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STOP PRESS

DRAGON

EDITORIAL

Welcome to the third edition of Stop Press which, like its predecessors, has been sent to all those Dragon owners who returned their guarantee card. Those who have not (and there are many) are not as yet registered members of Dragon Users Club and will not be on the mailing list. If you know of anybody in this category, gently prod them to return their card so that future issues of Stop Press may be directed to them.

Though not (as yet) a fully-fledged magazine, Stop Press continues, in this and future issues, to offer Dragon owners pages of program-oriented material. Programs which (a) do something interesting (b) illustrate programming techniques and (c) can be typed into Dragon in a short time, are ideal for inclusion in Stop Press. Most of the material presented falls into at least two of these categories!

Two features in the last issue have their counterparts within. Indeed we hope that Machine Code Corner and the Young User Pages will be regular features. In the belief that there are many Dragon users who will appreciate a gentle introduction to machine code, MCC (nothing to do with cricket!) continues the series by showing how the commands introduced last time can be harnessed to perform high-speed, high-resolution graphics. As each issue is published, readers will be able to accumulate sufficient expertise to make modest use of machine code in their programs.

This does not deny the fact that Dragon's BASIC interpreter offers a rich vocabulary of commands for constructing programs, whether they be games or whatever. Two of the commands, SOUND and PLAY, are explored in the YOUNG USER PAGES which also includes a puzzle and a competition.

Mr W Harrold sent a contribution (Patterns) which exploits LINE. He and others will be interested in 'Take 1ØØØ lines' where other intriguing aspects of the LINE command are investigated. Incidentally the pictures in this and the previous issue were not produced by ruler and pencil but by Dragon and a Hewlett Packard graph plotter.

Another contribution, this time from a young user in Cardiff, is a game of skill called 'Chicane'. Full marks to Gareth Rowlands for a superbly designed game and a compact program. We look forward to many other such contributions from young and old alike.

The summer months may see a lull in programmers' activities as they take advantage of the hot weather! **But don't forget to send your entries for the 'Draw a Dragon Logo' competition (see Issue 2) by the end of July please, to the editorial address.**

Miss Cathy Hyde,
Dragon Data Ltd., Kenfig Industrial Estate,
Margam, Port Talbot, West Glamorgan

As for Dragon Data, every month, hot weather or otherwise, is a month of intense activity in preparing for the launching of new ventures and the consolidation of software for Dragon 32. Stop Press will play an increasing role in providing up to date information in the months ahead.

PRICE CHANGE

On the 23 May the retail price of Dragon 32 was reduced to £175 including V.A.T. At the same time the following reductions were made: Joysticks selection 2, Graphic Animator, examples from the manual, Dragon Mountain and Dragon Selection 1 down from £7.95 to £4.95; Ghost Attack cartridge down from £24.95 to £19.95. These price adjustments are to be enhanced by the release of approximately 25 new titles over the next few weeks with many more to follow shortly there after. Also note that the Dragon disc drive and operating system was launched at the recent Computer Fair at Earls Court, and disc-based software will be released shortly.

MACHINE CODE CORNER

An area of programming in which the effect of machine code is particularly striking is the animation of graphics. To see the limitations of BASIC in this respect, try keying in this short program:

```
1Ø PMODE4,1:PCLS1:SCREEN1,Ø:COLORØ,1
2Ø CIRCLE(1Ø,2Ø),9
3Ø DIMA(11)
4Ø GET(Ø,1Ø)-(2Ø,3Ø),A,G
5Ø FORI= 1TO235:PUT(I,1Ø)-(I+2Ø ,3Ø),A,PSET:NEXTI
6Ø GOTO6Ø
```

A small circle is drawn on the left of the screen, and moved, by the finest possible increments, to the right. The "animation" takes about 15 seconds. Our more artistic readers may like to convert the circle into a snail! (By the way, note how small the array dimension is - it needs to be about a fortieth of the area of the "GET" in pixels, which is 21x21 = 441.)

Well, how much can this be improved by using machine code? Try this one:

```
1Ø DATA  1Ø,8E,7,4Ø,86,8,3Ø,A4,C6,15,66,84,66,1,
   66,2,66,3
2Ø DATA 3Ø,88,2Ø,5A,26,F2,4A,26,EB,31,21,1Ø, 8C,7,5D,26,E1,39
3Ø FORI=ØTO35:READX$:POKEI+32ØØØ,VAL("&H"+X$):
   NEXT
4Ø PMODE4,1:PCLS1:SCREEN1,Ø:COLORØ,1
5Ø CIRCLE(1Ø,2Ø),9
6Ø EXEC32ØØØ
7Ø GOTO7Ø
```

This, of course, is really two short programs. Lines 1Ø-3Ø POKE in the machine code, and lines 4Ø-7Ø execute it. Even with the READ-POKE loop the program is finished in one second. The action itself takes one fifth of a second. After the first RUN, the machine code will be in position, so RUN4Ø will give you an action replay.

This is obviously faster than you will need for most purposes, and can be slowed by the use of delay loops. As with the BASIC program, every intermediate position is occupied, so a completely smooth movement is possible at any speed. The BASIC can be speeded up by leaving out some of the intermediate positions, but this results in a jerky movement.

Before we look in detail at animations of this sort, we must investigate the means by which Dragon stores graphic information. We shall concentrate on PMODE4,1. This makes use of memories $6ØØ to $1DFF (or 1536 to 7679), i.e. a total of 6144 bytes. In this mode, each of the 256x192 pixels is either 'on' (green or buff) or 'off' (black). If it is 'on' it has value 1, if it is 'off' it has value Ø. Pixels are grouped together in sets of eight, so the top line of the screen is made up of 32 sets of 8 pixels, and each set is represented by one byte of memory. For example, if the first eight pixels are 'on, on, off, off, on, on, off, off', then $6ØØ will contain the binary number 11ØØ11ØØ (decimal 2Ø4). This can be seen by running

```
1Ø PMODE4:SCREEN1,Ø:PCLS1:POKE&H6ØØ,2Ø4
2Ø GOTO2Ø
```

(PCLS1 turns the whole graphics screen on i.e. it places binary 11111111, or decimal 255, in each memory, $6ØØ to $7DFF.) So the rows of the screen are contained in memories $6ØØ-$61F, $62Ø-$63F, $64Ø-$65F etc.

