



DRAG'N'DROP

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

July 2017
Volume 8 Issue 4
£3.50

Apps

Envelope Editor
Desktop F Keys
Stave Paper

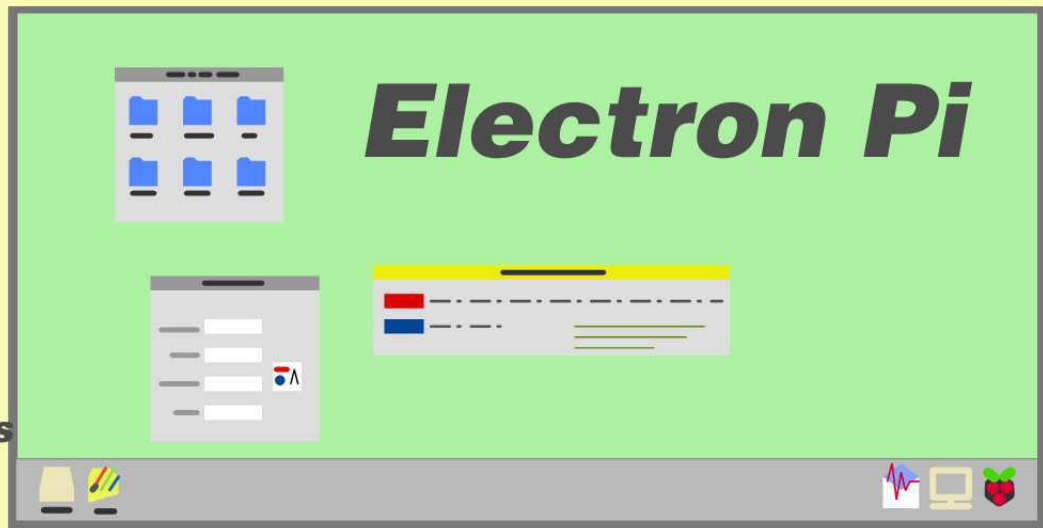
Game

Attack of the Raspberry Macaroons

Series

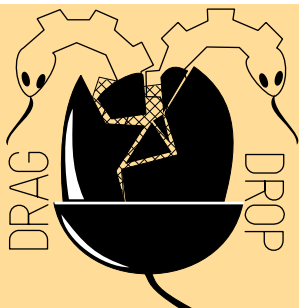
Wimps
Using RDSP

Type 'em in!



EG[Ⓢ]





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Produced on RISC OS computers

This issue has been blessed with contributions from the following people:
Tony Bartram (Using RDSP)
Jon Robinson (Wimp programming)
Steve Royd-Maker (Small Changes in Design...)
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

I hope you are having a good summer.

RISC OS 5.23 has finally arrived for the Raspberry Pi and we take a look at some changes.

If your fingers are itching we have everything from a classic space invaders game to more sensible applications to type in. All have full program listings, you don't need anything other than this magazine and your computer.

If you like building things then the articles on the Electron Pi keyboard kit and PiCano case may interest you.

The index to volumes 1-8 will help you, if you remember seeing something in *Drag 'N Drop*, but can't quite remember which issue it appeared in.

Chris.

Christopher Dewhurst

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How do I...?

...get the BBC Basic prompt?



To 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.

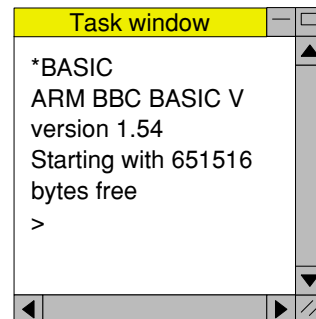
...open a Task window?

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.



...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 or you can use the IEasyCSD application presented in *Drag N Drop* 6i1.

...open an Application Directory?

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

News and App Updates

Recursion 2017

The third annual day dedicated to computers in science, industry and leisure took place at King Edward VI school, Stratford-upon-Avon on July 1st. There was a strong RISC OS presence but less of a retro scene than in previous years.



Drag 'N Drop Volume 9

Thank you to everyone who took up the subscription offer to this volume, prices for a subscription to volume 9 will appear on the website soon.

Currency Exchange

This is a new and free app available from

riscos.kevsoft.co.uk/ which can be used to convert one currency to another, it looks up information on the internet in the background so will always be up to date.



RDSP 0.22

The RISC Digital Sound Processor (RDSP) now has its own webpage plus an update. Version 0.22 can be downloaded from www.amcog-games.co.uk/rdsp.htm. RDSP brings the ENVELOPE command back to RISC OS and enables the programmer to easily add sound effects and play samples to enhance games. See the articles in this issue of *Drag 'N Drop*.

