



DRAG'N'DROP

RISC OS **Pi** and all RISC OS 5 machines

Autumn 2017
Volume 9 Issue 1
£3.50

Licht

Draw fill effects with our clever program

Series

- RISC OS font format in detail
- Programming with Draw_Stroke

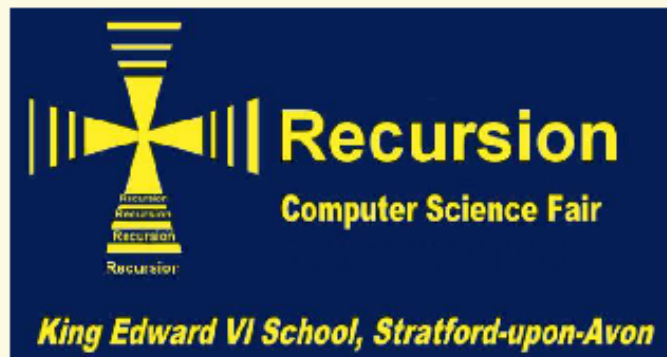
Modules

- Module Filing System
- Voice generator
- Sound samples

Type 'em all in!



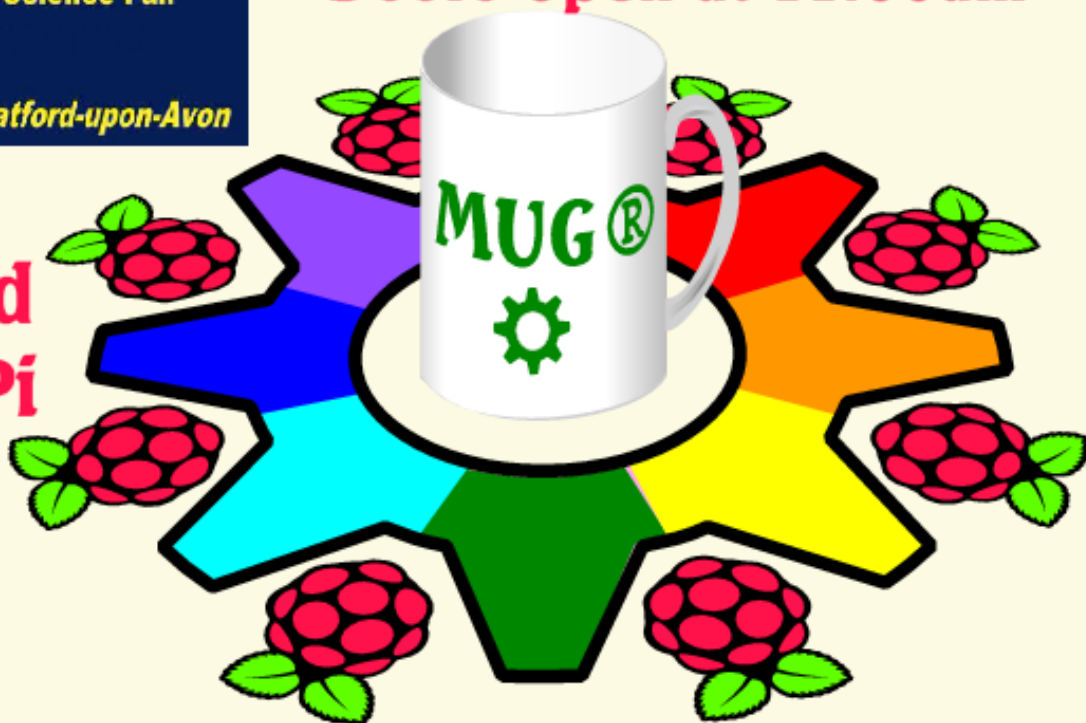
Midlands User Group RISC OS Jam at:



TM

Saturday 17th Feb 18
Doors Open at 11.00am

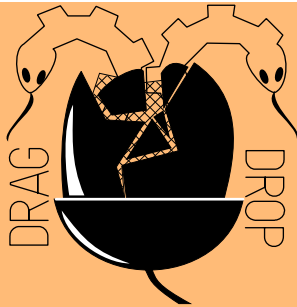
RISCOS and
Raspberry Pi



King Edward VI School, Stratford Upon Avon, CV37 6HB
<http://www.recursioncomputerfair.co.uk>

<http://mug.riscos.org>

<http://raspberrypi.org>



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Produced on RISC OS computers

This issue has been blessed with contributions
from the following people:
Tony Bartram (Using RDSP)
Christopher Dewhurst (everything else)

The views expressed in this magazine are not
necessarily those of the editor. Alternative views
are always welcome and can be expressed by
either writing an article or a short editorial.