From this discussion, you may have concluded that it is easier to move things up and down than sideways - and you would be right. The byte configuration remains the same in vertical movement. So let's see if we can make the balloon go up, in a controlled sort of way.

Let's start in BASIC:

```
1Ø PMODE4,1:PCLS1:SCREEN1,Ø:COLORØ,1
2Ø CIRCLE(128,17Ø),7:PAINT(128,17Ø)
3Ø LINE(121,17Ø)-(128,186),
   PSET:LINE(135,17Ø)-(128,186),PSET
4Ø LINE(124,186)-(132,19Ø),PSET,B
5Ø DIMA(12):GET(12Ø,162)-(136,191),A,G
6Ø FORI=1TO162:PUT(12Ø,162-I)
   -(136,191-I),A,PSET:NEXT
7Ø GOTO7Ø
```

Our balloon drawing is (conveniently) confined to the 16th and 17th bytes in rows 163 to 191. As with GET and PUT it is useful to include the bottom blank row to avoid the problem of "rubbing out" the bottom row of the picture as it moves up. Row 163 starts at byte $6ØØ + 32* 163 = $1A6Ø, so the top of the picture is $1A6F and $1A7Ø, then $1A8F and $1A9Ø etc.

The following assembly language routine will do the job:

```
                                 Machine Code
           LDY      #$1A6F       1Ø 8E 1A 6F
   LOOP1   LEAX     ,Y           3Ø A4
   LOOP2   LDD      ,X           EC 84
           STD      -32,X        ED 88 EØ
           LEAX     32,X         3Ø 88 2Ø
           CMPD     #$FFFF       1Ø 83 FF FF
           BNE      LOOP2        26 F2
           LEAY     -32,Y        31 A8 EØ
           CMPY     #$6ØF        1Ø 8C Ø6 ØF
           BNE      LOOP1        26 E7
           RTS                   39
```

One command you may not have met before is Load Effective Address (LEA). The statement LEAX ,Y may be compared with LDX ,Y but instead of loading into X the data *indexed* by Y, the actual *address* (the "value" of Y) is loaded into X. The opcodes for LEAX and LEAY are, respectively, hex 3Ø and hex 31.

The numbers in the *operand* field, prior to the comma, in lines 4, 5 and 8 are called *offsets.* They cause the *command* to be applied to the register value + offset. In other words, line 4 stores the value of D in the memory whose address is 32 less than the value in X, line 5 *increments* X by 32, line 8 *decrements* Y by 32.

The byte following an opcode which requires a register as part of its operand is called a *postbyte.* We met one in the last edition: ,X+ is represented by postbyte $8Ø. For our present program, we need to know that ,X and ,Y are respectively $84 and $A4 (with no offset) and with offsets in the range 16 to 127 or –128 to –17 the postbytes are $88 and $A8 (for X and Y), followed by another byte - the offset. Negative offsets are FF= –1, FE= –2, etc.

Our BASIC program, incorporating the machine code, is:

```
 10 DATA 1Ø,8E,1A,6F,3Ø,A4,EC,84,ED,88,EØ,
    3Ø,88,2Ø,1Ø,83,FF,FF
 2Ø DATA 26,F2,31,A8,EØ,1Ø,8C,6,F,26,E7,39
 3Ø FORI=ØTO29:READX$:POKE32ØØØ
    +I,VAL("&H"+X$):NEXT
 4Ø PMODE4,1:PCLS1:SCREEN1,Ø:COLORØ,1
 5Ø CIRCLE(128,17Ø),7:PAINT(128,17Ø)
 6Ø LINE(121,17Ø)–(128,186),PSET:
    LINE(135,17Ø)–(128,186),PSET
 7Ø LINE(124,186)–(132,19Ø),PSET,B
1ØØ EXEC32ØØØ
11Ø GOTO11Ø
```

Finally, to control the speed, we insert between lines 7 and 8 the following delay loop:

```
                                Machine Code
              LDX      $7FFE    BE 7F FE
     LOOP3    LEAX     –1,X     3Ø 1F
              BNE      LOOP3    26 FC
```

The postbyte of LEAX –1,X requires explanation. When the offset lies between –16 and 15, the postbyte represents the offset. For offsets of Ø to 15, postbyte = offset. For offsets of –16 to –1, postbyte = offset + $2Ø.

The only other modification to the machine code is to the relative address of line 1Ø. 26 E7 becomes 26 EØ. The following program gives a controlled movement:

```
 1Ø DATA 1Ø,8E,1A,6F,3Ø,A4,EC,84,ED,88,EØ,
    3Ø,88,2Ø,1Ø,83,FF,FF
 2Ø DATA 26,F2,BE,7F,FE,3Ø,1F,26,FC,31,A8,
    EØ,1Ø,8C,6,F,26,EØ,39
 3Ø FORI=ØTO36:READX$:POKE32ØØØ+I,VAL("&
    H"+X$):NEXT
 4Ø PMODE4,1:PCLS1:SCREEN1,Ø:COLORØ,1
 5Ø CIRCLE(128,17Ø),7:PAINT(128,17Ø)
 6Ø LINE(121,17Ø)–(128,186),PSET:
    LINE(135,17Ø)–(128,186),PSET
 7Ø LINE(124,186)–(132,19Ø),PSET,B
 8Ø POKE&H7FFE,5:POKE&H7FFF,255
1ØØ EXEC32ØØØ
11Ø GOTO11Ø
```

Line 8Ø puts the value 5*256+255 = 1535 into memory $7FFE/$7FFF. Smaller values give a faster movement; larger ones give a slower movement. The result - a very fine control over the speed of the balloon.

PCOPY with Care!

When we write BASIC programs on DRAGON 32 we are well protected by a sophisticated error trap which prevents us from giving commands that cannot be carried out. As an example of this, turn on your Dragon and type PMODE4,5. The answer is FC ERROR - you can't address page 5 in PMODE4 until you have PCLEARed 8 pages (the default is 4). So type PCLEAR8 and then PMODE4,5. This is accepted.