Cyborg 2.20

Cyborg is included as an example

game in the AMCOG Development Kit (reviewed in this issue). It can also be bought on its own and, since our review, a new version of the game has been released. It's based on Cyberton Mission (which appeared in the 80s for the BBC Micro) and now features additional levels, improvements to graphics and animation and sound. Cyborg costs £9.99 and further information is available at www.amcog-games.co.uk/cyborg.htm.



ADFFS 2.61

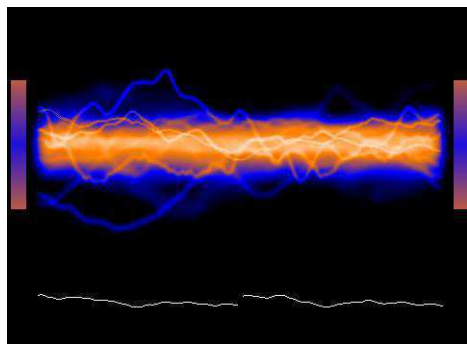
Thanks to the ADFFS floppy disc emulator, many RISC OS games

which were released on 3.5" disc in the 80s and 90s are once again playable on your Raspberry Pi. Version 2.61 plus a large selection of games (in ADFS image format) can be downloaded from

forums.jaspp.org.uk:9000/forum/viewtopic.php?f=14&t=355

DigitalCD 3.10

Version 3.10 of the digital sound player is available from <http://www.riscos-digitalcd.net/digitalcd/player/download.htm>. It features updates to several 'plug-in' formats including those to display the music being played as graphical a animation.



Harinezumi 0.07

This is a utility very much in its early stages of development ('alpha' in computer speak). It's being designed to oversee your normal !Boot sequence and create a log if things go wrong. Test versions of the software can be downloaded from

www.heyrick.co.uk/software/harinezumi/

MiniTime 1.07

MiniTime which is available for free from

www.stronged.iconbar.com/fjg/index.html displays the date and time on your icon bar. Colours and styles are fully configurable.



StrongHelp 2.90

StrongHelp is an application to assist the reading and designing of on-screen manuals using the hypertext system we are all familiar with on web pages.

Version 2.90 can be downloaded from www.stronged.iconbar.com/

fig/. A collection of StrongHelp manuals is available at www.riscos.info/downloads/stronghelp/manuals/.

Arcade BBS

The bulletin board system (BBS) of the 1990s is still alive and well as a website offering RISC OS files, which can be found at <http://www.arcade-bbs.net/filepages/findex.htm>

The Icon Bar

Another stalwart portal for RISC OS news and discussion is The Icon Bar. Point your web browser at www.iconbar.com/ for tutorials and discussion. There's also a shop a shop at [www.cafepress.com/the icon bar](http://www.cafepress.com/the_icon_bar) selling T-shirts, mugs, and mousemats .

RISC OS 5.23

Finally in case you hadn't noticed, RISC OS 5.23 is now available for your Raspberry Pi. We have a no-nonsense guide to upgrading in this issue or, if you prefer, buy a new SD card from

www.riscosopen.org/content/sales/risc-os-pi for £10 + £2 P&P.

Electron Pi Keyboard Kit

At a recent show I was intrigued to see an Acorn Electron running RISC OS and after making enquiries I found you can buy a USB interface kit for around £43 to connect your Raspberry Pi to the Electron's keyboard.

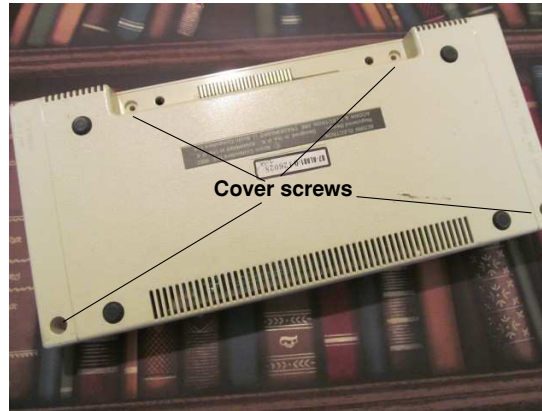
The Electron was originally released in 1983 and common causes of death in the ensuing decades were the ULA blowing or power supply giving up. Usually there was no problem with the keyboard. So if you have a dodgy Electron in the attic, dig it out and give it a new lease of life as the Electron Pi!

In essence what you do is remove the old electronics from inside the Electron (everything but the keyboard circuitry), put in the keyboard interface, your Raspberry Pi, connect the Pi to the interface, plus all the other accoutrements like the Pi's own power lead, network cable etc. and away you go.

I didn't find the instructions

helpful (in fact there were none!) so I decided to write this article.

Turn the Electron upside down and remove the cover screws as shown in the photo below.