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EDITORIAL

Welcome to another volume of
Drag 'N Drop.

The philosophy here is that
computer programming should be
enjoyable. Many people have been
put off computing by the dominance
of machines which aren't easy to
use. Machines should also enhance
human interaction and not confine it.

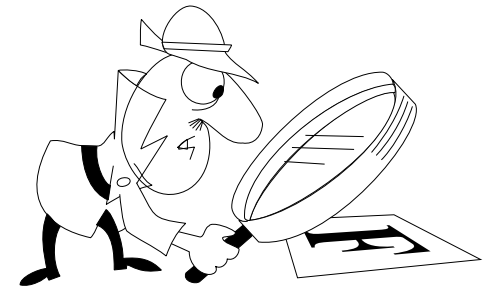
We're all about learning to use
and program your RISC OS
machine in a fun and accessible
way, with plenty of short example
programs to type in – as well as
longer more adventurous programs!

Within these pages there's a
program to help create cartoons in
the style of Roy Lichtenstein, you
can create voice modules, synthesize
drum sounds, write your own filing
system, transfer files with ease
between Android and RISC OS and
more.

See you soon.

Chris.
Christopher Dewhurst

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Beginner's Page

How do I get the BBC Basic prompt?



Press F12 and type *BASIC and press Return. You can change the screen mode with MODE n where n is a number e.g. MODE 7 or MODE 0.

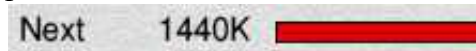
Type AUTO for automatic line numbering. Press Escape to stop and type *SAVE "myprog"* followed by Return to store *myprog* on hard disc.

To return to the desktop type *QUIT.

Programs listed in *Drag 'N Drop* are assumed to work on all machines with RISC OS 5 e.g. Raspberry Pi, unless otherwise stated.

How do I open a Task window?

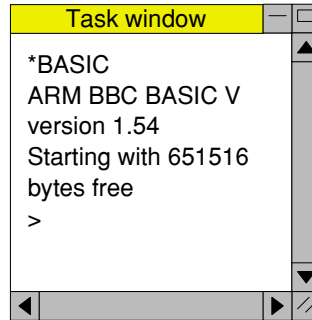
Menu click over the Raspberry icon on the right side of the iconbar and select click on Task window. Or press Ctrl + F12.



You may need to reserve more memory for the task in which case adjust-click on the Raspberry icon and under Application tasks click and drag the Next slide bar out to

the right.

You can also type programs in a task window, hold down Ctrl and press F12. You can't use the cursor editing facility or change MODE, however.



You can also program and run Basic programs from the desktop. Double-clicking on the filer icon runs it, holding down Shift and double clicking loads it into your text editor.



How do I select the currently selected directory?

Articles may tell you to set the CSD (currently selected directory). Just click menu over filer window and choose Set directory ^W.

How do I open an Application Directory?

Application directories begin with a ! called 'pling'. Hold down shift and double click select to open the directory.

I get blank a screen when trying to run games listings

Check you have the Anymode module installed. You can download it from www.pi-star.co.uk/anymode. It goes in *!Boot.Choices.Boot.Predesk*.

Open the *!Boot* application directory, in the root directory of the SD Card, that is *SDFS::RISCOSPi*.



\$.!Boot. Locate the *Loader* which is a multi-coloured directory with PC written on it. With Shift held down double click it to open it. Create a text file in Edit with the following line (press Return at the end):

```
disable_mode_changes
```

Save it inside *Loader* as *CMDLINE/TXT* and restart your machine.