Now type PCLEAR4. Back comes the answer: FC ERROR. You can't PCLEAR down to 4 pages while you are addressing page 5. So type PMODE4,1 and then PCLEAR4. This is accepted.

Most commands are protected in this way. The obvious exception is the POKE command - if you POKE addresses carelessly you are likely to lose control - try typing POKE136,Ø (136 and 137 control the cursor position).

A less obvious problem is the PCOPY command. You might expect this to be protected in the same way as PMODE and PCLEAR - but it isn't. If you type a program in, and then (without PCLEARING) type PCOPY 1 TO 5, your program will disappear. This is because graphics page 1 has been copied to the location which held your program. Admittedly this would be a silly thing to do but the problem is more likely to arise with programs containing statements like PCOPY I TO J, when it is quite easy to get the value of J wrong. So PCOPY with care!

PATTERNS

Thanks to Mr William Harrold of Cambridge for this short program. He suggests using densities of between 3 and 6. It is a program that we have seen around in various forms - the intereference patterns caused by the discrete nature of the screen pixels are generally referred to as MOIRE patterns. They will occur when lines are plotted close together.

```
1Ø ' PATTERNS
2Ø ' WILLIAM HARROLD 1983
3Ø CLS:INPUT"ENTER DENSITY";S
4Ø PMODE4,1:SCREEN1,1:PCLS
5Ø FOR I=Ø TO 255 STEP S
6Ø LINE(I,Ø)–(255–I,191),PSET
7Ø IF I<192 THEN LINE(Ø,I)–(255,191–I),PSET
8Ø NEXTI
9Ø A$=INKEY$:IF A$="" THEN 9Ø ELSE 3Ø
```

Programs

PARTIAL RESTORE

When a program runs on a large number of DATA statements which may have to be accessed in any order, the most convenient method to adopt is to read the whole dataset into an array and use an indexing variable to access it. This takes up a fair amount of room in the machine, however, and an alternative is to read through the whole dataset every time access is required, using the RESTORE command to return to the beginning of the list. This is undoubtedly the most efficient method of conserving memory, but is a rather cumbersome procedure. A partial RESTORE can be achieved using the DATA memory pointer, in addresses $33 and $34 (decimal 51/52). By PEEKing these addresses at suitable points the first time the data are read, we can store relevant values so that the pointer can be reset to those points by POKEing at a later time. The principle is illustrated by this small program.

```
 10 FORI=1TO3:X(I)=PEEK(51):Y(I)=PEEK(52)
 20 READX$:NEXT
 30 CLS:PRINT@7,"WHICH STATEMENT?"
 40 X$=INKEY$:IFVAL(X$)=ØORVAL(X$)
    >3THEN4Ø
 5Ø X=VAL(X$):POKE51,X(X):POKE52,Y(X)
 6Ø READX$:PRINT@71,X$
 7Ø FORI=ØTO1ØØØ:NEXT:GOTO3Ø
 8Ø DATA "FIRST STATEMENT"
 9Ø DATA "SECOND STATEMENT"
1ØØ DATA "THIRD STATEMENT"
```

JOYSTICK GAME

This game is for two players (one on each joystick). The left joystick controls the "L" and the right joystick controls the "R". The idea is to manoeuvre your letter about the screen "running down" as many of the numbers as possible, before your opponent gets to them. You score the value of the number and your score is shown at the top of the screen. If you disappear off one edge of the screen, you will reappear immediately at the opposite edge. The numbers are 1-9 (so if you see an '87', it is just an eight and a seven together). New numbers appear from time to time to keep you busy. The time limit is controlled by the 499 in line 8Ø.

```
 1Ø REM JOYSTICK GAME
 2Ø REM A.D. MAYER 1983
 3Ø CLS4:GOSUB21Ø
 4Ø L(1)=12:GOSUB23Ø:J(1)=J+1Ø55:
    POKEJ(1),L(1)
 5Ø L(Ø)=18:GOSUB23Ø:J(Ø)=J+1Ø55:
    POKEJ(Ø),L(Ø)
 6Ø PRINT"LEFT=Ø";:PRINT@1Ø,"RIGHT=Ø
    ";:PRINT@21,"TIME=Ø";
 7Ø S(Ø)=Ø:S(1)=Ø:S=1
 8Ø FORT=1TO499
 9Ø IFINT(T/1ØØ)*1ØØ=T ORS(Ø)+S(1)=S*45
    THENGOSUB21Ø
1ØØ JY=RND(2)-1:GOSUB24Ø
11Ø JY=1-JY:GOSUB24Ø
12Ø PRINT@5,S(1);:PRINT@16,S(Ø);:PRINT@26,T;
13Ø NEXTT
14Ø IFS(Ø)>S(1)THENPRINT@263,"RIGHT IS THE
WINNER";:GOTO17Ø
15Ø IFS(1)>S(Ø)THENPRINT@263, "LEFT IS THE
WINNER";:GOTO17Ø
16Ø PRINT@26Ø,"THE RESULT IS A DRAW";
17Ø PRINT@324,"DO YOU WANT ANOTHER GAME?";
18Ø X$=INKEY$:IFX$=""THEN18Ø
19Ø IFX$="Y"THEN3Ø
2ØØ IFX$="N"THENSTOPELSEGOTO18Ø
21Ø FORI=1TO9:GOSUB23Ø
22Ø POKE1Ø55+J,I+112:NEXT:S=S+1:RETURN
23Ø J=RND(24Ø)*RND(2):IFPEEK
    (1Ø55+J)><191THEN23ØELSERETURN
24Ø H=Ø:R=JOYSTK(2*JY):IFR<15THENH=-1
25Ø IFR>48THENH=1
26Ø V=Ø:R=JOYSTK(2*JY+1):
    IFR<15THENV=-32
27Ø IFR>48THENV=32
28Ø X=J(JY)+H+V:IFX>1535THENX=X-48Ø
29Ø IFX<1Ø56THENX=X+48Ø
3ØØ IFX=J(1-JY)ORX=J(JY)THENRETURN
31Ø IFPEEK(X)><191THENS(JY)=
    S(JY)+PEEK(X)-112
32Ø POKEJ(JY),191:POKEX,L(JY):J(JY)=X:
    RETURN
```