With the rear of the Electron facing towards you, remove the cover, remove the three screws holding the power circuitry on the left and the four screws

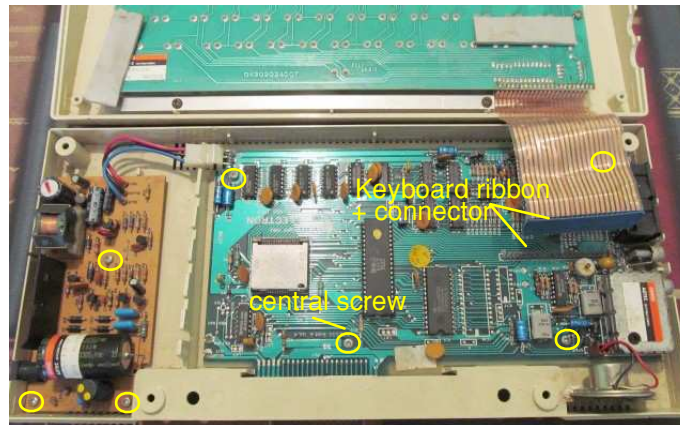
securing the motherboard. These are circled yellow in the lower photo on the left. I'll come to the one I've labelled 'central screw' in a minute.

Gently remove the 22-way keyboard ribbon connector. Take out the power circuit board and the mother board, plus the small speaker.

Arranging the Raspberry Pi, keyboard and leads is

quite tricky but the best configuration seemed to be as in the photo on the next page, the Pi is angled at around five degrees to the edge of the Electron's case.

I found 'Gorilla' tape to be useful in keeping the USB,



Upgrading to RISC OS 5.23

Version 5.23 the operating system finally arrived in April 2017, some 34 months after RISC OS 5.21 back in June 2014.

Of course you can just buy a new SD card from RISC OS Open but it's about time we refreshed our memories as to how to upgrade our Raspberry Pi machines safely with the existing SD card.

It is assumed you originally purchased the SD card in your Pi with RISC OS on from RISC OS Open, either the full-size (7/8 inch) SD card or the 3/8 inch micro-SD card.

First of all download the Beta RPi ROM (RC15) from www.riscosopen.org/content/downloads/raspberry-pi. The filename is **BCM2835-RC15/5/23/zip**.

Next download

Then download **bootcode.bin**, **fixup.dat** and **start.elf** from github.com/raspberrypi/firmware/tree/master/boot. They are

accessible with Netsurf, click Download the download button on the webpage. The files will appear in the RISC OS filer as bootcode/bin, fixup/dat and start/elf respectively because the full stops before the 'file extensions' are swapped to forward strokes on RISC OS which uses full stops to separate parts of the file path.

You'll need the updated !Boot sequence from

www.riscosopen.org/content/downloads/common.

which is inside the HardDisc4 download – you have to download the entire HardDisc4/5/22/zip file, there's no option to download just !Boot.

The main reason for needing a new !Boot file is the new monitor configuration plugin which is compatible with the Extended Display Identification Data (EDID) standard in modern monitors.

Store these files on a USB stick – the *Drag 'N Drop* back issues one is ideal – so you can revert to the previous state if

things go wrong.

Now take a back-up the main !Boot in the root directory of your SD card (that is SDFS::RISCOSPi.\$.!Boot). This may take a while as it will have grown in size with applications adding their choices, scrap directories, configurations and so on.

Click Menu over a filer window (any filer window will do) and choose Options > Newer.

Copy across the new **!Boot** file (inside **HardDisc4/5/22/zip**).

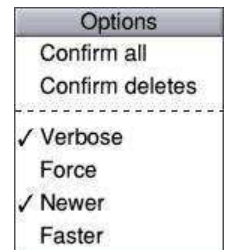
Setting the Options to Newer ensures that only completely new files, or those with a more recent date stamp are copied.

Hold down Shift and double click on !Boot in the root directory of the SD Card, that is

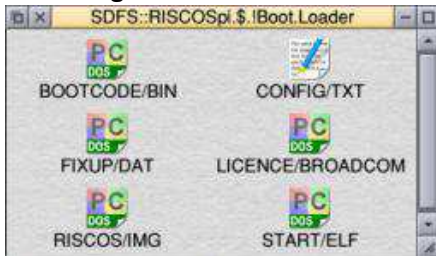


SDFS::RISCOSPi.\$.

Locate **Loader** which is a multi-coloured directory with PC written



on it. With Shift held down double click it to open it, you will see the following:



Copy the existing BOOTCODE/BIN, FIXUP/DAT, START/ELF and RISCOS/IMG onto your memory stick.

Double click to open BCM2835-RR15/5/23/zip and drag the new RISCOS/IMG out into the Loader directory. Also copy the new **bootcode/bin**, **fixup/dat** and **start/elf** into Loader too.