News and App Updates

Recursion 2018

The all-formats computer science fair takes in Stratford-upon-Avon again but takes a winter slot on 17th February at King Edward VI grammar school. The RISC OS Midland User Group has always had a strong commitment to Recursion and will be there in 2018.

SW Show 2018

The South West show takes place on 24th February 2018 at the Webbington Hotel near Weston-Super-Mare in Somerset. Doors open 10.30. Entry price has yet to be decided but is likely to be just £5.00 as in previous years.

Card Payments

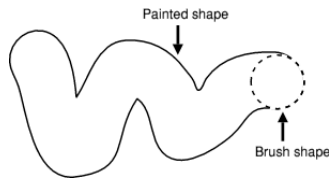
We can now take card payments at computer shows so if you forget your cash you can still buy lots of goodies at the *Drag 'N Drop* stand!

Price Increase

From January the price of *Drag 'N Drop* is going up to £3.75 (magazine only) or with the 'typed in' programs £4.75 per issue.

Artworks 2.X3

The first upgrade for five years is available, featuring a new "painter/eraser" tool which allows painting and editing of shapes plus clipping of paths using



various brushes. Artworks now also runs reliably on high-end RISC OS machines like Titanium and the upgrade costs £30.00. We'll be testing out 2.X3 in the next issue.

Protector

If you liked Planetoid on the BBC micro you're in for a treat with



Amcog Games' latest offering. Bombers, bots, pods, missiles abound in this action packed game costing just £9.99 from !Store (or on DVD at the shows) with free upgrades. More at www.amcog-games.co.uk/protector.htm.

NetFetch 5

NetFetch is the program responsible for retrieving email and news for use with your email application (e.g. Messenger) and it has been upgraded to cope with modern standards and security issues that are beginning to affect everyone including RISC OS users. Upgrades from previous versions cost £15.00 (new price £30.00) available from RComp via !Store.

Kevoft updates

Kevoft Kevoft provides a number of small but really useful programs. The latest addition is RandUser which creates random user data. Other apps have received updates. Head over to riscos.kevoft.co.uk/.

LICHT is a clever program which takes shapes from a Draw file and applies dotted fills in the style of American pop artist Roy Lichtenstein.

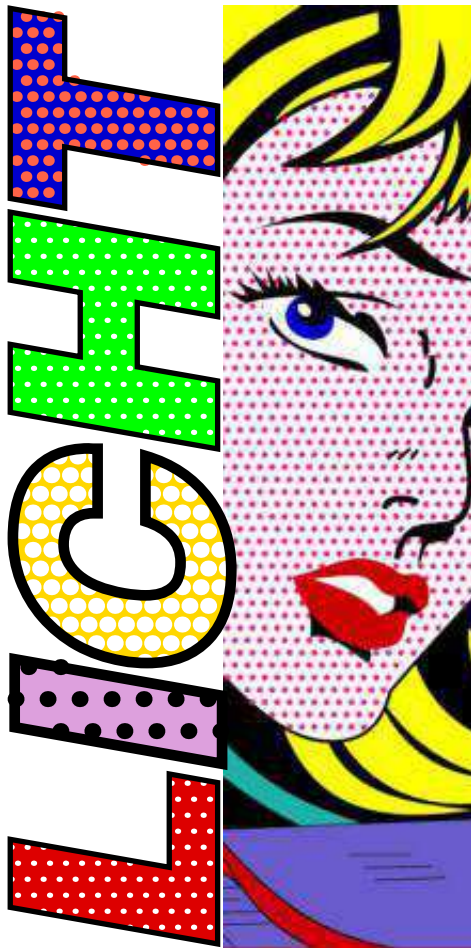
Such fill effects are normally only to be found in expensive graphics packages like Artworks. For the cover price of your favourite magazine you can create equally stunning effects.

Licht isn't multi-tasking as such but thanks to ease of RISC OS it can be used on the desktop, requiring just a few drags and clicks between t Draw and filer windows.

I'll explain how to use Licht and then delve into its works for those interested.

