanish government, by Planeta, an important editorial (published) by SOCRAC as important industry, by the regional government of Extremadura, and by the army. In the period October 1984 to October 1985 it sold 17,000 Dragons, but it also gave nearly 20,000 to kindergartens and public schools. Since October 1985 the government paid the 500, but when Burghard needed money for to discoveries in South American and expansion, his distributors he failed, and was submerged in a very important deficit.

His president Eduardo Manja resigned. Burghard owed some money divided in SOCRAC, Planeta, and TV3, a TV of Catalonia that made a program of how to learn Basic with the computers including a Dragon.

In the period October 1985 to March 1987 all the distributors sold his latest stock of Dragons at odd prices. And lately, the last distributor of Barcelona is giving his Dragons to other Dragonists.

In November 1986 Burghard shut his shops in Madrid and his shops in Barcelona shut last March. In 1986 you can buy Dragons and software anywhere in Spain there is nothing that sells Dragons, nothing. His factory in Gacessa shut last May, and the only thing we can do now is to wait for a miracle.

I personally never forget my Dragon, because I have passed very entertaining times with it.

The Dragon is a dead

Josep Jane
Josep-Maria, S
SOCRAC (Barcelona)
(Barcelona)
Spain

I'm sure that you will publish this letter, and guarantee that the contents of this letter is true.

WE'VE been getting periodic letters from all over Europe saying that Burghard was no longer answering letters or making deliveries, and our attempts to get some news from the Calera de la Torre were met with a polite blank, until one day nobody answered the telephone at all.

Josep's letter is by far the most detailed information we have had about Burghard's fate. If anyone in Europe has any newspaper reports which they can send, so much the better. Include a translation, please — I only read schoolish French and Anglo-Saxon.

Burghard (or its distributors) apparently went on trading on the European mainland for longer than in the UK, so Europeans generally have had more news that England has.

What is really amazing, and has been for most of this year, is that, having that miracle, no more Dragon hardware is going to be manufactured in the future by Burghard, whose are still, as far as we know, the official licensees.

It's always a sad moment to receive a requisition for a former supplier. But Dragoners have been getting along quite well by themselves, and look like continuing.

Josep is also now the official representative of the Dragon Soft Club of Valencia, at the address above.

Dragon to octal

I have written to inform the readers of DU about some features of the Dragon which are not described in the manual that I discovered some time ago. Firstly, the Dragon is capable of octal hexadecimal conversions using 'X' for example PRINT \$10 will display 9.

Secondly the DRAW command has an easier method of including variables interesting. Instead of Dragon programs you will see lines such as DRAW "BM" + \$TR\$(X) + " " + \$TR\$(Y). The Dragon will understand the much simpler alternative DRAW "BM" + X + Y. The variable name is preceded by an equals sign and succeeded by a semicolon. This format can be used in place of any number in a DRAW command.

P. D. Smith
University Hall
Birkenhead Road
Penylan, Cardiff
CF2 2YD

Ireland calling

I have been getting Dragon User every month since issue 1 and since it is now my favourite, I think it is better in every way. I like the shape, the printed quality, the layout and the style of programming. But there is just one thing I would love to see in Ireland and that is DRUGS.

I know for a fact that there are a lot of Dragon owners proud of their machines. If anybody is organising a Dragon Show here, it would be just great.

Keep up the good magazine for a few years more. When all the other magazines are dead, the Dragon will still be around and kicking.

Gavin Griffin
St John's Park
Tallaght, Co Dublin
Ireland

PS I would also like a few people to let me know what my way games, hints, old games etc.

Toolkit in a socket

UPON reading the October '87 edition of your excellent magazine please keep up the good work! I read with interest the article in Dragonsoft on premier's Toolkit and don't be.

I am in possession of two Premier software packages on Eprams, namely Toolkit and Encoder 68. An excellent assembly of a member. I also have Toolkit on disc, either 5.25 or 3 inch. If anyone has prob-

lems obtaining these programs they can write to me.

Also, I notice it says in the article that the software must be used in conjunction with DataDOC.

This is not true, as any cartridge may be fitted with the Epram (I have a cartridge, with two sockets, which will take both programs, in any position and provided that Dragoners has a spare socket. I don't see why Toolkit or Encoder should be tied to that.

Hope the above is of help.
C. P.A. (Lurgan)
rd Patterson Road
Creecham, Bucks HP10 2DD

NDUG bargain

THE modern review by Ken Smith misses one important point: members of the NDUG get a £25.00 discount on the price of their Dragon. Smith pointed out that purchasing the modern is a waste of money if you have a Dragon 10 to become a member, as the group is a bargain at £5.00. Anyone contemplating purchasing the modern and not already an NDUG member would do well to join and get the bargain for the price of one.

P. J. Deed
27 Finbar Rd.
Elton, Gwent
NP23 4EP

My disc runneth over

IS there anyone out there who can help and stop my Premium Disk Full Error? I use Microsoft's Telewriter program with Gnosser Software's Super-DOS 86 chip. The program works well but fills discs far too rapidly. Gnosser have informed me that there is a problem with Telewriter but do not know the cure, their advisors are in touch with the author of the program, Gordon Twiss — I've tried but without success. So does anyone know of a cure before I sink under a pile of discs?

Mike Hales
23 Cranston Road
Dorchester, Dorset
DT1 1EP

Suppliers get together for Show

DRAGON publishers and retailers are gearing up for the 1989 Show in London on December 5th.

H C Andersen Computer Inc., the official licensee for OS-9 software, will be taking a stand at the show, at the Connaught Rooms in London's West End.

This is the first time that H C Andersen have attended a UK Dragon show, and they will be selling the OS-9 operating system at a special show price of £99.

Maria Miron Software and MacGowan Consultants will be joining forces on a double stand. Bob Harris will be showing his recently published Kik Utility, and MacGowan Consultants have told Harris that they will be demonstrating 16 systems

of desktop publishing for the Dragon.

The editors of Dragon's *Academy* course-launching after-semester with twenty-six pages, and will be giving away topics. A link up from the show via Prestel, is also users at the show to communicate with users elsewhere. Has been proposed.

QuickSearch will be at the show, demonstrating some new software.

David Martin of MusicMaker fame will be demonstrating some more of his music software, some which will appear in Dragon User over the next couple of months.

And these are just the ones who have called us here in the last few days.

Dragon User hopes to be seeing you there!

Starship in search of new sponsor

STARSHIP-UP Software has had to temporarily withdraw all its software published by Microvision, as a result of that company's recent cessation of trading.

The Cartwrights are currently looking for a new outlet, and would like to hear from anyone who is seriously interested in distributing their games. "I would like to make it clear that I have NOT abandoned the Dragon. I have a couple of new titles finished, and several on the way," says Jonathan Cartwright.

The titles affected are *Starship Destroyer*, *Dungeon Country*,

Wild West Destroyer, *Compass*, *Companion* and *51Pea*.

Enquiries to Starship (8th floor, 23 Tattenham Road, Chesham, Bucks HP8 3DF).

Motorbike repair

The author of *Motorbiking in the November issue of Dragon User* writes to say:

"It has come to my attention that the program can sometimes give unexpected results. This can be rectified by adding the line:

```
2228 B = 0 : P = 0 : X = 0
```

"This note to the original program still apply."

Booklet for beginners

VCR4SURE Television are marketing a booklet in conjunction with their Channel 4 production *So life Bought A Computer*.

The booklet costs £1 and is a greatly simplified guide for the prospective user, especially the non-technical or business user. Literally an introduction to the idea of computers, only the style and brevity of the booklet gives rise to a number of small inaccuracies, but anyone starting to use or expand a computer system seriously would quickly clear these up by reference to more comprehensive sources. This is a wedge in the door.

The six-part series is also available on video (VHS or Betamax) for £49.95 for 'business and commercial use' and £29.95 for 'home educational institutions'. Both prices include VAT.

The programs are also available singly, but at a rather less attractive price.

68 Club keep going

TWO copies of 88 Microcom, the journal of the 88 Micro Group for May and July, arrived next or less next to last. July includes a hardware/software project to make a calendar/book for the MC88000. May is mostly a report on the Group's AGM. They seem to have faced and once again averted the catastrophe which confronts all small organisations from time to time: no problem solving able and willing volunteers to undertake the necessary tasks involved in running the club.

However, the July issue demonstrates that they are well under way again. The membership secretary is Kath Barnes of 176 Great Cox, Springfield, Chesham, Bucks HP8 3LA, and the group has a bulletin board number on Tom Gosselin's 24-hour board at 01-994 9622, 1st part, 1st stop, 8 date, 780000000 00000000.



As silent as a printer

EPSON are joining the rush to develop quieter printers by studying sound pressure levels from printers in their anechoic chamber at Hirooka, Japan.

The chamber is designed to provide a base background noise level of 50dBA (automatic decibels), compared to 'domestic room' background noise of 40dBA (30dBA, whisper) (30dBA) or air conditioning (30dBA). The lowest audible level for humans is 0dBA.

Under these conditions, with no echo or reverberation present to multiply sound and account for direction, microphones can measure sound levels unaffected by position or direction.

The noise made by operating printers will be recorded, analysed by computer and used as a sound simulation source.

Epson are committed to producing, within 12 months, a new generation of printers with noise levels of well below 50dBA. Laser and inkjet printers are already available below this level, but some printers print at 60dBA, as compared to heavy traffic passing a window at 75dBA.