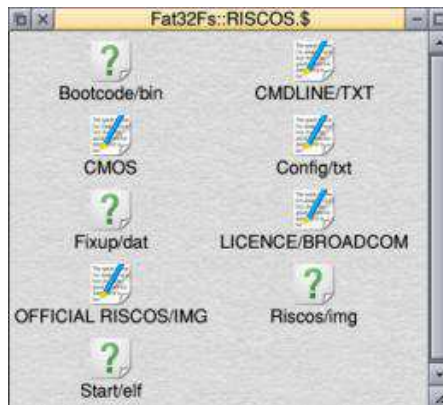
If you haven't downloaded the Anymode module, do so now from www.pi-star.co.uk/anymode/ and put **Anymode** inside !Boot.Choices.Boot.Predesk. This is necessary for the Pi to display screen modes used in games

Now create a text file in Edit with the following line (press Return at the end):

disable_mode_changes

and save it as CMDLINE/TXT inside Loader.

If your SD card is the one from the now-defunct R-Comp support scheme then you won't have a Loader file inside !Boot.



In this case you need to install the new files on another RISC OS machine (with a card reader).



Clicking on the USB icon will bring up a filer display on the 'boot partition' which is exactly the same as Loader although the appearance of the file icons and case of filenames may vary. Proceed as before and back up the original copies of bootcode/bin, fixup/dat, start/elf

and RISCOS/IMG, then copy over the new versions.

Your Pi should now boot up with RISC OS 5.23. If you select-click on the monitor icon (next to the Raspberry icon on the right hand side of the icon bar) you should see that RISC OS has picked up your monitor type (e.g. M227WDP) and chosen a suitable resolution.

Frequent users of Edit will notice that the copying and pasting method has changed: instead of highlighting text and positioning the caret at the point where you wish to paste, the copying (Ctrl+C) or cutting (Ctrl+V) now has to be done when the text is highlighted, putting it on the global clipboard.

At the time of writing only a few applications support pasting from the global clipboard, the ones that do include Draw (editing existing text), EasiWriter, MessengerPro, Netsurf, and Edit itself across text files. Text can be pasted into writeable icons, however, using the free lcnClipBrd utility from www.stevefryatt.org.uk/software/clipboard/.

Using RDSP

Last time in *Drag 'N Drop* we introduced RDSP, a digital sound processor for RISC OS. It allows easy sample playback as well as enabling RISC OS to be used as a software synthesizer.

RDSP can be downloaded for free from the AMCOG website at www.amcog-games.co.uk/rdsp.htm. It has architectural similarities to the Commodore 64 SID chip, the Korg M1 synthesiser and the BBC Micro's SN76489 sound chip.

The examples in this second article use the BBC Basic programming language and we'll look in more depth at the features RDSP provides.

Before we begin, ensure that RDSP has been loaded and started thus:

```
#RMLoad System:Modules.Audio.SoundChip.RDSP
```

```
*rstart
```

Firstly, there is partial built in

legacy SOUND command support. For example:

```
SOUND 1,-15,200,100
```

will play a square wave, albeit at a different pitch to the BBC Micro. This is because whilst the BBC Micro could play a little over 5 octaves (256 quarters of a semitone), RDSP supports nearly 8 octaves (365 quarters of a semi-tone).

There is also support for the BBC's noise channel e.g.

```
SOUND 0,-10,54,100
```

RDSP is distributed with examples and there is a BBC Micro SOUND command example included that demonstrates the current legacy features. Further improvements are planned to optionally support BBC Micro style ENVELOPE commands as well as playing sounds at equivalent pitches to the BBC Micro.

The RDSP synthesiser offers more sonic possibilities than RISC OS or the BBC has had via