The program uses the JOYSTK function to check the positions of the joysticks. Some versions of the Dragon primer give the JOYSTK values the wrong way round. The correct version is

JOYSTK(Ø)	Right	Horizontal
JOYSTK(1)	Right	Vertical
JOYSTK(2)	Left	Horizontal
JOYSTK(3)	Left	Vertical

If you want to use the joysticks in a machine code program, the procedure is as follows. Use the JSR instruction to execute the ROM subroutine which begins at address $8Ø12 (decimal 32786), then the relevant values, for the moment the subroutine was executed, will appear in addresses $15A, $15B, $15C and $15D (decimal 346-349). This method can, of course, be used from BASIC, using EXEC. These two programs are equivalent: try them with your joysticks.

```
(a) 1Ø PRINT JOYSTK(Ø);JOYSTK(1);JOYSTK(2);
    JOYSTK(3):GOTO1Ø
(b) 1Ø EXEC32786:PRINTPEEK(346);PEEK(347);PEEK(348);
    PEEK(349):GOTO1Ø
```

CHICANE

This driving game was sent to us by Gareth Rowlands of Cardiff. A width of road between 2 and 7 may be selected (we suggest you start at 7!) and the idea is to stay on the road for as long as possible, using the left and right arrow keys to steer. Those of us who were brought up in a more sedentary age may benefit by editing line 18Ø, to adjust the upper limit from 7 to 9. The benefits of selecting easy options do not last long - the road narrows as you progress.

```
  0 REM **chicane** G. ROWLANDS
 10 CLS:CLEAR200,29999:GOSUB 230
 20 AUDIOOFF:MOTOROFF:M1$=
    "T6O1CEGECCCEDEGEC":GOTO 170
 30 FOR I=31968 TO P-LD:POKE I,255:NEXT
 40 FOR I=P+1-LD TO P+RD:POKE I,175:NEXT
 50 FOR I=P+1+RD TO 31999:POKE I,255:NEXT:RETURN
 60 FORI=1 TO 16:SOUNDI*10+25,1:EXEC32051:NEXT:TIMER=0
 70 FOR Q=1 TO 10
 80 FOR I=1 TO 16:R=RND(2):IF R=1 THEN LC=175:RC=255
    ELSE LC=255:RC=175
 90 CP=CP+(PEEK(343)=223)-(PEEK(344)=223):
    POKEP-LD,LC:POKEP+RD,RC:P=P+(P≥31974 AND R=
    1)-(P<31993 AND R=2):EXEC32051:IF PEEK(CP)=255 THEN
    150 ELSE POKECP,30:NEXT
100 IF P<31984 THEN D=25 ELSE D=0
110 PRINT@D,INT((TIMER+100)/100)*5;
    :PRINT@D+32,"MILES";:SCREEN 0,1:NEXT
120 A=A+(A>2):SOUND200,1
130 PRINT@D+64,"ROAD";:PRINT@D+96,"NARROWS";
140 LD=0:RD=0:B=A:GOSUB 210:GOSUB 30:GOTO 70
150 T=TIMER:FOR I=1 TO 17:EXEC32051:
    POKECP+RND(3)-2,239:POKECP+RND(3)-2,207:
    POKECP+RND(3)-2,96:POKECP+RND(3)-2,159:NEXT
155 IFT<0THENT=0
160 PLAY M1$:PRINT@196,"YOU
    SURVIVED"INT(T/100)*5"MILES";
170 PRINT@230,"WIDTH OF ROAD?";:SCREEN0,1
180 A$=INKEY$:IF VAL(A$)<2 OR VAL (A$)>7 THEN 180
190 CLS8:LD=0:RD=0:A=VAL(A$):B=A:
    GOSUB 210
200 P=31982:CP=1519:GOSUB 30:GOTO 60
210 B=B-1:LD=LD+1:IF B<1 THEN RETURN
220 B=B-1:RD=RD+1:IF B<1 THEN RETURN ELSE 210
230 P=P+1:READ R$:IF R$="END" THEN RETURN
240 POKE P+32050,VAL("&H"+R$):GOTO 230
250 DATA 8E,05,E0,10,8E
260 DATA 06,00,EC,83,ED
270 DATA A3,8C,04,00,2E
280 DATA F7,8E,7D,00,EC
290 DATA 83,ED,A3,10,8C
300 DATA 04,00,2E,F6,39
310 DATA"END"
```

The machine code (lines 25Ø to 3ØØ) controls the down-scroll. The following listing may be useful:

```
                                Machine Code
         LDX     #$5E0          8E 05 E0
         LDY     #$600          10 8E 06 00
LOOP     LDD     ,--X           EC 83
         STD     ,--Y           ED A3
         CMPX    #$400          8C 04 00
         BGT     LOOP           2E F7
         LDX     #$7D00         8E 7D 00
LOOP2    LDD     ,--X           EC 83
         STD     ,--Y           ED A3
         CMPY    #$400          10 8C 04 00
         BGT     LOOP2          2E F6
         RTS                    39
```

CODEBREAKER

This is a short program to further illustrate the power of Dragon's string handling capabilities. It translates a typed message into a code which is constructed by randomly permuting the allowed letters. Because the random permutation has been generated using RND(– 1) to initialise the random sequence, the code can be deciphered using the same program providing the transmission code is known.