Before typing in the main listing, enter and run Listing 1 and save it as *MkDraw*. Set the currently-selected directory to where you've saved *MkDraw* by clicking menu over the filer display and choosing Set Directory. Double click *MkDraw*.

A Draw file called *DrawFile* is saved containing a rectangle approx 18 x 14 cm in size. Any shapes you want to fill need to appear inside this rectangle. You can of course export the filled shapes to a separate, larger drawing.



Listing 1

```
10REM Create Drawfile
20REM (c) Drag N Drop Autumn 2017
30outfile$="DrawFile"
40DIM mem% 1000
50dpp%=640:REM Draw Units Per Poi
```

```
nt
60pr%=0
70REPEAT
80 READ a$
90 IF a$(">")END" PROCprocess
100UNTIL a$="END"
110SYS "OS_File",10,outfile$,&AFF,
,mem%,mem%+pr%
120END
130
140DEF PROCprocess
150IF LEFT$(a$,1)="" $(mem%+pr%)=
MID$(a$,2,LENA$-1):pr%=pr%+LENA$-1:EN
DPROC
160IF LEFT$(a$,1)!="!" pr%!mem%=EVA
LMID$(a$,2,LENA$-1):pr%=pr%+4:ENDPRO
C
170pr%?mem%=EVAL("&"+a$):pr%=pr%+1
180ENDPROC
190
200DATA'Draw,!201,!0,'Drag 'N Drop
210DATA !0,!0,!0,!0
220DATA !2,!96,!0,!0,!0,!0
230DATA !-1,!0,!0,42,00,!0,20,!2
!0,!0,!0,!0,!dpp%*400,!0,!dpp%*51
!0,!dpp%*400,!0,!dpp%*511,!0,!5
240DATA !0
250DATA "END"
```

Type in the second listing and save it as *Licht*. Ensuring it's fully debugged, double click *DrawFile* and design a shape within the rectangle, setting line colours as needed and applying any normal fills you fancy (figure 1).

Select-click the shape and choose Menu > Save > Selection and drag *Selection* to the filer window where Licht resides. Double click Licht, which will temporarily exit the

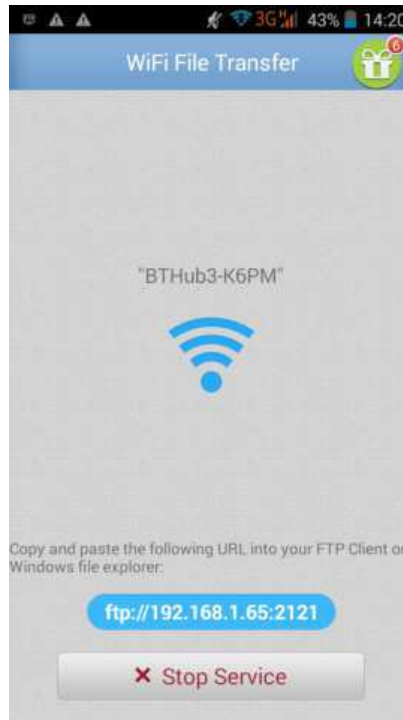
WiFi File Transfer

Occasionally I need to transfer photos or documents from my smartphone which runs Android OS – usually downloads from websites which are inaccessible under RISC OS.

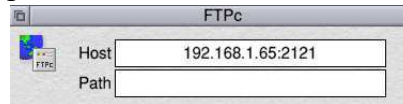
This can be done by plugging the phone into my Raspberry Pi's USB hub but that only works if the phone (or tablet, or phablet or whatever it is) is recognised as a 'mass storage device'.

I have a tablet which isn't so I found a solution using a free Android app called WiFi File Transfer, from the Google Play Store, and !FTPc on RISC OS, free from www.ftpc.iconbar.com.

When WiFi Transfer is running on Android, press Start Service and it will show a numeric address such as **ftp://192.168.1.65:2121**. Type this into FTPc's main window, in the box at



the top, next to Host. Omit the ftp:// prefix.



Click Connect and a filer-like display pops up on the desktop. You can then just double click on DCIM for example and drag and drop your photos from FTPc's window to a location on your Pi's hard disc.