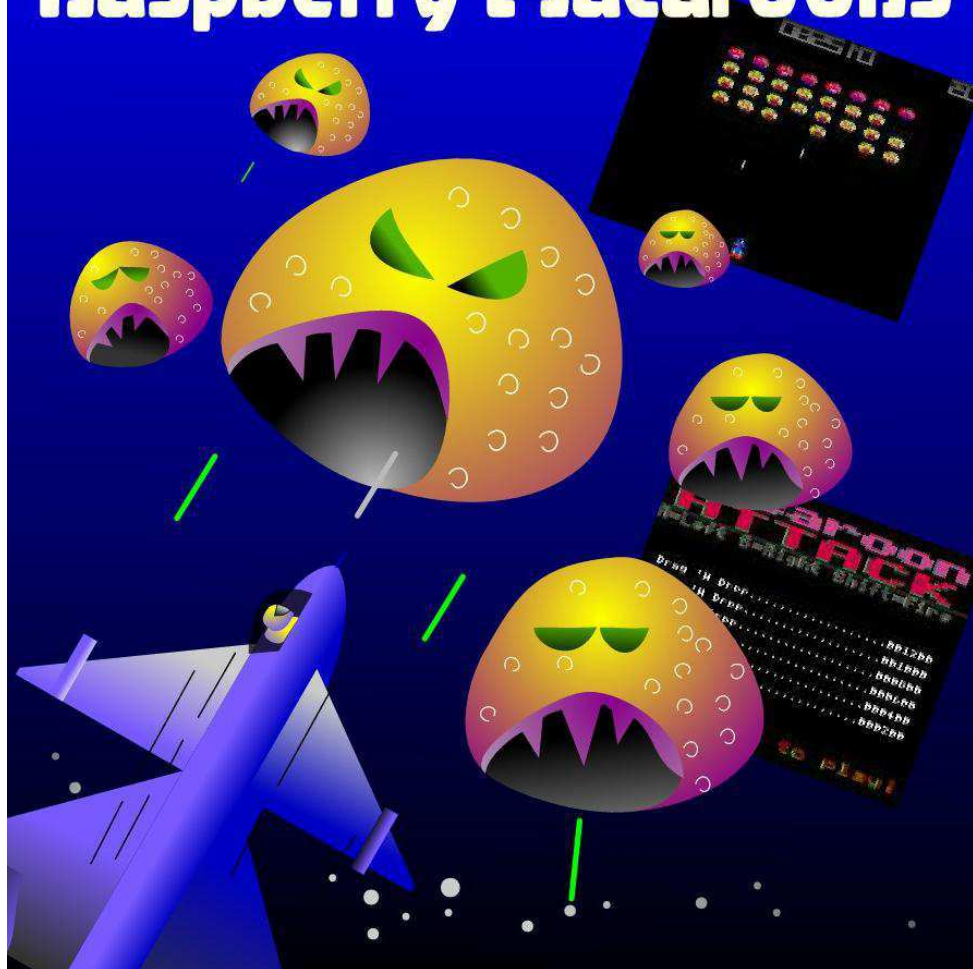
its SOUND command before. Here is a summary of the new options that the SOUND command can provide. The syntax is

```
SOUND FIC,TTVV,ZQNN,DDDD
```

where:

- F = Flags : &10 - Synchronise, &20 - Mute, &40 - XOR with previous channel
- I = Instrument: &00 - Waveform, &10 - Envelope, &20 - Sample: 0 to 254
- V = Volume : &00 to &ff
- C = Channel : 1 to 15 (or the BBC Micro noise 0 channel)
- Z = Filter cut off (bits 16-13): &F to &1 where &F is completely open. If this field is 0 it will be ignored.
- Q = Filter resonance (bits 12,-10) : &E, &D, &B, &A, &8, &6, &4, &2
- N = Note : (bits 1 to 9) : 0 to 364 (or 0 to &16c)
- D = Time in twentieths of a second.

Attack of the Raspberry Macaroons



YOU thought you'd seen them all off – Raspberry As and Bs, the Twos and Threes, not to mention the Zeros . . . but now there's a new wave.

Big (they run Windows), yellow and pink – they're lethal and they're the Raspberry Macaroons. Can you save the earth from a deadly invasion?

Find out in this type-in, classic, Space Invaders clone. It features fast colourful graphics, a high score table plus sound effects using the RSDP module.

Macaroon Attack listing

```
10REM Raspberry Macaroon Attack
20REM Programmed by Czody
30REM (c) Drag 'N Drop July 2017
40MODE13:OFF
50*RMEnsure RDSP 0.23 RMLoad System:Modules.Audio.Soundchip.RDSP
60*RSTART
70ON ERROR REPORT:PRINT " at ";ERL:END
80PROCinit:REPEAT
90PROCtitle:REPEATUNTILINKEY-99
100score%=0:lives%=3:level%=2
110PROCsetgame
120REPEATC%=0
130REPEAT
140IF C%=0 PROCmovealiens:aa%=aa% E
OR 1
150PROCplayer:PROCbullets:PROCdelay
(3)
160C%=(C%+1) AND3
```