Of course, given time all such codes can be 'cracked' and one of the ways to do that is to use the knowledge gained from 'Letter Count' concerning the frequencies of each of the letters of the alphabet. For a literary reference read 'THE GOLD BUG' in Edgar Alan Poe's 'Tales of Mystery and Suspense'.

```
  1 REM CODEBREAKER A.M.SYKES MAY83
 10 CLS:CLEAR1000:CH$=
    "ABCDEFGHIJKLMNOPQRSTUVWXYZ,.? "
 20 CC$=CHR$(13)+CHR$(8)
 30 INPUT"1 FOR CODING, 2 FOR DECODING";C
 40 ON C GOSUB 50,110:STOP
 50 R=RND(100):PRINT"YOUR TRANSMISSION
    CODE IS";R
 60 GOSUB130
 70 PRINT@128,"NOW KEY IN YOUR MESSAGE"
 80 PRINT"(<=255 CHARACTERS LONG AND ENDING
    WITH<ENTER>)"
 90 GOSUB240:GOSUB160:CLS
100 PRINT@1,"YOUR MESSAGE READS":
    GOSUB240:PRINT@128,CM$:RETURN
110 INPUT"ENTER TRANSMISSION CODE";R
120 GOTO 60
130 Z=RND(-1):FOR I=1 TO R:Z=RND(30):NEXTI
140 CD$=CH$:FOR I=30 TO 1 STEP -1
150 Z=RND(I):CD$=LEFT$(CD$,Z-1)+RIGHT$(CD$,30-Z)
     +MID$(CD$,Z,1):NEXTI:RETURN
160 M$="":CM$=""
170 K$=INKEY$:IF K$="" THEN 170
180 CH=INSTR(1,CH$,K$):CC=INSTR(1,CC$,K$):IF CH=0 AND
    CC=0 THEN 170
190 IF CC=1 THEN RETURN
200 IF CC=2 THEN L=LEN(M$):M$=LEFT$(M$,L-1):
    CM$=LEFT$(CM$,L-1):PRINT@1,M$:GOTO170
210 M$=M$+K$:PRINT@1,M$:ON C GOSUB220,230:GOTO170
220 K=INSTR(1,CH$,K$):CM$=CM$+MID$(CD$,K,1):RETURN
230 K=INSTR(1,CD$,K$):CM$=CM$+MID$(CH$,K,1):RETURN
240 FOR J=1 TO 2000:NEXTJ:CLS:RETURN
```

LETTER COUNT

This program counts the number of occurrences of letters in writing. Just type in the words and watch the bar chart build up. There is no backspace so type carefully. The program stops when any bar reaches the top. Then you can press ENTER for a table of the number of occurrences of each letter. You can press ENTER for the table at any time during a run but the program is then terminated.

```
  1 REM LETTER COUNT M.PEARSON MAY 83
 1Ø CLSØ:DIMB(25)
 2Ø PRINT@483,"ABCDEFGHIJKLMNOPQRSTUVWXYZ";
 3Ø PRINT@384,"   5-";:PRINT@224,"15-";:PRINT@64,"25-";
 4Ø PRINT@1,A$;:K$=INKEY$:IF K$=""OR K$=CHR$(8) THEN
    40
 5Ø IF A< >  -52 THEN 70
 6Ø CLS:FOR I=Ø TO25:PRINT
    TAB(5);CHR$(I+65);B(I),:NEXT:END
 7Ø A$=A$+K$:A=ASC(K$)-65
 8Ø L=LEN(A$):IF L>29 THEN A$=MID$(A$,L-28)
 9Ø IF A<ØORA>65 THEN4Ø ELSE B(A)=B(A)+1
1ØØ I=INT(B(A)/2):IF B(A)/2=I THEN C=223:I=I-1: ELSE
    C=211
11Ø C=C+32*(A/2-INT(A/2))
12Ø PRINT@A+3+32*(14-I),CHR$(C);
13Ø IF B(A)<28 OR INKEY$=CHR$(13) THEN 40 ELSE 130
```

Another way to display the bar chart requires the following changed lines, with line 11Ø deleted

```
 1Ø CLS:DIMB(25)
1ØØ I=INT(B(A)/2):IF B(A)/2=I THEN C=58:I=I-1: ELSE C=46
```

TAKE 1000 LINES

The LINE command can draw lines on the screen in any direction. Unlike the DRAW command it is not limited to eight directions. The command requires the co-ordinates of the end points of the line. It is very useful to have the high-resolution grid for reference. Once the end points have been established the LINE command takes another parameter, PSET or PRESET. PSET draws the line in the foreground colour whereas PRESET draws it in the background colour. The colours can be chosen using the COLOR command. This has two parameters FG, the foreground colour and BG, the background. The colours must be chosen with respect to the SCREEN in use. If the COLOR command is omitted the foreground colour will be the highest number available on that screen and the background the lowest. There is another form of the command LINE-(XB,YB) which draws a line between the new point and the last one used in a LINE command. If the first LINE command in the program is of this form, a line is drawn from the centre of the screen to the point. Using PRESET, the first time round might be one way of removing this line. In addition to PSET and PRESET there is another parameter: by adding B to the LINE command a box is drawn instead of the line, the diagonal of the box being the original line. If BF is added the box is filled in the foreground colour.

The following program shows a triangle subroutine in use. The co-ordinates of the three points are chosen at random and the colours are rotated. To colour the triangles in, a point inside the triangle must be found for the PAINT command. In this case the points of the triangle are chosen at random. So which point lies inside the triangle? The point whose co-ordinates are the average of the X values, (XA + XB + XC)/3 and the average of the Y values (YA + YB + YC)/3 will certainly lie inside.

```
 1 REM TRIANGLES M.PEARSON MAY 83
1Ø PMODE3:SCREEN1,Ø:PCLS
2Ø FOR C=2 TO, 4: COLOR C,1
3Ø XA=RND(255):XB=RND(255):XC=RND(255)
4Ø YA=RND(191):YB=RND(191):YC=RND(191)
5Ø GOSUB7Ø:PAINT((XA+XB+XC)/3
   ,(YA+YB+YC)/3),C,C:NEXT
6Ø GOTO6Ø
7Ø LINE(XA,YA)-(XB,YB),PSET
8Ø LINE-(XC,YC),PSET:LINE-(XA,YA),
   PSET:RETURN
```

Writing a lot of LINE commands can be tedious. One way out is to write the command as a subroutine and change the values of the end points either by defining them directly in the program e.g. XA = 1ØØ, or, by reading them from DATA statements.