You can add it as a shortcut to

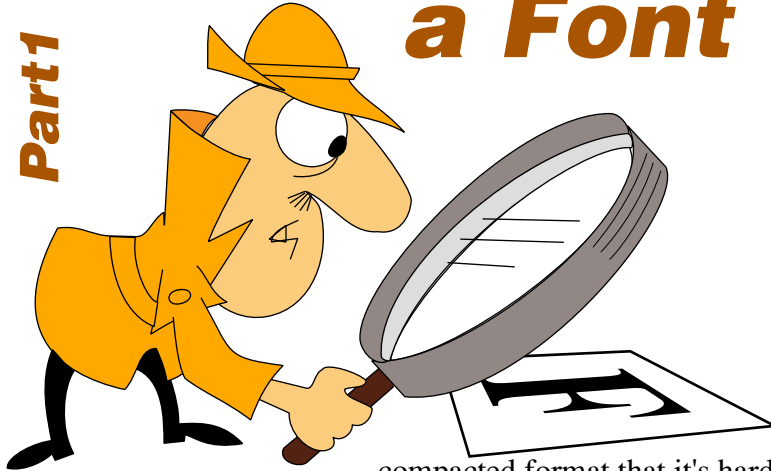


FTPc by clicking menu over the iconbar icon > Edit. At the bottom of the UserMenu file which opens in Edit add the following line:
name="Mobile Phone" value="ftp://192.168.1.65:2121"

In future just menu over the iconbar > User menu > "Mobile Phone".

Anatomy of a Font

Part 1



In this series we'll be looking in detail at the RISC OS font file format.

Unlike most other systems, fonts are split into two files. One file contains information on the letter spacing, underline and so on – the *Metrics* – while the second file holds the lines and curves data to draw the *Outlines* of the letters themselves.

The *Programmer's Reference Manual* (vol. 4 pages 470 on) summarises the different versions of metrics and outline files used since the Acorn Archimedes but in such a

compacted format that it's hard to follow and there aren't any demonstration programs.

So in this article I'll walk through a Metrics file and present short listings to do useful stuff like altering the letter spacing. I'll move on to Outlines files next time.

Open the Apps folder on the iconbar by clicking menu over it and choosing Open '\$'. Then open the **Fonts** folder.

You'll see the basic fonts which



are stored in Rom – Corpus, Homerton, and Trinity. Open the **Trinity** folder then the **Medium** folder inside that.

Locate the file called **IntMetric0**. This is the metrics file for Trinity.Medium. The first 40 bytes of the file are the font's name, padded with carriage returns (CHR\$&0D), followed by two words which always have a value of 16.

```
&0000: Trinity.Medium.....  
..... padding 26 CRs.  
&0020: 16  
&002A: 16
```

The next piece of data is a two-byte (16-bit) number specifying how many slots there are. *Slots* are like how many different characteristics there are in the font. A, D, G, H, K, N, O, Q, U, V, X and Y are all the same width in Trinity Medium, so a width of 722 units (we'll to the 722 later) only needs to be stored once, instead of 12 times.

The 16-bit slots number is, for some odd reason, split between location &30 (low byte) and &33 (high byte) in the Metrics file.

```
&0030: 35 )  
&0033: 0 ) 35 slots
```

Being a 16-bit value means there

Using RDSP

Part 3



RDSP is a digital sound processor for RISC OS, which can be downloaded from www.amcog-games.co.uk/rdsp.htm.

Version 0.26 has just been released at www.amcog-games.co.uk/rdsp.htm and in this instalment of the series we look present a program (see Listing 1) which generates a two-note chord using echo and synthesises drum sounds.

The program is well REMarked so should be self explanatory. The ENVELOPES are defined in lines 290 to 580.

Lines 640 to 710 assign pitch values to suitably musical variable names. These variable names appear in the DATA statements in lines 720-750, which are easier to read to musicians than pitch numbers.

They form a chord progression. Lines 810 to 900 sets up a computer-generated tune and the main loop from 990 onwards controls which sections of the music play when.