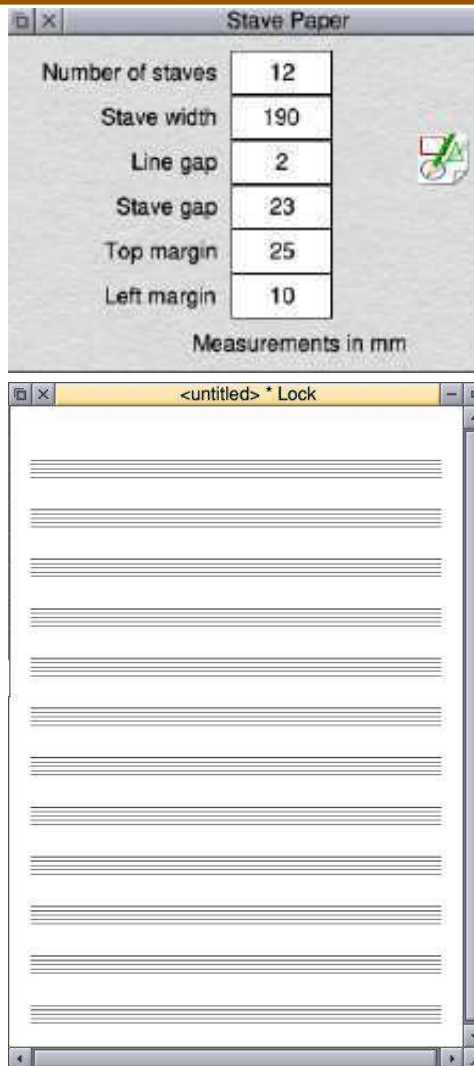
StavePaper

StavePaper is a multi-tasking desktop application which allows you to create Draw files of music manuscript paper for printing.

Various aspects can be customised including stave width, the gap between stave lines and margins.

Firstly type in listing 1 which creates the application directory, sprite, !Boot and !Run files. Then type in listing 2 and save it as !RunImage inside the !StavePaper directory. Finally double click to run. Click in the boxes and adjust the numbers as required then drag the Draw file icon directly to Draw's icon bar icon or to a filer window, it will be saved with the name *StavePaper*.

As it stands the program assumes you are using A4 paper and doesn't check values given are sensible. You could improve this and also add an option to bracket staves together for piano music, perhaps another option for pre-printed bar lines.



Listing 1

```
10REM Make files for Stave Paper
20REM (c) Drag 'N Drop 2017
30:
40app$="!StavePaper"
50$CLI"CDIR "+app$
60PROCcreatesprites
70PROCcreatefiles
80END
90:
100DEF PROCcreatesprites
110DIM H% 550:H%=550:H%:8=&10
120op$="OS_SpriteOp"
130SYS op$,&109,H%:READ n$,W%,D%
140SYS op$,&10F,H%,n$,,W%,D%,9:REM
create sprite
150SYS op$,&11D,H%,n$:REM create ma
sk
160FOR Y%=D%-1 TO 0 STEP-1:READ a$
170FOR X%=1 TO W%
180b$=MID$(a$,X%,1):IF b$="." THEN
190SYS op$,&12C,H%,n$,X%-1,Y%,0
200ELSE
210SYS op$,&12A,H%,n$,X%-1,Y%,EVAL(
"&"+b$)
220ENDIF:NEXT,
230SYS op$,&10C,H%,app$+"!Sprites"
240ENDPROC
250:
260DEF PROCcreatefiles
270REPEAT READ file$
280IF file$<>"" THEN PROClines
290UNTIL file$=""
300ENDPROC
310DEF PROClines
```

Envelope Editor

Thanks to the RDSP module it is easy to make sounds for your RISC OS games with BBC Basic's ENVELOPE statement but rather tricky to determine exactly what effect each parameter will have.

The desktop application presented here, !EnvEd, allows you to experiment easily with the

ENVELOPE statement by clicking on parameters and pressing buttons to hear the result.

Firstly type in Listing 1 which creates the !EnvEd application directory, sprite file, !Boot and !Run files.

Next type in Listing 2 and save it inside !EndEd as !RunImage.

Double clicking !EnvEd installs it

on the icon bar.

The !Run file ***RMEnsures** that the RDSP is in situ so make sure you have downloaded and saved it in the correct location as described in the *Using RSDP* article, elsewhere in this issue.

Select-clicking on a parameter increments it, adjust-click decrements, with Shift or Control

Click to store the envelope

Press S or Click red button to play sound

Click in the empty grey area for window to gain input focus to use keyboard shortcuts

Control+click to adjust SOUND

Help appears here for parameter clicked on

Select-click black numbers (parameters) to increment. adjust-click to decrement, +Shift to change by steps of 10

Press R or Select-click EnvEd's iconbar icon for random parameters

Menu-click iconbar icon for program information or to quit application

The screenshot shows the 'ENVELOPE Editor' window. It has a menu bar with 'N', 'W', 'FQ', 'O', 'T', 'S2', 'S13', 'D1', 'D2', 'D3', 'A', 'D', 'S', 'R'. Below the menu bar is a table of parameters: 'ENVELOPE' (1), '&15', '&80', '&D3', '252', '91', '189', '-120', '-65', '-54', '172', '66', '194', '221'. Below the table are two rows of text: '&0012, &0180, &E81C, 174' and 'PFIC TTVV FRNN DDDD'. At the bottom, there is a text area containing 'F=Flags (see user guide). I=Instrument: &00=wave / &10=envelope / &20=sample. C=Channel 1-8'. There are two buttons: 'ENVELOPE' (blue) and 'SOUND' (red). There is a grey area at the bottom of the window. There is an iconbar at the bottom right with a red and blue waveform icon and a menu icon.