Tape/mag

Dragon Tapes is a collection of Dragon programs and reviews (on cassette tape), which can be bought from A.R. Hopkins, Common Farm, Bitham, Shipshale T11 7HND. Mr. Hopkins will supply more details on request. The tape costs £1.50, and if it is successful there may be further issues. No typing!

Comms eprom achieves the peak of praise

Title: COMMON Eprom
Supplier: Prestel
Price: £14.95

THE COMMON is a substitute for the Eprom fitted in the Modern House Dragon communications cardridge and provides access to Prestel and other Videotext/bulletin boards, as well as boards requiring 1200BPS (scrolling) software. It also has other features.

The fitting instructions are clear and concise, considering no technical abilities are needed, merely care. Overall, the operation is quick and simple, if, however, the task appears too daunting. Prestelsoft's offering service also cost £2.50, which includes return insured first class postage, packaging and VAT.

Operation is straightforward. The software does not run on power up, it however, it does not, merely wait in Basic and call the COMMON by a simple keyboard instruction.

Once called, the protocol must be set by selecting either (A) raw data, or (B) raw or, for other boards, selecting (A) raw and (B) scrolling.

The whole package is menu driven so, if the protocol you

have set requires changing, a simple instruction instructs you to return you to the main menu/selection. Once the protocol is set, you may enter the terminal mode and dial up the host computer. Some boards (including the 6809 board) use multi-baudrates and adjust automatically to the user's rates; however, some models will drop the line if a carrier frequency is not detected after a few seconds, but redialling and a few seconds' delay will rectify the situation.

Control instructions in the Terminal mode are clear and simple and, indeed, Prestel Escape, controls some very useful special functions. The commands are shown as an Appendix in the written instructions and will enable colour codes, mosaic graphics, solid blocks, data and double or normal height, all attributes of an advanced terminal instructions.

Within the main menu other options are the ability to save the user's page to tape or to load a saved page from tape. The current page can be sent to a printer or a screen dump facility to an Eprom-compatible printer. Another option is to an auto-

matic mailbox menu which allows the preparation of up to 512 characters (including Escape). Within the mailbox menu commands are again clear and easy to learn. A prepared message on tape or to load a prepared message from tape and of course to return to the main menu.

When preparing a message, the characters are available for Prestel use, which again includes a facility to return to menu.

Finally, one piece of resistance of this excellent eprom, in my view, the buffer menu. Bulletin board text can move through the screen too quickly to read, to allow digest, and as calling bulletin boards normally requires a truth call, the buffer is designed for text use is also lost to be saved immediately and later perused offline at leisure. The buffer does also save Prestel screens, but they do contain sensitive characters and is the only negative comment I have against it. The buffer will store up to 30000 characters saved in a form, so that when it is full it will start again at the beginning, overwriting anything which may

already have been saved. However, a good check on the buffer menu will tell you how many characters have already been stored in the memory, and you may then save the buffer to tape and printer. There is, of course, a load buffer facility which allows a saved tape to be re-loaded, and, if there is a tape error, affords the opportunity to re-read.

Overall, I have nothing but praise for this eprom, the description of its facilities and the operating instructions are first class, simple to understand and easy to operate. The ease with which it was able to be used is a tribute to its simplicity, nevertheless allowing a powerful tool in the hands of a technical simpson.

If there are any problems, as always, Prestelsoft are very helpful indeed. The COMMON is excellent value for money at £14.95 and I have no hesitation in giving it full marks and my hearty endorsement.

R.M.L. Aswood



Kurgan's crash turns out to be lucky for adventure

Title: Starquest
Supplier: Simon Hastings,
Crawley Hill Farm, Uley,
Dorset, Glos. GL18 5RH.
Price: £5.00

THIS is the essence of the adventure series written by Simon Hastings, and although by his own admission the later titles are larger, faster and more complex, this is far from being a lost starting point.

The scenario of the test adventure is that you, in the role of the oddly named Kurgan, have, as a 12th century spaceship pilot. Unfortunately near old Kurgan is returning from a joyride flight when his craft gets a battering from a meteor storm clearing the ship's fuel rod. As there is no fuel/launcher or can park in space an emergency stop is needed in a nearby planet. Looking out of the window you realise there's

no intergalactic Base station and the fuel rod needs recharging you also need to find the launch co-ordinates for earth — these are your problems to solve.

Emerging from your ship you realise that there not only is no port station, but very little else nearby although you can go initially west or south indicated by the terminal these directions are shown upon the screen in lowercase. The other three applicable directions remain in screen in standard text.

Also shown on the screen is a description of the location (there are 82 in total this may be his first adventure but it's no great scale effort) and objects in the world that you can get your hands on. The terminal has been redesigned so this doesn't really alter the games atmosphere.

The immediate environment

reveals very little except desert, but just enough to hint at the total you across the planet by conventional methods as the old bridge collapses under your weight.

Once across the desert the adventure really begins as you enter the base and here you have to be careful which buttons (there many on the walls that you pass).

The base is a vast network of corridors with rooms branching off in all directions. There are laboratories, store rooms, pitch black rooms and communication centres. Also there are more relaxing rooms like the rest centre where you can take a well earned nap or the swimming pool where you can take a quick dip — or not you?

All in all there are 64 commands you can use one of which is 'list', which displays them all on the screen as well

as loaded and savepoints. Unlike later titles some words have to be entered in full rather than the first three letters, although all frequent commands such as 'directions' and 'presscan' be used by single letter entry.

The game is played in 'tick real time' so you don't get 'time passes' frequently flashing up but there is a day/night with your number of moves recorded.

As for faults, well, its certainly true that the other titles and certain locations are repeated several times. No major faults though.

Finally, all I can say is that as this is the first in the series, but it is the best progress through the series — they're supposed to get better and this is good!

Philip Scott



BACKING SHEET 2. Additional Volume. It has not been possible to list loading methods for every game, but see sheet 1 for a key to those given. Methods may be different if you have a different version of the games.

ICE CASTLES-(C) 20 POKÉ 19466, (LIVES) 1	POKEMON-(C) 20 POKÉ 9743, (LIVES) or POKÉ 11433, 125 (C)	MAPO HENGE-(F) During a game press the keys "P,M,K,M,Q,Q,M,M" (Just press the "M" quickly). If you are successful a heart should appear in the bottom right hand corner. You can now press "break" followed by a letter "A" to "M" to select your screen. For the below program type it in substituting LIVES for the number of lives you want, SCREEN for the screen number which you would like to start on, and INF for INF if you want infinite lives or 123 for a normal game. Once you have typed the program, type RUN then EXEC 171 -10 READ:POKE:171,M:1:1:IF 2323 THEN 90 20 DATA 16,204,0,253,183,144,144,134,144,183,31,30,134,183,1,183,91,78,134,183,91,178,128,1,153	THE KING--SEI FULC 000000000000 TO 12004, (LIVES)=200, HEAT=DEC This gives hundreds of lives.
	THE DARK PIT-(C) 20 POKÉ 11200, (LIVES) or POKÉ 11547, 125 (C) (F) during a game press the keys "P,M,L,M,C" then use the arrow keys and the enter key to select your screen, finally position your man and press enter to start.	NOB AND WILLS-(F) during a game hold down the keys "M", "A" and "I" at the same time, then select your screen using left, right and space. Finally position your man and press space again. The first of the programs below gives infinite lives and the other gives total immunity. Game typed in: type RUN then EXEC 171. -10 READ: POKÉ:171,M:5-C:1:IF 2323 THEN 90 20 DATA 16,204,0,253,183,144,144,134,144,183,31,30,134,183,1,183,91,78,134,183,91,178,128,1,153	
	NEXT ROOM-(C) POKÉ20044, (LIVES) or POKÉ1117, 125 (C)		
	WYATT WARE-To load type "SEAR 200,14000:SEI FULC:SEI FULC:SEAR" then, POKÉ20071, (LIVES) or POKÉ 20000, 125 (C) To run type EXEC		
	THE DARK MINE OF LIVES--the adventure passwords are "CODEP" and "ELL"		
	HERMITAGE-(F) From the main menu press the keys "P,M,S,Q,Q,L,S,T,L,S,enter,M" you should now be back to the menu. Hold down the keys "enter", "M" and "M" at the same time and you can access the screen designer. During a game (F) press "clear" and "M" to go onto the next screen or "clear" and "M" to gain extra lives to a maximum of 999.		
	THE BELLS (Keyboard)-(C) POKÉ 10779, (LIVES) or POKÉ218, 18 (C)		
	THE BELLS (Joystick)-(C) POKÉ 9790, (LIVES)		
	ELC HENGE-(C) 20 POKÉ 10336, (LIVES)		
	WONTERS-(C) POKÉ1000, (LIVES)		
PUZZLE MASTER-(C) during a game. POKÉ161, (LIVES)=0 and/or POKÉ101, 125 (infinite lives) Run with EXEC 7486			SPACE RAINBOW-(C) POKÉ 2004, (LIVES)=0: EXEC 16304
STURGEY ARMY-POKÉ 13367, (LIVES) and POKÉ 12388, (START STACK)	THE DRAGON COMP-DEC For a heads stop after every note, change line 333 so that there is a RETURN at the end and set a GOTO 330. Next, add the following lines "END GOTO 331 330000000000 331000000000:IF 2323 THEN 330"		
SHIA WARRIOR-(C) POKÉ 9409, (LIVES)	THE DRAGON COMP-DEC For a heads stop after every note, change line 333 so that there is a RETURN at the end and set a GOTO 330. Next, add the following lines "END GOTO 331 330000000000 331000000000:IF 2323 THEN 330"		
CHAMBERS-POKÉ 11119, (LIVES)	THE DRAGON COMP-DEC For a heads stop after every note, change line 333 so that there is a RETURN at the end and set a GOTO 330. Next, add the following lines "END GOTO 331 330000000000 331000000000:IF 2323 THEN 330"		
BOSSBILS SEVEN-POKÉ 14316, (LIVES)=Not easy)	THE DRAGON COMP-DEC For a heads stop after every note, change line 333 so that there is a RETURN at the end and set a GOTO 330. Next, add the following lines "END GOTO 331 330000000000 331000000000:IF 2323 THEN 330"		
OUTWENT IN SPACE-POKÉ 7971, (LIVES)	THE DRAGON COMP-DEC For a heads stop after every note, change line 333 so that there is a RETURN at the end and set a GOTO 330. Next, add the following lines "END GOTO 331 330000000000 331000000000:IF 2323 THEN 330"		
ROBIN HODD-(C) 20 POKÉ 15712, (LIVES)=127	THE DRAGON COMP-DEC For a heads stop after every note, change line 333 so that there is a RETURN at the end and set a GOTO 330. Next, add the following lines "END GOTO 331 330000000000 331000000000:IF 2323 THEN 330"		
HIMED OUT--Insert "EXEC10780" before the RETURN at the end of line 88 to display mines during play, or change line 203 to read "M=0:FOR 1 TO 9:1" thereafter reaching screen 3 or higher gives a choice of any starting screen.	THE DRAGON COMP-DEC For a heads stop after every note, change line 333 so that there is a RETURN at the end and set a GOTO 330. Next, add the following lines "END GOTO 331 330000000000 331000000000:IF 2323 THEN 330"		
FORMEL 20-(C) 20 POKÉ14747, (LIVES)=11)	THE DRAGON COMP-DEC For a heads stop after every note, change line 333 so that there is a RETURN at the end and set a GOTO 330. Next, add the following lines "END GOTO 331 330000000000 331000000000:IF 2323 THEN 330"		
CHUCKIE EGG-(C) POKÉ22312, 255: EXEC 16440 then when OK appears, EXEC again. This adds extra fun by enabling the man to jump to the above platform (SEE CAREFUL)	THE DRAGON COMP-DEC For a heads stop after every note, change line 333 so that there is a RETURN at the end and set a GOTO 330. Next, add the following lines "END GOTO 331 330000000000 331000000000:IF 2323 THEN 330"		
Issue 11. Updated 7/2/87. Many thanks to all the contributors.		December 1987 Dragon User 7	