The following demonstration program shows how DATA statements can be used with a LINE subroutine to make a picture out of filled boxes. The COLOR command allows the boxes to be different colours. Only when a variable is changed does it's new value have to be READ. The program draws ten boxes and then RUN should reveal one very familiar 'box'.

```
  1REM BOX M.PEARSON MAY 83
  10 PMODE3:SCREEN1,1:PCLS:C1=7:C2=8:CO=C1
  20 DEF FNC(C)=-(C=C1)*C2-(C=C2)*C1
  30 FOR I=1 TO 5:READ XA,YA,XB,YB,C:GOSUB1000:NEXT
  40 FOR I=1 TO 2:READ YA,YB:GOSUB1000:NEXT
  50 READ  XA,XB:GOSUB1000
  60 FOR I=1 TO 2:READ YA,YB:GOSUB1000:NEXT

 120 GOTO120
1000 COLOR C,5:LINE(XA,YA)-(XB,YB),PSET,BF:RETURN
2000 DATA 20,40,180,170,8,40,60,135,130,
     6,60,150,104,144,7
2010 DATA 148,110,170,156,7,148,60,155,70,7
2020 DATA 75,85,90,100,163,170,75,85,60,70
```

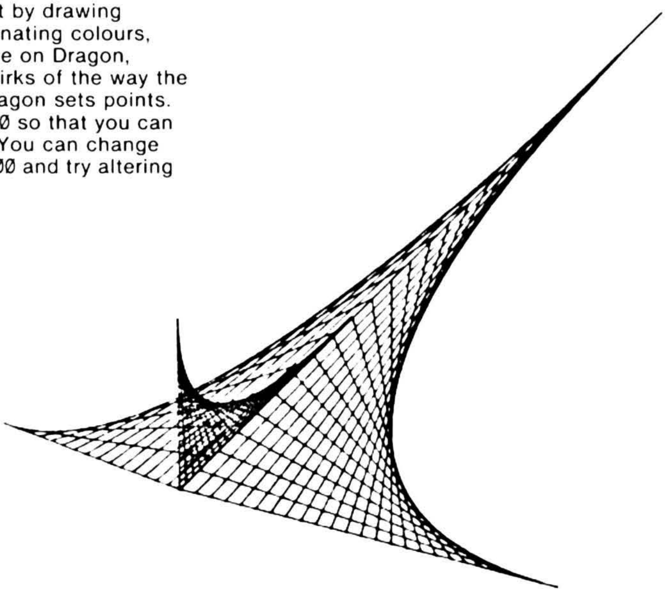
Another way to change the co-ordinates is in a FOR. . .NEXT loop. This works well when the coordinates change in a regular way. The next few lines use this method to shade the top and sides of the 'box'. Five LINE commands, together with PAINT could have been used but by drawing lines very close together in alternating colours, new colours, not readily available on Dragon, appear. These are created as quirks of the way the eye combines colour and the Dragon sets points. The colours are defined in line 1Ø so that you can experiment with different ones. You can change the step length in lines 7Ø and 1ØØ and try altering the SCREEN.

Add these lines to the previous program.

```
 70 FOR I=1 TO 30 STEP2:COLOR CO:LINE(180+I,40-I)-(180
    +I,171-I),PSET
 80 CO=FNC(CO):NEXT
100 FOR I=1 TO 30:COLOR CO:LINE (20+I,40-I)-
    (180+I,40-I),PSET
110 CO=FNC(CO):NEXT
```

There is another sort of shading available with a LINE command. This involves joining points along two lines. Each line is divided into many equal intervals and the points are joined as in peg and silk designs. The effect is of a moulded shape. The following program shows this beautifully.

```
 1 REM CONCORDE A.M.SYKES
10 PMODE4,1:COLOR0,5:SCREEN1,1:PCLS5
20 FOR J=1 TO 3
30 READ N,A,B,C,D,AA,BB,CC,DD:FOR I=0 TO N
40 Z=I/N:X=A+(C-A)*Z:Y=B+(D-B)*Z:U=AA
   +(CC-AA)*Z:V=BB+(DD-BB)*Z
50 LINE(X,Y)-(U,V),PSET:NEXTI,J
60 GOTO60
70 DATA  25,12,12,180,150,180,150,50,180
80 DATA  15,12,12,180,150,180,150,240,130
90 DATA  25,120,100,180,150,180,150,180,100
```



YOUNG USER PAGES

NINE-NINE-NINE

Does anyone know what sound a dragon makes? Dogs bark, cows moo, and E.T. says 'goohm', but what do dragons do? The sort of dragons that live in lairs and terrorise villagers by burning down houses whenever they cough, that is. Of course the sort that live in houses near the television only terrify the old folks (Over 3Ø's). We know these Dragons sing, make crunch noises and bullet whines. But you haven't really got a well-trained Dragon until it makes noises that you want it to make. You can use the SOUND command to tell your Dragon to make noises. Type in SOUND 89, 16 followed by ENTER. You should hear a middle C lasting about a second. If you don't then try turning up the sound or adjusting the tuning on your TV.!

Try using different numbers. The first determines the pitch and can be from 1 to 255. The second number controls the length of the note and must be greater than Ø.

If you want to hear all possible pitches you can put the SOUND command into a loop.
Going up:-

```
1Ø FOR P=1 TO 255
2Ø SOUND P,1
3Ø  NEXT
RUN
```

The loop takes P through all the values from 1 to 255 increasing one at a time. We can change the loop to take P through all values from 255 to 1 decreasing 1 at a time. Just change line 1Ø.
Coming down:-

```
1Ø FOR P= 255 TO 1 STEP -1
```

Perhaps you want to play the same note over and over again. Try:-

```
1Ø FOR J= 1 TO 5
2Ø SOUND 17Ø,6
3Ø  NEXT
```

This loop takes J through values 1 to 5 but J isn't mentioned inside the loop so the program just does the same thing five times. How dull! Let's change line 2Ø to

```
2Ø SOUND 17Ø,6:SOUND 15Ø,6
```

Run this. Does it remind you of anything? Now add these lines to give you the familiar drop in pitch.

```
4Ø SOUND 169,6:SOUND 149,6
5Ø FOR J=1 TO 3
6Ø SOUND 168,6:SOUND 148,6
7Ø  NEXT
```

You can make very small changes in pitch using the SOUND command, but you need a very good ear to decide which number gives which note. However with the PLAY command you use letters CDEFGAB for a scale together with sharps (#) and flats (–), or alternatively, numbers separated by semi-colons 1;2;3;4;. . .11;12 to play successive semitones. This is the way to make your Dragon tuneful. There are lots of instructions available and page 113 of the Dragon Primer lists them all.