Review

Product: Amcog Development Kit

Category: Gaming

Price: £14.99 (PlingStore) also available on DVD at shows

Supplier: Amcog games

www.amcog-games.co.uk

A steady stream of games has been flowing into the RISC OS scene over the last few years thanks to the talented Tony Bartram of AMCOG games.

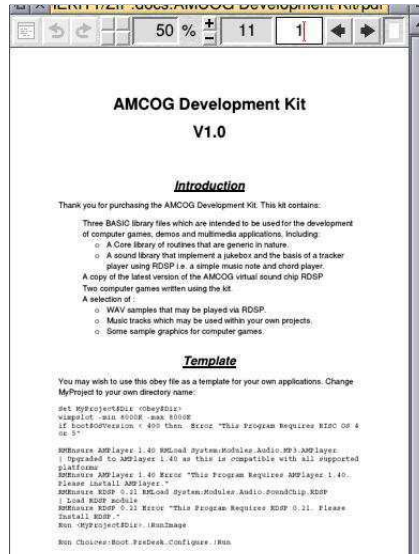
The latest offering is a little different, it's a games designer kit. Two complete games are included plus a library of BBC Basic procedures to handle sprites, sound and collision detections. There are background music MP3s and an eleven-page reference manual, too.

There is also a very small (16 sprites) graphics library. A Google image search for "sprites" will bring up hundreds more, although a fair amount treatment will be necessary to make them suitable for use in your game.

You do have to know a fair bit about the RISC OS filing system

and BBC Basic to get started.

The example games, Cyborg and Mutant Penguin, are maze-type games with an overhead view of the action.



I'm not sure how well the Basic procedures as supplied would meet the needs of other genres like space invaders or ladders-and-platforms.

I was quickly able to set up the screen mode, get a scrolling starfield, load in some sprites and display outline text in yellow

(there doesn't seem to be a choice of colour).



Even if you don't create any masterpieces of your own the Kit's still worth buying for the example games. They are of the usual polished standard from AMCOG and will keep you occupied for some time.



Small Changes in Design

The PiCano is a Raspberry Pi in a VESA-mount case and has been on the market for a while now. And like all designs it's difficult to predict how sales will evolve.

Therefore you start off as simple as possible and as you see sales develop you improve production methods, packing methods, and also try to reduce stock items.

Developing something is great fun but improving the methods of production (the efficiency) is a different kind of joy.

In this article, I'll take you through a problem on the PiCano case. It's the drilling of holes for the countersunk screws in the aluminum sheet. It's been a bother from the beginning.

The screws had to be countersunk because if they rise above the aluminium they can damage the back of your monitor when the case is used as VESA bracket (e.g. in between the monitor and wall mount)

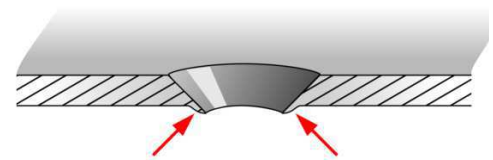


You would think that this involves just setting up the drill equipment and countersinking them to a prefixed depth but it isn't that simple...

To begin with, anodized aluminum always seems to be a soft quality and it sticks to the countersink drill. To prevent this I use a light oil but I needed to stop the drill at least every 3 holes and remove the aluminum chips which have bunged it up.

The next problem is that the pressure of the drill causes the aluminium to bend around the holes, caused by the pressure of the drill. And when the drill starts to get bunged up it takes more downward force to make it cut,

and this results in a downwards deformation around the hole.



On my lathe I have a second countersinking drill going at slow speed so I can counter-drill the hole to get rid of the deformed material at the back.

I have to be careful, though, because I may go too deep and enlarge the hole too much that the screw will fall through. And end up throwing away an otherwise perfectly good part with a considerable amount of swearing...

The oil is removed with a cloth, which leaves fluff around the hole and has to be picked off. This is where my patience gets tested. All these silly details take an enormous amount of time and time is money.

Then there is the problem that the M3 countersunk screw has a



RISC OS Programming

11. Choosing Items From a Menu

In the last part of this tutorial, we picked up a click on the Encoding menu icon, and used it to call a PROC Encoding MenuClicked, which at the moment just displays a message.

This PROC needs to be expanded to display an encoding menu, and allow a selection to be made.

According to the PDFToText documentation we can specify several alternatives for the encoding of the output file, the two most useful being UTF-8 and Latin1. These are the two options we should display in a menu when the user clicks on the Encoding icon.

Luckily, we have already developed the code to display a menu when the user clicks on the icon bar menu (way back in part 2 of this series). So the easiest way to create a new one is to re-use PROC CreateIconMenu and just

modify it slightly.