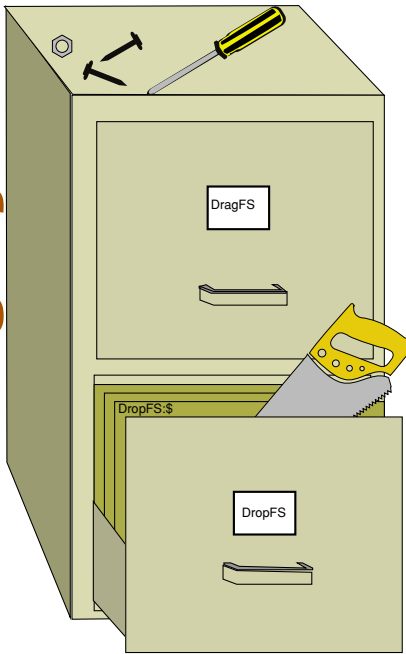
The program can be stopped at any time by pressing the space bar.

Listing 1

```
10REM 2 note chord using echo
20REM Synthesized drum sounds
30REM (c)Drag N Drop 2017
40
50*RMEnsure RDSP 0.26 RMLoad System:Modules.Audio.SoundChip.RDSP
60*RMEnsure RDSP 0.26 Error "This Program Requires RDSP 0.26. Please Install RDSP."
70*restart
80REM Ensure that reasonable defaults are set
```

```
90*RBell 0
100*Rfx 8
110*RVolume 120
120*RFXMIX 1 0
130*RFXMIX 2 0
140*RFXMIX 3 0
150*RFXMIX 4 0
160*RFXMIX 5 0
170*RFXMIX 7 0
180*RFXMIX 8 0
190*RFXMIX 9 0
200*RFXMIX 10 0
210*RFXMIX 13 0
220*RFXMIX 14 0
230*RFXMIX 11 1
240*RFXMIX 15 1
250*RFXMIX 6 1
260*RFXMIX 12 1
270*RFXMIX 1 0
280
290REM 1 second echo with 25% feedback
300*Rdelay 100 25
310
320REM Define synth bass
330bass%=1
340REM waveform filter
r
350ENVELOPE bass%,&40,&40,&40,&20,1,40,40,1,1,-2,1,150,150,20
360
370REM Define lead synth sound
380lead%=5
390ENVELOPE lead%,&80,&20,&c2,1,10,10,20,0,-20,80,40,40,100
400
410REM Define another lead synth sound with a square wave vibrato
420lead2%=6
430ENVELOPE lead2%,&20,&80,&90,2,1,1,40,-40,0,80,40,40,100
440
450REM Create a synthesized bass drum using 'rumble' when played at low
460REM frequency
```

DIY Filing Systems



The prospect of writing your own filing system can seem rather daunting but with this type-in application things are made easier.

Essentially what it does is to 'blow' a directory of files (of any type) dragged to it, rather like the Rom filing system of BBC Micro days. Once the module has been loaded, *ModFS will take you to the new filing system and all of the files

are immediately to hand.

Firstly type in Listing 1 which creates the necessary application directory, sprite, boot and run files. Then type in Listing 2 and save it inside



!ModFSMake as !RunImage.

Assuming you haven't made any typing slips, double click **!ModFSMake** to install it on the icon bar.

The ModFS is really only designed to allow a number of Basic programs to be held in memory simultaneously so only a few of the standard filing system commands are supported.

Drag a directory to ModFSMake and the programs inside will be made up into a module saved with the same name appended with FS, e.g. a directory called **BProgs** in **16GbPi.\$** the module will be called **16GbPi.\$.BProgsFS**, and you double click **BProgsFS** to install.

Any subdirectories within the directory you drag to ModFSMake are ignored.

You can catalogue the ModFS directory in a task window by typing ***CAT** or *****. and you can either **CHAIN** or **LOAD** programs as

normal too.

```
Task window
168 20394E54 203938D4 COMPRESSJPEB
169 2039FC54 20365EB4 VectorUtil
170 203A9FD4 00000000 ModFS
*basic
ARM BBC BASIC V (C) Acorn 1989

Starting with 1405180 bytes free

>*.
Draw
Draw2
Draw3
MetricStats
RipSamp
>
```

You needn't go into ModFS either but may use an FS prefix instead. For example **CHAIN "ModFS::Noodles"** from the ModFS will load the Basic program Noodles from the ModFS and run it without leaving the current filing system.