Pamcodes

Part two of our series on machine code by Pam D'Arcy

COPYING machine code examples from books and magazines can be a miserable job at the best of times, let alone for a beginner. The example may use a different assembler than yours. The principle difference is likely to be in the make-up of label names, as adaptation of the source code to suit your assembler's rules should not be too difficult. There certainly have been assemblers on the market that do not support all the available types of source code instruction like the first one I purchased for more than twenty pounds. Life was tough (possible and difficult) to get a much cheaper, much better (and still available and supported) assembler package. If you find that you simply cannot obtain an error free assembler of your instructions, or cannot obtain the expected object code despite following the assembler's rules and can get no satisfaction from the software publisher, seriously consider culling your dross and starting again with a better supported assembler, having the right tools for the job gives you the best start of all.

Another difficult problem to cope with is if the source code is written in such a way that the program will only successfully execute if it is loaded at a particular address in memory. This is known as position dependent, or non-relocatable code and poses a problem if it clashes with the memory occupied by the assembler itself or perhaps, disk workspace. Printing errors provide a further headache. One can probably cope with something as printing error in a Basic program, but where does one start with assembler program mistakes?

If I have deferred you further with that catalogue of woes, take heart, as with this series of articles I have high hopes of helping you to understand what is going on within any piece of machine code, so that you can work out what, if any, changes you need to make to get it to work on your system.

Return to sender

There is a very important instruction when using machine code: RTS. Return from Subroutine is its official description, but having just come up with the above heading to describe this paragraph, I think that Return To Sender is perhaps a more apt way of thinking of it. To execute machine code, one can use the USR or EXEC functions from within a Basic program or use EXEC direct from the keyboard (= common mode). In the same way that an assembler takes source code and converts it to machine code instructions, Basic programs act as a form of source code that the Basic ROM has been designed to interpret and carry out the functions required with equivalent machine code instruction. When the Basic

ROM is asked to EXEC or carry out a USR function, it will perform a

JSR 'address'

machine code instruction (Jump to Sub-Routine) and will continue executing instructions after instruction until it meets an RTS (Return from Subroutine) instruction that returns to the next machine code instruction following the JSR instruction. In the instance being described here, that is within the Basic interpreter ROM, if the machine code has been called from within a Basic program, it will then return to the Basic program at the statement following the EXEC or USR function; if EXEC was typed in from the keyboard in command mode, will display OK to advise you that the machine code called by the EXEC command has been carried out and the Dragon is ready to receive your next command. Note that you if you forget to ask your machine code to Return To Sender after it has completed its process, as the accompanying Dragon will treat the contents of the next byte as a further machine code instruction ... and the next byte ... and the next byte ...

Try:

```
CLEAR SCREEN
POKE 40960,0
EXEC 40960
```

00 is the value in hexadecimal of the generated object code for an RTS instruction. With these commands, you will have printed a machine code program — about a single RTS instruction — and returned successfully from it.

Switch off and remove anything from your system that could become corrupted (eg the disc). Switch on and try an EXEC to any address you care for — you may be lucky and get an 'OK' without apparent ill effect — or you may effect a spectacular system crash. That is the effect of executing machine code that does not terminate with a Return To Sender instruction — the Dragon cares on as if you have instead carry out those instructions beyond the true end of your code and who knows what might happen?

Using ROM routines

It is very useful to use the existing Basic ROM routines for some functions. This in particular avoids having to understand how to communicate with the world outside the Dragon, until we feel ready to investigate and confident enough to experiment. As well as saving time by not having to design, code and test our own code for such functions, it reduces the memory requirements of our test programs by not duplicating existing code. I shall refer to using the ROM routines as 'calling a ROM routine' or something similar — in much the same way that

unless it is qualified further, any reference I make to program, routine, subroutine or module simply mean a lump of machine code.

Many machine code programs and examples use ROM calls. These can be recognised by JSR instructions

JSR 'address'

where 'address' is in the range \$0000-\$FFFF. If you are running a Dragon in 64K mode, set your alarm bells jangling immediately and look for this type of JSR (mode) ROM call as you will basically need to add \$4000 to such addresses. However, this only holds true as far as address \$0000 (page 341 of Street and Somerville, Inside the Dragon). Although I have never seen it in print, thanks to a Dragon User reader I believe that beyond that point, the value to be added is \$0F00. I will be joining the articles to the 64K mode ROM.

To execute correctly, called ROM routines may need additional information which may be provided in a combination of registers and/or fixed (Basic workspace) memory locations. Brian Cadogan's 'Forward' series (September 1985 — April 1986) and Dragon Answers column are valuable sources for Basic ROM information.

CLEAR SCREEN is a ROM call that doesn't need any additional information. Its address is \$B477 (November 1985 issue) — so EXEC 40960, \$B477 typed in from the keyboard would clear the screen, OK appearing at the top left being the Basic interpreter's confirmation that the command you requested has been completed and it is ready to receive further input. Basic programs

to GOS

or

to EXEC 40960

would get the same result.

The ROM call used in last month's article (\$B3F3) is not listed in Brian's series — it may well be one of those ROM calls that has been 'discovered' by someone disassembling the Basic interpreter or revealed by those with 'inside information' as it is probably a routine called by the interpreter when we are editing a Basic program. It also falls in the category of needing additional information for it to perform correctly — namely register A set accordingly. I am not going to discuss how the ROM routine does what it does — but, at last, I am going to discuss some machine code instructions!

Programming

Programming is the manipulation of data or information. A few machine code instructions act directly upon memory

locations but, on the whole, the data is manipulated in registers or accumulators by copying (reference known as loading) the contents of a memory location or two into a register, carrying out a function on it and copying (or storing) the result back in the same or different memory location(s). Data can only be moved to/different places in memory via the registers.

There are two sizes of register in the Dragon: single byte (or 8-bit) that can hold a value up to 255 (\$FF) and double byte (or 16-bit) that can hold a value up to 65535 (\$FFFF).

The single byte registers are:

B

DP (Direct Page)

CCR (Condition-Code Register)

Double byte registers (also known as index registers) are:

X

Y

U

SP (Hardware Stack Pointer)

PC (Program Counter)

Additionally, registers A and B can be treated as a double byte unit, named D. Affecting other than registers A, B, (D), X and Y can have a disastrous effect on your program unless you know what you are doing — so don't touch them until you have some understanding of their special functions (I write into the New Year diary that I could run this series, \$FF).

When storing data, obviously the operand always represents a memory address. The Load and arithmetic instructions differ, however, in that the operand may be an actual value rather than the contents of a memory location. The use of an actual value (sometimes known as *spread data*) is recognised by the operand commencing with a hash (#) symbol.

LD A,#3

ADD B,#5

LDI B,0x1

This can often be a source of error in coding as you can omit the #, the contents of that memory location will be used — and who knows what that memory might contain when your program is executing?