To make the siren sound using the PLAY command I decided to use B and B flat above middle C (Ø3) played very rapidly (T25Ø) to give the chord effect. I played them 15 times to get the right length of note. For the lower note I used F and F#, but you can change the notes to suit yourself. I wanted the siren to start quietly and come nearer so the volume had to be increased. I could write lots if strings: PLAY"V1" + . . .,PLAY"V2" + . . . and so on. That's tedious so the changing numbers are in a loop. For example lines 1Ø, 3Ø and 9Ø in the following program are:

```
1Ø FOR L=1 TO 1Ø
3Ø PLAY"V"+STR$(L)
9Ø NEXT L
```

(L for loudness).

When you use several loops in a program it's wise to state which variable you want when you end the loop with NEXT. Hence NEXT L.

Here is the program for a siren getting nearer.

```
1Ø FOR L=1 TO 1Ø
2Ø FOR I=1 TO 15
3Ø PLAY  "V"+STR$(L)
4Ø PLAY"T25Ø;O3BB-"
5Ø NEXT I
6Ø FOR I=1 TO 15
7Ø PLAY"FF#"
8Ø NEXT I
9Ø NEXT  L
```

If you want to carry on and make the siren go past use

```
100 FOR L=20 TO 1 STEP -1
```

and a drop in pitch say A and B flat with F and E.

Now a challenge! Can your Dragon ring like a telephone? If it can, send your program to us and will reward the best entry with free Dragon software! For details, see Young Users Competition.

Now follows a tiny program to develop weird sounds by changing one line.

```
10 P$="T20ABBCA"
20 PLAY P$:GO TO 20
```

You must use the BREAK key to stop this program. Here are some other ideas for line 1Ø.

```
10 P$="T200  ABBCA"
10 P$="T200  ABBP1"
10 P$="T200O  1ABBP1P1"
10 P$="T100O  1ABBP1P1"
10 P$="T100O5  ABBP1P1"
10 P$="T100DGCCDEFGFGCCDEFG2" (spacecraft sound)
10 P$="T100EDCCEDCCGFEEGFEE" (mice running fast)
10 P$="T10EDCCEDCCGFEEGFEE" (slower mice)
10 P$="T2EDCCEDCCGFEEGFEE" (sedate mice)
10 P$="T100GFEDC" (spaceship hit sound)
```

So PLAY AWAY!

COMPETITION

WIN 4 SOFTWARE CASSETTES

WIN 4 SOFTWARE CASSETTES (COMPETITION)

If you are twelve years old or under and would like to win some Dragon Software then devise a program on your Dragon 32 that uses the computer's SOUND or PLAY commands to mimic a telephone ringing. The program should not be more than twenty lines long.

The young programmer judged to have devised the neatest program will win 4 cassettes of their choice from the software listed on the back page and some posters illustrating some popular Dragon games.

Send your entries to The Editor of the Newsletter at Dragon Data, by 31st August 1983. The editorial decision is final.

The editor, The Newsletter, c/o Dragon Data Ltd, Kenfig Industrial Estate, Margam, Port Talbot, West Glamorgan.

DRAGON PUZZLE 2

This program plays a tune but first you must get the lines in the correct order. On the right are clues to the missing line numbers. Put the answers in the spaces left for them and type RUN. I'm sure you will recognise the tune.

```
1 'DRAGON PUZZLE 2
....PLAY"L8EEDL4.CL8C"          .... saw the start of World
                                War 1
..PLAY C$FOR I=1TO2             .. is quite a score
....PLAY"L4GECEL4...D"          .... is the year Columbus
                                discovered the Bahamas
..H$="L4...G":F$="L4...F"       .. is a baker's dozen
....PLAY"L8EFL4GECDL4...C"      .... is the year of the
                                Dragon
....PLAY"L4EGL8G"+F$            .... and World War 1 ended
....PLAY H$+C$:NEXT             ...., the year Harold saw no
                                more
..Y$="L4GECD":C$="L8CEF"        ..., coming of age
```

SOLUTION TO DRAGON PUZZLE 1

```
10 CLS:PRINT"DRAGON PUZZLE"
20 PRINT@294,"FIRE"
30 PRINT@263,"GAMES"
40 PRINT@132,"PIGLET"
50 PRINT@196,"FOOTBALL"
60 PRINT@167,"PYTHON"
70 PRINT@325,"PANDA"
80 PRINT@230,"GEORGE"
90 PRINT@101,"BRAKE"
95 FOR I=1 TO 3000:NEXT
100 FOR I=3 TO 10:P=PEEK(1032+32*I)
110  PRINT@32*I+8,CHR$(P+32);
:NEXT:PRINT@350,""
```

(See YOUNG USERS PAGE in previous issue)

NEW RELEASES from the Dragon's Lair

Here are 24 new titles in the official Dragon Data Software range that should be appearing in the shops about now. Watch out for further Software news in STOP PRESS.

M30526 STALAG ENO

No joysticks. Two adventure games. In stalag, your goal is to escape, alive, from a prisoner of war camp before it is bombed. In Eno, you are searching for the money left by your late aunt. To prove that you deserve the fortune that has been left to you, your aunt has hidden the cash.

M30524 MANSION OF DOOM

No joysticks. Mansion of doom is an adventure game in which you have been chosen to reunite the crown princess Marlena with the townspeople of her village in Transylvania. You must rescue the princess from the mysterious Count van Steinoff. His mansion, on the edge of the village, is replete with legend. The count himself has never been seen in daylight.

M30522 POSEIDON ADVENTURE

No joysticks. Poseidon Adventure is an adventure game in which you are aboard the luxury liner S.S. Poseidon. A huge undersea earthquake has caused a tidal wave which has capsized the ship. It is floating, bottom-up on the surface and taking on water. Your goal is simply to get out alive.

M30533 DREAMBUG

No joysticks. Dreambug is a monitor (debugger) and disassembler for the Dragon 32 which is designed to be used in conjunction with dream (editor/assembler cassette for the Dragon 32).