All this is made possible by the FileSwitch module. When issuing a **CHAIN** command in Basic, this in turn issues various **SYS "OS_File"** commands. In turn, filing system calls such as "OS_File" are indrected to the appropriate handlers in the current filing system.

So, put simply, when defining your own filing system, all you need to do is tell FileSwitch what your

Draw_Stroke is a command built into RISC OS which allows you to paint lines on the screen, like BBC Basic's DRAW command only more advanced. You can have thick lines, dash patterns, rounded ends and so on.

You call it from Basic like this:

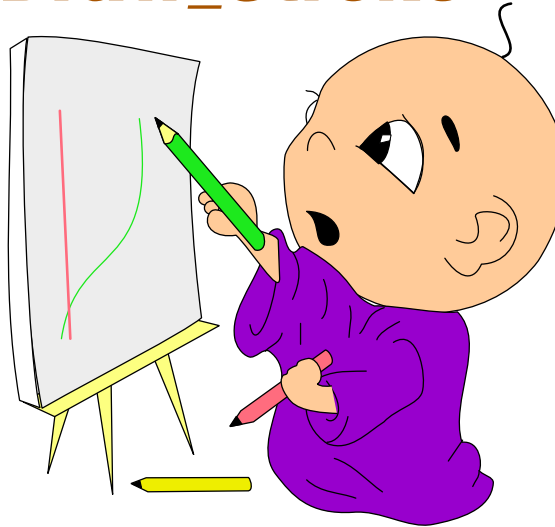
```
SYS "Draw_Stroke",path%
```

Where *path%* is a parameter block in memory. A word (four bytes) in the parameter block indicates what to do with the pair or pairs of coordinates following it, also stored as words. To move to position (5,5), for example, the sequence of words in memory is 2, 5, 5.

Listing 1

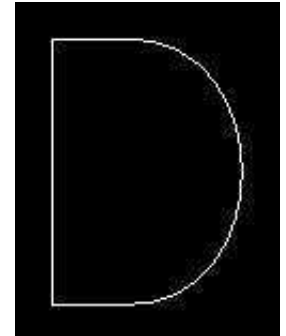
```
10REM DrawStroke demo
20REM (c) Drag N Drop Autumn 2017
30MODE MODE
40dunits%=1814
50DIM path% 1023
60pr%=0:REM pointer into memory
70REPEAT
80 READ type%
90 pr%!path%=type%
100 pr%=pr%+4
110 IF type%=2 OR type%=6 OR type%
=8 THEN
120 FOR i%=0 TO -(type%=6)*2
130 READ x%,y%
140 pr%!path%=x%*dunits%
150 pr%!(path%+4)=y%*dunits%
160 pr%=pr%+8
```

Drawing with Draw_Stroke



Coordinates are measured in 'draw units' or dunits for short and there are 1814 dunits per millimetre.

Type in Listing 1 which draws a letter D on the screen. The MODE MODE in line 30 just puts the computer in the mode the desktop was in.



```
170 NEXT
180 ENDIF
190UNTIL type%=0
200SYS "Draw_Stroke",path%
210END
220
230REM Shape data.
240REM 0=end, 2=move, 5=close
250REM 6=curve, 8=draw
260REM 2,6,8 followed by coords
270DATA 2,5,5
280DATA 8,5,40
290DATA 8,15,40
300DATA 6,35,40,35,5,15,5
310DATA 8,5,5
320DATA 5
330DATA 0
```

Lines are plotted in the current graphics foreground colour. The area of memory to store the path is reserved with the DIM statement in line 50.

Lines 70 to 190 set up the path data by READING in the DATA stored from line 270. A value of 6 indicates a curve followed by two pairs of co-ordinates and a value of 8 denotes a line drawn to the pair of co-ordinates which follow.