Depending on how you wish to count, there are several ways of specifying the source/destination memory address in the operand column. Once you have mastered how to calculate what address is involved in any machine code routine, you will be a long way towards your goal as you will be able to recognise where code will not suit your system and amend it accordingly.

To me, these memory variations boil down to three and a half ways, or modes:

Extended — actual (= fixed) address

Indexed — an address has been previously loaded into a register and may be further qualified by the contents of registers A, B or D or by a fixed value (known as constant offset) or +, - symbols.

Indirect — a lesser used method — both extended and indexed may additionally be indirect — acting upon the address in an address, as will be touched on below.

Direct — the 'half' method that, apart from being faster to execute and generating less object code than extended mode instruction, only has real significance if programs manipulate the DP register.

Last month's program contained an example of direct, extended and indexed modes of addressing in only the first three lines of code!

Direct mode or base page addressing

It just may be that the assembler you are using does not support this mode of addressing. If certain of last month's instructions generated different machine code, thus:

```
000010 LDH B,B
00001B STB B,B
00001C STX B,B
00001F STX B,B
```

it means that your assembler is one of these and will translate instructions as extended types. For the moment, apart from accepting that generated code may differ from that appearing in these articles, ignore this confusion from your assembler.

If you are the owner of an assembler that allows you to 'force' modes, you will be able to duplicate the above generated object code by following the assembler's instructions (eg using Dragon, preceding the operand with ! will force extended mode — I bet you always wondered what the ! symbols were for).

Memory addresses are always 16 bits or double byte values. How direct mode actually arrives at the memory address in question is that it prefixes the value generated by the operand (which is never \$FFF = never \$FFFF) with the contents of the B-bit DP register:

STB B,B

If the DP register contains 100, the contents of Register B are stored starting at address \$207B in memory. If the DP register contains 800, the contents of Register X are stored starting at address \$807B in memory.

The Basic interpreter contains many direct mode instructions, so if calling PCall routines from machine code that has altered the contents of the DP register, it needs to be reset to null (\$00) prior to calling a ROM routine to ensure satisfactory results.

For now, we will not touch the DP register

as it will remain at its default value of \$00. If your assembler supports direct mode instructions, any operands containing an actual memory address of not more than \$FFF will generate direct mode object-code unless you intervene by forcing extended mode.

Extended mode

Assemblers not supporting direct mode will automatically generate extended mode code for operands containing an actual memory address. Assemblers supporting direct mode will automatically generate extended mode code where the memory address in the operand exceeds 8 bits (\$FF). Extended mode, then, contains the full 16 bit (= double byte) address in its generated object code. JPH (\$80F3) in last month's code is an example of this.

Indexed mode

This is where a memory address has already been loaded into one of the index registers (X, Y, U, SP, PC) and memory is being accessed using that register — which may be further qualified by the contents of registers A, B or D or by a fixed value (known as constant offset) or +, - symbols. For the moment we will ignore the indirect mode instruction of last month's code (LEAX, 2,X) as the Load Effective Address (LEA) instruction is (as society's special case).

For the following examples, we will assume that memory contains:

```
$8000 $0A
$8001 $05
$8002 $00
$8003 $01
$8004 $FF
$8005 $08
```

Load actual memory address \$8003 into register X, (LDX, # \$8003)

When Register appears in the operand, the actual address is calculated by the processor before the instruction is carried out, eg:

LD A,X or LDA,B,X

copies into register A the contents of the 8 bits, or byte, of the memory address contained in register X plus null or no offset.

X = \$8003 so

LD A,X or LDA,B,X

will copy into register A the contents of memory location \$8003 = \$05.

The range of the offset can be up to +\$3FFF or -\$3FFF. With the value \$8003 in register X, what will be the contents of registers A and B after

LD A,1,X

LD B,1,X

I hope you arrived at \$FF and \$00 respectively.

Register offset

Register A or B or the combined unit D can be used as the offset. If register A or B is

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64 Columns

Paul Harrison does an upgrade on the Dragon screen display

64-COL is a program which attempts to give one thing which makes the Dragon inferior to many home computers of its class — the screen display. The table below lists several problems that Dragon Data created when they decided to use the Motorola board on which the Dragon was based too closely:

- * There is no invert/erase.
- * You cannot redline text.
- * The screen is limited to 32 columns of 16 characters — which is almost unusable.
- * There is no decent way of mixing/text with hi-resolution graphics.
- * Inverse text is not properly provided for.

Had Dragon Data changed/boosted quality 6841 video display chips (for example) the 68415 (as used in the 8085 micro) and the IBM Colour Graphics Adapter, the Dragon could have been capable of a great many other things — 16 colours, flashing colours, 80-column text, 4Hx256 resolution, etc. All this seems ridiculous in a micro with probably the best graphics facilities out of all the home market today.

Unfortunately, it is difficult to connect another VGA to your Dragon. However, if you use a few tricks involving the low quality of the standard television set, and the expandability of the system software-wise due to the useful vectors provided by Microsoft, you can get 64 columns text on the computer, allowing an amazing three times the amount of data on the screen at any time! (Because the program code this is stored in RAM, you can redline/erase as well, and ... wait! it ... you can (at last) have lowercase on the Dragon!

This is exactly what my program does. The screen mode it uses is PMODE-4 so you can mix hi-res graphics and text on the screen at the same time. The character size is 4x7, allowing 64 columns of 27 lines side-wide. Unlike some other text modes, facilities like a visible cursor are provided, when you are typing in text or while a program is running (this feature is possible to turn off). There are control codes for inverse text, for non-destructive backspace and forward space, to make the screen scroll without affecting the cursor position, and the usual Dragon control for delete and the carriage-return/line feed sequence.

The table below summarises the effects of the control codes:

- 0 No operation (NULL)
- 1 Non-destructive backspace (BS)
- 2 Non-destructive forward-space (FT)
- 3 No operation
- 4 Scroll (does not effect cursor position)
- 5 Enable cursor
- 6 Disable cursor
- 7 No operation
- 8 Delete (DEL)

- 9 No operation
- 10 No operation
- 11 No operation
- 12 Clear screen (FF)
- 13 Carriage return/line feed (CR/LF)
- 14 Home return
- 15 Inverse off (use white on black characters) These also effect the scroll and form-feed colours.
- 16 Inverse on (use black on white characters)

Facilities have been provided for machine code programmers to increase the number of codes provided. There is a vector at the end of the program location 3100h which can be patched, either by over-writing it to be placing a jump to the location to a subroutine of your own. At this point, it holds the current character (0x00-0x00ff) and any control characters that need to be interpreted, will have. Note though that you can still check for these characters, your routines being executed after the ones in the 64-Col program itself.

As a rough guide to the whereabouts of space memory, you can write your routine in the space between 3110h and 31FFh without any problems.

The Character Set

There are 128 displayable character altogether lying from 0x20 (space) to 0xFF. Characters above 0x0F are stored in the ROM and print out as rubbish. Characters are stored as 8 bytes (although only the first 7 bytes are displayed). At each line of each character has only 4 bits, the characters have two forms — one, which is printed for every odd column, and one for every even column, which uses the lower 4 bits of the 8 bytes that make up the character. This, turned out to be the easiest way of doing it, and a programmer could easily find ways of taking advantage of this.

The characters between 0x00-0x0F and free for you to redefine. You can redefine the others as well, but you may get some funny results if you do (or you imagine a listing where all the Es appear instead of space invaders 7777). You can calculate the position of the first byte of a character by using the equation $8 * C - 841760$, where 'C' is the ASCII code of the character to be changed.

An easy way of redefining characters is by using **listing 3**. This runs using 68-Cal and allows you to define characters using a grid, and a cursor that can move around the grid changing individual bits. The computer will display the codes that make up the character at the side of each line of the character, so that when you have finished, you can write them down and use

them in another program.

To demonstrate how this is done, you could using the following subroutine to define character 100 as a box.

```
1000 LET CHARACTER = 8*100 + 841760
1010 LET A = "PBOXBOX"
REM THE CODES THAT MAKE UP THE CHARACTER
1020 FOR N = 1 TO 7
1030 88 = 841760 + 8*STRING
      (MID$(A,N,2))
1040 POKE CHARACTER + 1*NAL(88)
1050 NEXT N
1060 RETURN
```

Typing in the program

Listing 1 is the only listing you have to type in. **Listing 2** is a very useful character designer (see above).

After you have typed in routine 1, GSAVE the program to tape, and then RUN it. You are bound to have made some typing mistakes, even if, magi-brilliant as I am, do that sort of thing. The computer will tell you where any mistakes have been made, and stop. You can then edit the appropriate, and/or rest it. Once the program has done typing mistakes out of it, it will set itself up for while on black text, with a cursor. The computer will clear the screen, and print the entire ASCII range (0x20 to 0xFF).

The following basic instructions have to effect:

- * CLS
- * TAB (x) and ;
- * SETRESSET (Use PSET and PRINT instead)
- * PRINT (i.e., the text will be printed at the current cursor position).

The equivalent of the instruction PRINT A(x,y) is PRINT CHR\$(14-STRING\$(y,10,0)HEND\$);

It is not a good idea to use graphics if the cursor has been switched on as it expects the screen to be the same as what it left it, and if you draw lines through the cursor, lines will appear/disappear where the cursor was beforehand.

I have not decided to produce a program that is compatible with most standard Dragon programs, as it would be difficult, if not impossible for them to make full use of the new screen size. Any programs not designed to run on this system will therefore be unlikely to work.