M30523 FINAL COUNTDOWN

No joysticks. Final Countdown is an adventure game in which your mission is to prevent a nuclear missile from being launched and starting world war III. You begin the game outside a missile base which has been evacuated after a berserk General has started the countdown on a missile.

M30530 TIMSCRIPT

No joysticks. Printer required. A speed writer which will enable you to use your Dragon to produce continuous text, such as business letters, quickly and easily. Timscript allows frequently used words and phrases to be replaced by two letter codes, considerably reducing the number of keystrokes required. The codes are automatically expanded when they are typed.

L30516 DREAM

No joysticks. A professional quality screen editor and assembler for use in the production of assembly language programs and subroutines.

I20001 ALLDREAM EDITOR/ASSEMBLER

No joysticks. A screen editor, assembler, disassembler and monitor together on a cartridge. The package will enable the user to create and debug assembly language programs or assembly language subroutines to be called from within basic programs.

L30520 PIXEL EDITOR
No joysticks. This program will enable quick and easy creation and editing of graphics shapes. Each individual pixel can be accessed in order to produce detailed pictures and character sets.

L30521 HIDE AND SEEK
No joysticks. Hide and seek is a program designed by experts to aid short term memory and develop early reading skills. The program has a range of difficulty levels to suit children between the ages of four and eleven, and, as well as being educational, is a program which children will enjoy using.

L30519 NUMBER PUZZLER
No joysticks. Number puzzler is a program designed by experts to develop childrens powers of mental arithmetic. The program has a range of difficulty levels to suit children between the ages of four and eleven and, as well as being educational is a program which children will enjoy.

L30517 NUMBER GULPER
Joysticks optional. As for number puzzler.

M30528 CIRCUS ADVENTURE
No joysticks. Circus adventure is an adventure game designed especially for children between the ages of 4 and 8. The program incorporates a number of user inputs to encourage keyboard familiarity and presents the child with a series of choices to be made to encourage decision making skills. The program is designed to be non-frustrating and children will enjoy using it.

M30529 SCHOOL MAZE
No joysticks. As for circus adventure.

M30510 DRAGON SELECTION 3
Joysticks required for aliens. Dragon selection 3 is a collection of four games programs:- Money, Detective, Aliens, Hangram.

N30511 DRAGON SELECTION 4
No joysticks. Dragon selection 4 is a collection of three party games for children. Password, Lucky Dip, Composer.

J20111 RAIL RUNNER
No joysticks. A fast moving video game, rail runner is a race against time to cross a series of tracks. avoiding trains and handcars to rescue Herman Hobo.

M30518 EL DIABLERO
No joysticks. El Diablero is an adult adventure game. You are wandering in the desert trying to regain your lost magic powers before confronting El Diablero.

M30527 STORM ARROWS
Joysticks required. Storm arrows is a fast moving, multi-screen maze game. Your task is to defend yourself against hostile arrows while maintaining your energy supply.

K30112 GALAX ATTACK
Joysticks required. As wave after wave of enemy ships attack, you must defend your ground base against them. The enemy craft fly in convoy formation but they will disband in order to attack.

K30532 SHARK TREASURE
Joysticks required. You have discovered the lost wreck of a ship which sank many years ago with a cargo of gold bars. The only thing between you and a fortune is a swarm of huge sharks. Shark treasure is graphic video game.

J20110 DOODLE BUG
Joysticks required. Doodle bug is a colourful, fast action maze game. An increasing number of enemies have to be avoided together with a number of dangerous obstacles.

K30535 SHUTTLEZAP
Joysticks required. Orbitting the earth your task is to grab as many satellites as you can, before landing safely back at base. This program has great graphics and what's more - it talks to you.

K30114 WHIRLYBIRD RUN
Joysticks required. Whirlybird run is a fast moving arcade type game, with multiple screens, different types of attacker and a maze to be negotiated in the final stages.

DRAGON SOFTWARE

SOFTWARE AVAILABLE FOR THE DRAGON 32

N.30500 DRAGON SELECTION ONE Four games for the younger user. Written in BASIC, they can be listed and edited.

N.30501 DRAGON SELECTION TWO Collection of utilities. Create your own data base, write your own tunes.

M.30502 QUEST Adventure game in amedieval setting. Defeat Moorlock, master of the dark castle.

M.30503 .MADNESS AND THE MINOTAUR A real-time adult adventure game.

N.30504 PERSONAL FINANCE Keep track of family finances.

N.30505 GRAPHIC ANIMATOR Create simple cartoons on the screen and animate them by flipping through the pages. Joysticks required.

M.30506 COMPUTAVOICE Your Dragon will talk with this voice synthesizer.

N.30507 EXAMPLES FROM THE MANUAL 30 examples from the programming manual.

M.30508 CALIXTO ISLAND An adventure game. Return the hidden treasure to its rightful place.

M.30509 BLACK SANCTUM An adventure game. Overcome the forces of blach magic.

M.30512 TYPING TUTOR Improve your speech and accuracy.

N.30513 DRAGON MOUNTAIN An adventure game. Defeat the guardians of the treasure hidden in the mountain.

M.30514 FLAG Race your opponent through a constantly changing maze to the final flag. Joysticks required.

M.30518 EL DIABLERO An adventure game set in the desert.

J.20100 BERSERK A challenging shooting game, based on the popular arcade game, one or two players. A high resolution game in black and white. Joysticks required.

J.20101 METEOROIDS Guide your ship through treacherous asteroid belt. A game requiring skill, fast reactions and concentration. A high resolution game in black and white. Joysticks optional.

J.20102 COSMIC INVADERS Dragon version of the famous arcade game.

J.20103 GHOST ATTACK Maze game for one player. Joysticks required.

J.20104 CAVE HUNTER Descend into the maze of caves in search of gold. Joysticks required.

J.20106 STARSHIP CHAMELEON Protect your planet from the attacks of the Gabulators. High quality arcade game with superb graphics and sound. Joysticks required.

J.20107 ASTROBLAST Defend your ship against waves of attackers. A high resolution game in black and white. Joysticks required.

I.20108 CHESS Nine levels of play, from beginner to master.

J.20111 RAIL RUNNER Move Bill Switchman across the tracks, avoiding trains, to rescue Herman Hobo.

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