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Son et Lumière

John Cantrell's assistant at his slide shows is — his Dragon

OVER the years there have been many articles and letters concerning the uses to which the Dragon might be put. The search to find something useful to do with a computer is very real, although one suspects that people who read *Dragon User* are the hardcore pioneers for whom the Dragon is more than a games toy.

Many people own cameras and slide projectors, take pictures on their summer holidays and then enjoy reliving pleasant memories when they have returned home.

Obviously part of the enjoyment of a slideshow is the quality of the pictures themselves. It is well outside the scope of this article to offer advice on the actual taking and selection of slides but there are many excellent books on the subject in local libraries.

Another major aspect of a slideshow is the presentation and it is in this area that your Dragon can help turn just a collection of pictures into an impressive show.

The first and easiest use to which your Dragon can be put is in designing titles. I imagine that most users will have access to some kind of graphics programme, either bought as a package or typed in from one of the excellent articles that have appeared in *Dragon User*. There are two ways to approach the job of titling.

The first, and most difficult way is to create a library of titlescreens on cassette tape and have the titles appearing on the TV screen at the appropriate moment. Naturally the projection screen must be placed next to the TV or monitor, and the timings can be difficult. It is, though, a novel way to title your slide show and best fails to impress the viewers' interest, as I am going to suggest another use for the cassette later. I recommended the second, easier method of titling.

This method helps to give that profes-

sional touch by creating your title on the screen and then taking a photograph of it. Because of the nature of the scan on a TV set or monitor it is necessary to take the photograph at a speed of 1/15 of a second or slower. The additional need to focus close to the screen means that a single lens reflex camera is by far the best for the job, but such cameras are very common these days and most serious photographers will own one. After processing, the slides can be incorporated in the slide show sequence.

This second method of titling leaves the cassette player available for the important job of music and other sound.

The problem here concerns the type of slide projector which you intend to use. Listing 1 provides a system for a completely manual projector and prompts you as to when to change slides.

Listing one

0 Sets up title sequence.

1 — 19 These are numbered so that they match the slide numbers in the slide magazine.

20 Displays red screen to indicate the end of the show.

30 — 115 Sets the time for which the slide will be onscreen. The WAIT command is a DragonDOS command where each thousand is equal to 1 second. If you are not using a DOS these lines can easily be replaced by a FOR...NEXT loop to create the correct delay.

125 — 126 This puts a small white square on the top right hand corner of the screen. This square is the prompt which indicates to the operator that a slide has been changed.

300 — 600 This subroutine switches the cassette in and off at the correct slide. The timings for music are not as difficult as you

might expect and can be done with a stopwatch or built in timer routine. A timer routine is shown in Listing 2 and could be incorporated into Listing 1. The timer routine can then be deleted when the music finishes the slides. The slight delay at line 600 is to give time for the cassette motor to reach operating speed.

1000 — 30 Starting sequence

2000 — 30 Computer music can be played as routines and called at any particular point in the show. This example plays Ford, glorious Ford when a picture of a barbecue comes up. If you have a copy of Composer by Microbit or similar utility you can call up quite sophisticated tunes from within the program itself.

This system works very well and you can get good results. There are one or two drawbacks. The operator cannot really watch the slides because he is watching for the white dot to appear. Also, the music is not the whole sequence is then lost.

The solution to these problems is to have a fully automated show where the computer changes the slides. This is only possible if you own an automatic projector. There are two main types: (a) where the button which changes the slide is connected to the projector by a wire or (b) where the button which changes the slide activates an infra red beam which is picked up by the projector, that is, a cordless system. Both types are quite common.

Whichever type you have you will find that the switch which activates the slide change is basically very simple.

Let me make it quite clear that I am the sort of person who can have trouble changing a lightbulb — but this wiring modification is really very easy — just open up the projector's controls, find the switch which changes the slide and connect the Dragon tape lead as shown in Figure 1.

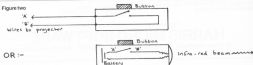
To achieve computer control of the projector you simply wire the cassette motor lead to the slide photo switch. Or, if you find the connections are as shown in Figure 2.

If you have the infra red type of projector you can now change slides with the projector in the opposite side of the room from the computer. If you have the wired type then obviously the projector will have to be fairly close to the computer.



Figure one

Figure two



Listing one

```

0  GOSUB 1000:CLS
1  GOSUB 500:GOSUB 110
2  GOSUB 105
3  GOSUB 103
4  GOSUB 104
5  GOSUB 105
6  GOSUB 115
7  GOSUB 102
8  GOSUB 108
9  GOSUB 106
10 GOSUB 400:GOSUB 105
11 GOSUB 104
12 GOSUB 102:GOSUB 2000
13 GOSUB 103
14 GOSUB 500:GOSUB 108
15 GOSUB 105
16 GOSUB 102
17 GOSUB 105
18 GOSUB 600:GOSUB 110
19 GOSUB 115
20 CLS:GOTO 20

1000 CLS:PRINT#130,"SET TAPE TO CORRECT POSITION"
1010 PRINT#142,"SET PROJECTOR TO FIRST SLIDE"
1015 MOTOROFF
1020 PRINT#226,"PRESS SPACEBAR WHEN READY"
1030 ON=INKEY$:IF ON=" " THEN RETURN ELSE GOTO 1030
2000 REM*****TIME DELAY*****
2010 A#="DAL300CL6L7ED3CL2B-L4M.7FD02BCLAB+L3B"
2020 B#="AB-AB:PLAY"VOST3"+B#
2030 RETURN

```

Listing two

Listing 2 shows how the slide delays are set up. This is a much easier arrangement than for the manual projector, and means the length of time any particular slide is on show is easily changed by altering the appropriate DATA line.

5 Prevents premature firing of the slide mechanism.

10 — 40 Start sequence.

45 — 48 Music Cue. Because the computer now controls the projector and not the cassette, these lines flash a white

screen which prompts you to switch on the tape recorder.

55 — 65 Data lines. The length is given for each slide. You add as many as you need. The total number of data statements must match the number of slides specified in line 110.

100 — 150 Main loop which reads the data and fires the projector. Line 110 is the total number of slides (see above).

Lines 108 and 260 can be used to fire all or part of the show so that the commentary and/or music can be set up on tape accurately. To use these lines just remove the

REM statement. Listing 3 can also incorporate computer music if you wish by splitting the readings of the data into two or more batches and using a subroutine for the PLAY command as in listing 1.

You should now be in a position to create a slide show which is not otherwise ordinary and will entertain other people as well as providing you with memories of your holidays. For those who wish to go further it might be possible to control both the projector and the cassette by use of relays only using the cassette port and one of the joystick ports together. Good viewing!

Listing two

```

5  MOTOROFF
10  CLS:PRINT#130,"SET TAPE TO CORRECT POSITION"
20  PRINT#142,"SET PROJECTOR TO FIRST SLIDE"
30  PRINT#226,"PRESS SPACEBAR WHEN READY"
40  ON=INKEY$:IF ON=" " THEN 45 ELSE 40
45  CLS
48  REM *****TIME DELAY*****
50  DATA 1000,1000,1000,2000,5000
55  DATA 5000,3000,4000,2500,2750
60  DATA 2000,4500,6000,1000,8000
65  DATA 4000,3000,2500,7000,9999
70  REM *****PROJECTOR SWITCH*****
100 REM TIMER=0
110 FOR SLIDES=1 TO 20
115 READ P
118 WAIT P
120 MOTORON
130 MOTOROFF
150 NEXT SLIDER
200 REM TIMER:=T/50:PRINT"TIME ELAPSED="E "SECONDS":STOP
300 CLS:GOTO 500

```

Write: ADVENTURE

A dead Dragon gives Pete Gerrard some new ideas.

CRIMINAL is a minor technical hitch (see Adventure Trail for full explanation) we won't be doing any programming this month. On the other hand, this does give me the opportunity to deliver a quick diversion to a lot of your letters, and that is: "I'd like to write an adventure but everything's been done already. Where do I start?"

Everything has been done already, is the first point to note. People have been writing books for a lot longer than they've been writing adventures, and still they manage to come up with fresh ideas. It is true that quite a large number of themes have been done so many times that there's little point in considering them further. I'm talking here about things like spoof versions of *Colossal Cave*, or plundering ideas from *Land of the Rings*.

I'll even admit to using a dwarf and a wizard in my last completed adventure, something that started off life as a very small game just for kids, a friend I have played you can complete an adventure once you've got all the main routines sorted out and working from other games. Like so many things, the adventure grew, and the legend of *Drat! Gnarling the Vandal Dwarf* is now rather more of the finished idea.

I've already started work on a follow-up to that one, but meanwhile there are so many other ideas floating about that there are times when I feel that I'll never have enough hours in the day to consider using all. All these ideas really started taking off when I "discovered" how other adventure fanatics in my locality, and we now quite regularly meet up and talk about the game, joining other more mundane matters like beer and poetry. From these discussions spring many a thought for a game, and I cannot emphasise enough how useful and important it is to get in touch with fellow fanatics (whether by post doesn't matter what colour they are — ED.) adventurers. Apart from generating ideas it helps to have someone around who can test a game for you.

One of the more unusual themes suggested from these meetings is that of considering the game from a different standpoint from the usual "You are a gaudy adventurer in search of treasure" or "You are a detective" or "You are a space pilot" or whatever. In other words, you do not necessarily have to be a human being.

For example, many of you I'm sure will have read the wonderful *The Colour of Magic* by Terry Pratchett. This has been turned into an adventure game (alas, not for the Dragons, and if you play the part of a board trapped in a strange part of an even stranger world. With you is a magical piece of animated, thinking luggage with hundreds of legs, and someone suggested that the game would have been much better if you played the part of the luggage and everything was taken from there.

Other ideas (which will never be used by us, as feel free, anybody) focused on the cartoon characters Garfield and Snoopy, ignoring copyright just for the moment, wouldn't it be a wonderful change if you played either Garfield or Snoopy in an adventure, rather than the human beings who also populate the cartoon strips? Leading on from that, there is nothing to stop you producing an adventure where the hero, the person playing the game, is a cat or dog. Apart from anything else, it gives you the opportunity to produce problems that would be different from the sort of thing that we are more used to encountering in adventures. Things could be viewed from cat or dog level, rather than human or wizard level.

Gifts are *Golden Cat*, this I believe, the *Adge* is *lightly* about. Mistakes is *just* missing. Only mistakes can open the *Final Mistake* following up by the *Cave* and *Final Mistake* doesn't lie where it landed yesterday out of reach. Cautiously you advance, one moon-shaped clear extended, it.

That is just one of the many ideas that might occur to you, which again we'll probably never get round to using, so get programming, come about the night before writing this article. By the nearest chance, two of us had met up in a pub during the evening. Oh, all right, we'd been playing adventures all afternoon and went to the pub to recover. Anyway, while there we met one of the local characters, a lad called Archie. Things happen to Archie. He's one of Mr's disasters, waiting to happen. He falls over walls, into hedges, and generally speaking if there's anything inanimate lying around Archie will sooner or later suffer at the hands of it. Wouldn't it be an interesting and unusual adventure if you were to play the part of his guardian angel and your task was to guide him through 24 hours without any mishaps befalling him? You could go north, south, east or west as usual, but Archie could say: go the put, go home, go to town, or go away from town, and more often than not would not go in the direction you wanted him to move in. Naturally, you would have to compensate by allowing the guardian angel to go twice as fast.

From this all you have to do is look around at some of the people you know, and ideas, different ideas, for games begin to present themselves. Rather like Douglas Adams and his *Infinite* game *Barbecore*, take a real life situation and think of it in terms of an adventure. Makes a change from re-reading the *Foundation Trilogy* to get ideas to rehash.

Having written the adventure you'll then want to test it was well, and this brings us back to the point mentioned earlier, namely having fellow adventurers around or contactable by post who can test the game for you. This is a turn of play you in the

position of testing adventures for other people, so what is the game player looking for when he gets his (or her, of course) game tested? Well, let's take a real situation and see what happened.

Without giving away anything about the game, a friend of mine had written an adventure that she wanted testing, and I said that I'd be happy to oblige. Anything for a drink! As well as playing and writing adventures have the good fortune to occasionally review them as well, and combining everything gives me a reasonable clue as to what people like and dislike about the games, although I know I'll never agree wholeheartedly with anyone who thinks an adventure isn't an adventure unless it has rooms of graphic screens popping up all over the place.

The first thing to look about is that in the long run if it's going to be kinder to be cruel. The person who's written the game might be your best friend, but they're not going to thank you if you try and tactfully ignore something and later a magazine reviewer with a vast audience picks on that very thing and gives the game 1 out of 10 because of it. If you see something wrong, point it out.

I start by playing the game as if I'd just rushed home from the shops, tore it out of its cellophane wrapping and loaded it into the machine. Like any other adventure, I'll begin drawing a map (always at the wrong place on the sheet of paper, naturally), noting objects found, problems encountered, and any exits that I can come back to and explore later. But then, the testing side takes over.

You have got to try doing everything to everything to see what happens. Things that you'd never dream of doing in a finished adventure must be tried and any strange results noted. Since no game is ever really complete and 100 percent free from bugs we must expect mistakes, but better to find them now while they can still be corrected.

Always play the game with a different way to find as well. Spelling mistakes are the bane of the adventure reviewer's life, since so many games seem incapable of having even the simplest word spell correctly. Some are even incapable of getting the author's name right on the opening screen, but I won't embarrass them by naming them (I'd have to tell you to read another magazine, and *She Who Must Be Obeyed* wouldn't like that. How do you know, Steve? She might be writing it...) if you find a spelling mistake, note it down and get the author to write it out 200 times.

Are the problems that you encounter logical, or do they rely on a very obscure word, or combination of words, to be solved? If you want to wedge a gate open with a stick, the program should accept anything from wedge grate with stick to

prop the gate open using the stick or push the stick under the gate. And then check to see if you meant gate. So many adventures fall down on their use of words, and it's just one at random I can think of few people who would immediately think of the word 'oscillate' rather than the word 'sway'.

Another thing that I personally dislike is encountering an 'imminent death' situation. I don't think that you should ever be killed in an adventure without being recompensed at least once, and I also don't think that you should be killed off without several warnings being given, or hints like "If you don't eat something soon you're going to die of starvation". Alas, often in games I've been killed for no apparent reason, and that should never happen.

The game MUST have a save and restore/load option built into it, preferably a tam save as well, although I'm prepared to live without that. If you're using discs, then give the player the chance to name the file, and have several different save positions available: five is usually sufficient.

Finally, does the game as a whole stand up? That is, does it make a coherent story from start to finish and provide me, the player, with an interesting and thought-provoking set of challenges that are different from anything that I've seen before? Some familiarity I'm prepared to accept, and indeed welcome on some occasions, giving newcomers the chance to feel their way gently into the great world of adventures, but if I see another version of Colossal Cave



it's going to get no marks out of ten no matter how superbly programmed it is!

But don't think that this is the end of all your hard work. You'll probably end up seeing the game two, three or even more times before the author feels confident enough to launch it on an unsuspecting public. And quite right too. There are far too many incompetent games being released, and if the situation were reversed and someone was testing one of your games you'd want it thoroughly examined as well.

No game should be released without someone else playing it through first. Different people have different ideas about different things, and what might seem an easy and logical problem to you might

perhaps defeat anyone else trying to get through. Apart from anything else, some of the ideas that you might get back will probably be things that you never thought of, and could be used to considerably enhance the game. In *Dani Glibing the Wonder Dean* you are at one point forced to get past a set of liffids (you suspect a plant), and although the problem is a new bit obscure, you are given something of a strong hint and are also told at the start of the game that a loop of puns is essential to the solving of it. It all makes sense of you play the game! Anyway, what I have suggested anyone do is to try and 'use the liffids'. Lovely idea, and there is now a suitable response to that.

To conclude, try and come up with ideas for adventures that are different from the norm, and that make a sense of surprise to the person playing the game. There's nothing worse than starting a new game and getting that 'There we go again' feeling. Ideas abound, it's up to you to write the adventures.

And if you're testing a game for someone, be ruthless. You can always buy them a drink or something afterwards and restore the friendship. They'll appreciate it in the long run. Finally, if you're writing a game, get it tested and be prepared to bring your head in shame when all the errors are reported. Don't worry, it's far better for one person to write them down than it is for several reviewers to submit them out. Cheers.

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Pete GERRARD'S ADVENTURE TRAIL

A grunting of teeth and lamentations across Wigan. My Dragon's dead! Well, it's undergoing major surgery anyway, and hence it's a little tricky repeating adventures this month. Those tapes just won't fit into an Amstrad disc drive... The scene is the shop. "Can you fix this?" I ask, presenting floppy assistant with Dragon that might well have been shot by Bard the Berserker for all I know about it. "No problem, sir," came the stout reply, Realising he was talking to me (sir?) I left the shop. One week turned into two and I went back. "Fixed the Dragon yet?" "No problem there, sir, all you need is a..." and hence named a totally incomprehensible component number at me. "Have you got one?" I asked finally. "No" was his unhelpful reply. I am still waiting.

However, absence of a Dragon does not prevent me from completing the saga of the missing cassette inlay notes from all discards, and carrying on from where we finished last month, we have the following:

Twisted Dancer are some special features of all Discards:

Enhanced movement.
Outdoor locations are large and have arbitrary perimeters that cannot be crossed. To avoid the disarray of repeatedly typing **GO EAST** etc., you choose the arrow keys to control movement instead. The upward down keys are for going north and south, the right arrow is for **GO EAST**, the **Q** key is used for **GO WEST** (this leaves the left arrow for backspacing).

Danger situations.
When a location description is preceded with the words **I AM IN DANGER!**, there is only one correct response which will keep you from being killed. There are no second chances. However, there are subtle warnings which will keep you from getting into the situation before you are prepared.

Stone hints.
It's a good idea to examine unusual things well. They will often give useful hints. You can only carry a limited number of items with you. To see a list of what you're carrying type **VIEW INVENTORY**. Should you want to save a game it is continued later, the **GSAVE** command will save the game status to tape. The **GO/DROP** command can be used to reload the game, the disc version uses **LOAD** and **OSAVE**. These commands can be used freely, easier in danger situations as noted above.

End of cassette inlay notes and back to me again. How that you know what you're doing, perhaps a few of you enjoyed further in this interesting Dragon adventure.

To the rescue

Apologies to Peter Hawes for missing him out last month. A long and interesting letter, bits of which we'll be coming to in a moment, and he says that if anyone wants any help with **Testator**, **Spygic**, **Jehonathan Adventure**, **Sunken City**, **Sea Quest**, **Shenigans**, early stages of **Justposition** and **Return of the King**, **Colossal Cave**, **Water Floater** and **King of Darkness** (that's 10, young Peter, and others go through this lot, what will he have solved by the time he reaches my exalted grave?) then send an SAE to: Peter at 9 (Stratford Road, Whitstable, Kent CT5 2EP and you will receive my help.

Anyway, back to his letter (another gravely ill, love it), and hints for me less than eight different adventures. What a busy ship.

Shenigans first of all. If you want to find the four lost down, then make a left turn a mile into a meadow of clover near the river. These are times when brother Mike's use of backward writing to disfigure letters is a point in the...

Water Floater next. When in the London scene you get thrown into the dungeons, you'll need the saw to cut bars. Don't forget the examining the skeleton man that once. Also, reveal flap in the sarcophagus to retrieve the lost treasure. All treasures must be placed in the small room at the top. If you're stuck on the scene with the furnace then try **homeness** and **h1** (granted because it's very hungry. Also, if you're having trouble with the coal (and I refuse to type all this lot out backwards) then try going away and a load to insert it in the **rephases** **destrussary**, pressing the button, and to and behind when you return **treasurypert** at before you know if you have a diamond in the chamber. Well, fancy that.

On to **Sea Quest**. You have to use the metal detector more than once. To find a passage you must take it to go and then to find yourself outside the house you must enter and only by walking back can you enter and find its treasure. To raise the anchor on the bottom you have to (careful)

drop flap with **vhahia** or **noohab** release it.

Return of the King comes under the banner now, with the following snippets of information. To escape the nightfall mutant you must ride a ewe and to get the book of skulls you have to look at each parchment you see in the nightfall mutant's cave, and then slinkily looking. You have to remember to get out of the place fast before day turns into night, otherwise you're going to be it a spot at bottom! You need full experience and many credits (I say here). Your companions **Selenites**, **Mark** the Elf and **Selone** the technician will all be helpful by carrying items for you such as weapons, rings and energy packs. **1,2,3** and 4 even try to avoid the sapper on levels nine and ten (goes without saying, really).

Justposition (is there an adventure he hasn't played?) gives us the next lot of clues, starting with escaping from the Green Tower with the **Florian** **Enraged** in it. You need to use a wonder unit, which can be found in the **Deeds of Thewes** on the other side of the river down a shack in the **Blue Lands**. If you're stuck on the top balcony, try **rethogot** several green, and climbing down then on to a lower balcony. When the droid has been killed you'll have to examine it to find an important pass.

Shenigans again. The landlord wants yemon **enish**. To wander along the streets **up** etc. is what a kind. To get rid of the muggers, you must think words to them. To get any further into adventure you need to find a gold underground **lock** and enter the gates with it.

Sabres and spiders

But enough of **Shenigans** and on to **Spygic**. To enter the **enish** **enish**, **enish** **enish**, and to go rid of the alien creature you want. Then, **enish** **enish** to light up the stone and get the light sabre in the end room. However, in the other dark room you need the light sabres fight **Darth Vader**. To kill him you need to keep your sabre crossed with his, all the time so as to sub-manoeuvre him.

Ever onwards and we arrive at **Testator**, and I'm blawed if I'm writing this lot backwards either. To get out of the mine you need to redig end of **stapap** and **enish**, which will knock it out, then take redig **enish**

Dragon Answers

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

Slightly off colour

SOME time ago I purchased a second-hand Dragon 32 plus some games. On testing it from scratch I don't seem to get all the screen colours. Colour 5 gives a purplish colour (rather than buff), blue gives dark blue, red gives pinkish/brown (have tried this on two TVs, is there a screen fault in the Dragon 32 colour circuit?)

Alan Loft
8 Richmond Road
Reading
Berk

UNFORTUNATELY, the Dragon 32's colour display was never exactly 'top of the class' even with a composite monitor. The default has been changed in the Dragon 64 which gives a much better colour display (still not perfect though). I did know of a company who would change a few transistors etc. in your 32 to improve the display quality, but alas they are no more. (Unless any reader knows of a similar service to which I'm afraid you'll just have to live with the off-shade colours on your 32)

Point floats away

I'm writing to ask for your help with regards to floating-point and any variables from memory (String variables don't seem to be any problem, but my trouble is with the SAC floating-point accumulator).

The program I'm trying to write is a spreadsheet where values in a matrix are printed on the screen. I'm willing to use BBC code to output variables to screen rather than a Basic FOR/NEXT loop. The BBC code and basic programs I am using are:

Machine Code:

ORG \$2000
JSA \$8000
TFR B,X
JSA \$C000
LDR A,B#1
JSA \$8000
JSA \$8C00
RFS
END



Basic:

10 DEF (SBO)=SA3000
(D)=4-40
(O)=VAL(PTF0A)
40 C=USBOB
50 PRINT C

The value of C should be the same as A. Please could you tell me if the routines are correct?

Paul Sweet
16 Haddon Way
Upton
Nr. Witley
A. Hants.

YOUR machine code routine calls a number of well known firmware routines. The one at \$8500 will return the value passed as argument to the 018 routine as an integer in the 'D' register (in the value of 0 in the Basic code). Unfortunately, the routine at \$8501 does not exist (or rather it's within the cartridge area). It is not a valid BBC routine. Finally, the routine \$8607 will return the value in the D register as the result of the 018 call.

You don't say where you obtained this particular routine, but as it stands it is not correct. If you wish to proceed as integer and then return one, only the first and last routines need be used.

Incidentally, using machine code ROM routines to print arrays will not noticeably increase the speed of your program anyway!

Can the Dragon speak Tandy?

I have just acquired a Tandy Speech Sound Cartridge for use with the Tandy 2000. I have a Dragon 32 and I'd just bought the cartridge for the ROM port for a physical fit and there is no problem. The cartridge has not been used with the power on. Could you tell me whether the cartridge can be used with the Dragon?

Brian Richardson
7 Gates Close
Shortlands
Barnet
Herts

I am reliably informed that the Speech Sound Cartridge is entirely hardware compatible with the Dragon (although I haven't witnessed one being used with a Dragon). Therefore, there should be no risk of harming your computer with the power on.

However, I'm told that it is unlikely that the software is 100% compatible with the Dragon. If you have the technical information on the sound chips used then it's possible that you may be able to drive the unit yourself.

Tandy routines

COULD you please tell me the Dragon equivalents of the following Tandy ROM routines:

\$D0A, \$D0A, \$D7D, \$D9E, \$D9F

Martin Evans
11 Tynan Park
Ayr
Ayrshire
Dyfed

I assume that you are trying to convert a C64 machine code program to your Dragon. If so, you are in luck, as all of the above routines have direct equivalents in the Dragon ROM. They are as follows (together with the firmware name of the routine):

Tandy	Dragon	Firmware Name
\$D0A	47852	COPY848
\$D0A	36306	COPY848
\$D7D	36465	COPY848
\$D9E	36442	COPY848
\$D9F	36306	COPY848

Over to disc

I have recently acquired two DragonDOS drives and have been steadily transferring much of my cassette based programs and data to disc. But I have a real problem with any machine code programs when I haven't tested the start, end and exec addresses. It is possible once the program has loaded from tape to locate this information so as to be able to transfer to disc?

A.D. Lloyd
321 Glider Road
Dumfrieshire
Galloway
Glasgow

THIS is a very common question from one disc drive owner, together with "How can I stop software programs from running?". Personally, there is a very simple answer in the former (but not in the latter). Load in your machine code from tape and then point the following PEEKs:

START ADDR:
PEEK \$A0720A=PEEK \$A000
END ADDR:
PEEK \$120A=PEEK \$127E-1
EXEC ADDR:
PEEK \$A032=PEEK \$A000



Winners and Losers

Every month
Gordon Lee will
look at some prize programming

WHEREAS normally the competition provides the prizes, in this case of the July issue, it was the prizes which provided the competition! This Gibraltar situation came about as the prizes were copies of John Perry's Music Maker package, and the problem was based on the words MUSIC MAKER.

The puzzle was to assign the digits 1 to 9 to the letters in these words, each different letter representing a different digit, such that the numbers formed by "MUSIC" and "MAKER" were both perfect squares. To prevent ambiguity, "MAKER" should be higher than "MUSIC". The quest was to find the different ways this could be done.

Almost all entrants adopted the most logical approach: (1) generate all five-digit squares (2) reject those containing zero or any duplicated digits and (3) from those which remain, find pairs which (a) commence with the same digit, and (b) have all other digits different.

This formed the basis of the program listing given on October's answer page. As regards the entries submitted, the task posed few problems, with the majority of competitors coming up with the correct answers — mainly using the method outlined above. The most common error was in giving only one of the two possible answers — usually due, not to any major error in programming, but simply by the program stopping after the first of the results was printed out.

The fact that most of the entries were correct came as no surprise. Over the past

three and a half years that the competition has been running, the rate of correct to incorrect entries depends generally, not on the relative difficulty of the problem — though this does affect the total number of entries submitted — but into which of two categories the competition problem falls. These are those in which the answer is easily checkable, as opposed to those in which this is not the case.

A good example of the latter of these types was the March 1987 problem which featured a small cross-number. Once a possible solution to this has been unearthed by the computer it is a simple task using pencil and paper to determine that it does fit into the grid, and is therefore correct. For this type of problem we would expect, and indeed did receive, an almost all correct set of replies. This is presumably because any obviously incorrect answers were easily detected, and were therefore not submitted. Last month on this page I gave a list of which were received and which claimed a minimum score for the June competition of a sequence of thirteens. As the answer that I had been expecting was only eight, this came as a surprise! In fact, the impossibility of this solution would have become readily apparent if each of the numbers in the chain had been printed out, the first five numbers being:

5730
7304
5038
0488
1882 ... and so on.

A simple test would have shown that none of the above values is a multiple of seven, and this would have indicated a fault in the system. In fact, when the program goes wrong it is to append the remainder found after the division, instead of finding the four-digit multiple itself.

The second of the two categories is the one in which the answer is not so easily checkable, and it is into this area that the majority of the competitors fall. Here the rate of correct to incorrect replies is much more variable, and it is in these Winners & Losers it is based.

Perhaps mention ought to be made here of a special type of competition from this latter category. This is the one in which there is not an absolutely correct answer, merely the best submitted. The competition in January to design an on-screen pattern was one such example, as was the "primrose quest" grid from last February. Incidentally, no-one has as yet succeeded in beating the grid of 179 prime numbers which I gave in July's Winners & Losers page.

Finally, mention ought to be made of the tie-breakers. They were, almost without exception, soulful that I am not even going to try sorting out the best! I can only sympathise with those of our Danish readers who are completely befuddled by this highlight of the English language. So, to Glen Nielsen of Ørskov, my apologies, and the assurance that such a fearsome tie-breaker will roll over again (well, not too often, anyway).

CLASSIFIED ADS

DRAGON 32. Books, magazines, dual color joysticks, etc. £50 onco. J.D. Laid-Green, 1 Whitlands, Raxford, Leich, W. Yorks LS29 6BU Tel: (0532) 506891.

DRAGON 32. DOS, Various books, programs, Dragon Users, P.L. Raxford, 17 Auran Crescent, Bath, Avon BA1 2BN Tel: Bath (0305) 2896.

WANTED: for cash, Petrie Pascal by Osis, M.A. Evans, 57 Catcote Road, Bournemouth, Hants. Tel: 01-953 1557.

DRAGON 32. New drive, joysticks, mouse, programs, all Dragon Users, £150 onco. Phil Jones, 17 Maidstone Drive, Wexley, Bourne, W. Mids. Tel: (0264) 270885.

AAAsingh, help! WANTED: proficient MC programmer to write program for personal use. If you are good enough, please contact me as soon as possible. **GOOD PRICE!** Philip Send S&L for details. Andrew Powell, 20 Northcote Street, Cambridge.

SUPERB WPS. 64 chars per line display, WYSIWYG, repeat, auto, ball, menu, delete, outline, blocks, window, etc. 20 redefinable printer functions. Postscript routines. Dragonator cassette. £18. R.P. Stephens, High Green, The Drive, Belsdon, Surrey GU8 7DN. Tel: 01-643 8864.

DRAGON 32. Perfect. Tape recorder, books, joystick, many tape games and tutors, B&W TV Complete kit: £110 onco. G.D. Davies, 72 Aldenham Road, Bury, Warrford, Hants. W62 2ND Tel: Warrford 22796.

DRAGON4. Handy used! Onk controller, OS-8 operating system with dialogic word processor and RMS record management system, plus other business software, sale Dragon books! £140 onco. R.J. Hoed, 52 Barnet Way, Mill Hill, 1887. Tel: 01-905 0864.

DRAGON SOFTWARE for sale. Cassettes and cartridges, all originals, cheap prices. Also back issues of Dragon User from '83 onwards. Please Matthew Lodge on 0600 72707 or send S&L to: Mace Main, Holmes Chapel Road, Lach Dennis, Northwich, Cheshire CW9 7GJ.

940C SYSTEMS, DRAGON 30S, SCOOTERS, and DELTA. Affordable. Carriage with manual, only £35. Also drives and printers. Send via S&L (or 2 clip stamps), to PRO-TECH SYSTEMS (OS), 25 Pelican Road, Farnham Heath, Basingstoke RG25 6EN.

HERE'S MY CLASSIFIED AD.
(please write your code in capitals on the lines below)

Name

Address

..... Tel:

Please call out and send this form to: Classified Department, Dragon User, 12-13 Little Newport St, London WC2E 7PW.

Using this method, you will be able to find the centre of any maze. Your route will not necessarily be the shortest possible, but it will work.

To give you practice you may like to try the method but using the existing given box which generates a maze layout around which you can travel by using the four arrow keys. You are given a birds-eye view of the portion of the maze around your present position which enables you to see just the neighbouring passages. Your position is denoted by the G, and the centre of the maze by the E. To assist you in your task you can also drop markers. By pressing any letter key (A to Z) an appropriately

labelled marker will be left behind when you move it. To pick up any marker use the space bar.

Take care when typing in the program — especially lines 28 and 30, and the DATA line 330, as these determine the layout of the maze. The actual method that the program uses to create the maze from this information is deliberately devised!

Now for the competition. I have a small cuboid of wood which measured 7 by 8 centimetres in size. The cuboid has been painted on each of its six faces and I have now sawn it into 336 centimetre cubes. Of these smaller cubes, 216 of them will have at least one face painted, while the

remaining 120 cubes (those from the inside of the original cuboid) will be completely unpainted. If I were to collect all of the painted cubes I could build them into an exact 6 by 6 by 6 cube. This is the smallest cuboid (having its principal dimensions differing by 1 centimetre) that is possible.

The next largest in the series would be one measuring 8 by 8 by 8 centimetres, where 1384 painted cubes would form an exact larger cube 24 centimetres along each edge.

Can you determine the next largest cuboid that is possible under the given conditions?

This is Gordon Lee's own solution to the November competition — see page 26 for results

The Answer

ANSWER: The missing digits are 7762521080

SOLUTION: The problem can be more easily handled by 'inverting' the calculations to be made. We are interested in the value of N in the following expression, with the product being equal to R ($y = 34543$):

$$34543 \times y = R_{(10^6)}$$

R represents the repeat number which consists of 34543 ones, consequently the value of y can be determined by dividing 1111111... by 34543. The process of long division as done using pencil and paper, when taken step by step, involves determining how many times 34543 will go into a 5- or 6-digit number and the remainder so produced. This is a function easily handled by the computer, whereas

the original sum is not — at least, not directly.

The program is quite simple. Starting with six 1s (as computed at line 30), this string variable is converted to its numeric equivalent (line 33). This line also defines variable A as zero. This variable will eventually represent the following digit of the dividend in the calculation. To compute this digit and also determine the remainder at each stage, the value of N (which is repeatedly subtracted from R at line 40). This is done until the value of R is less than N . Each time that a subtraction takes place the variable A is incremented by 1. Once R is less than N the program jumps to line 70. At this point R will represent the remainder to be carried forward to the next step in the calculation, and A the following digit of the dividend.

R is then converted to a string variable and '1' is tagged on the end. This is equivalent to 'bringing down' a 1 if we were performing the calculation on paper. The digit in variable A is printed out on screen so that we can keep an eye on the progress of the computation. The reason for converting it to a string first is so that it can be printed without spaces appearing between the digits. Note also that when converting to a string from a numeric variable, the leading 'zero' space is removed by using the `STR$` function.

As each successive digit is computed variable D is incremented to keep a tally of the number of digits in the dividend. When this reaches 20 (10 computations) the last ten digits on the screen are the required numbers.

Listing

```
10 R="11111" : I=1 : N=34543 : D=0
20 IF VAL(STR$(R)) THEN R=R+STR$(I) : I=I+1 : GOTO 20
30 R=VAL(STR$(R)) : A=0
40 IF D=20 THEN PRINT : PRINT "Computation completed at " D : GOTO 20
50 IF R<N THEN GOTO 70
60 R=R-N : A=A+1 : GOTO 40
70 R=STR$(R)+A : STR$(A) : R=R-STR$(A) : D=D+1 : I=I+1 : GOTO 20
```

Communication

Problem: I have had trouble trying to obtain Chess for my Dragon 32. If you could a supplier I would be very grateful for your help.

Name: Andrew Cressman
Address: 18, Malvern Rd
Arteson, Bevington, E. Yorkshire,
HU17 2HH

Problem: Does anyone know where I can obtain a good Dragon 32 Speech Synthesiser at a good price? Has anyone had any problems with it? Also, how much would it cost?

Name: M. McCullough
Address: 129 Cragagh Road,

Belfast, N. Ireland BT5 0LA

Problem: Does anyone know where I can obtain the MKT Controller for the Dragon 32 as Compaq's systems no longer stock it. How much would it cost?

Name: M. McCullough
Address: 129 Cragagh Road,
Belfast, N. Ireland BT5 0LA

Problem: Has anyone got a Tandy Color Computer 300 version of Windows (20 July 1985), Writer (May 1985) and Analyser (November 1985), or can anyone in touch with anyone who has?

Name: E. Neave
Address: 31 Abboton Lane,
Severn Beach, Bristol

Problem: Anyone have an MS-CALC Spreadsheet Cassette in

good nick to sell or know of something similar or better—must be cassette

Name: Les Simpson
Address: 11 Hoot Close, Littleport, Cambs. CB9 7HU

Write down your problem on the coupon below (make it as brief as you can) together with your name and address and send to Communication, Dragon User, 121/131, The Newport Street, London WC2H 9PP.

Problem

Name

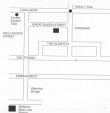
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