This new procedure can be seen in line 2360 onwards in the listing at the end of this article.

As before, there is a section at the top which defines the general appearance of the menu then there are two separate sections for each item on the menu (Latin-1 and UTF-8).

And, as before, it has to be called as part of the program initialisation to load the menu into memory before it starts to execute the main loop.

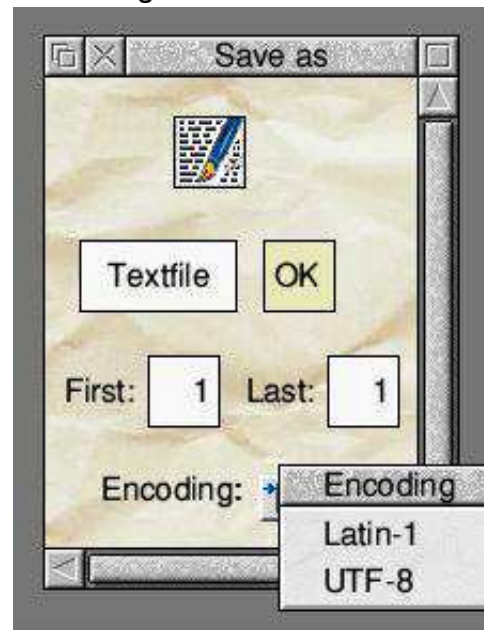
This is to be displayed when the user clicks on the Encoding icon, which is icon 8, in the main program window.

A click with a mouse button is being handled by PROC MouseClick.

Wimp_GetPointerInfo is used to determine where the mouse pointer is when the user clicks on the icon, so that the same coordinates can be used to display the corresponding menu.

Clicking on the window's toggle

icon, then on the encoding icon, should bring up the new menu, containing Latin-1 and UTF-8:



Once we've got an open menu on screen, the program will just cycle around and around the main loop, until the user performs another action.

When PROC MenuClick was originally written (back in part 3 of this tutorial), the quit option was the second item on the Icon menu

Desktop Function Keys

This is a small multi-tasking application which displays a row of function keys on the desktop, corresponding to those on your keyboard.

Clicking on a button in the window simulates the striking of the equivalent keyboard key. For instance, in most RISC OS applications, pressing F3 calls up the Save dialogue box, and clicking F3 has the same effect.

Type in Listing 1 which creates the application directory !Fkeys and automatically saves the !Boot, !Run and Sprite files inside.

Next type in Listing 2 and save it inside !FKeys as !RunImage. Finally double click !FKeys to start. Clicking with Adjust simulates Shift + F key, Menu simulates Ctrl + Fkey.

The keys are red but you can have other coloured keys merely by changing the leftmost digit of the icon flags in line 780. For example &9700613D for green keys or &2700613D for boring grey.



Listing 1

```
10REM Make files for Function Keys
20REM (c) Drag 'N Drop 2017
30:
40app$="!FKeys"
50OSCLI"CDIR "+app$
60PROCcreatesprites
70PROCcreatefiles
80END
90:
100DEF PROCcreatesprites
110DIM H% 550: !H%=550:H%!0=&10
120op$="OS_SpriteOp"
130SYS op$, &109, H%
140READ n$, W%, D%
150SYS op$, &10F, H%, n$, W%, D%, 9
160SYS op$, &11D, H%, n$: REM create ma
sk
170FOR Y%=D%-1 TO 0 STEP -1
180READ a$
190FOR X%=1 TO W%
200b$=MID$(a$, X%, 1): IF b$="." THEN
210SYS op$, &12C, H%, n$, X%-1, Y%, 0
220ELSE
230SYS op$, &12A, H%, n$, X%-1, Y%, EVAL(
"&"+b$): REM set pixel in sprite
240ENDIF
250NEXT,
260SYS op$, &10C, H%, app$+"!Sprites"
```

```
270ENDPROC
280:
290DEF PROCcreatefiles
300REPEAT READ file$
310IF file$<>"" THEN PROClines
320UNTIL file$=""
330ENDPROC
340DEF PROClines
350READ type$
360out%=OPENOUT (app$+"."+file$)
370REPEAT READ line$
380IF line$<>"" BPUT#out%, line$
390UNTIL line$=""
400CLOSE#out%
410OSCLI"SetType "+app$+"."+file$+"
"+type$
420ENDPROC
430:
440DATA !fkeys, 17, 19
450DATA .0000000000000000.
460DATA .0111111111111111.
470DATA .0111111111111111.
480DATA .0117777177111111.
490DATA .0117111117111111.
500DATA .0117111117111111.
510DATA .0117771117111111.
520DATA .0117111FF7111111.
530DATA .0117111F8F1111111.
540DATA .0117111F88F1111111.
```

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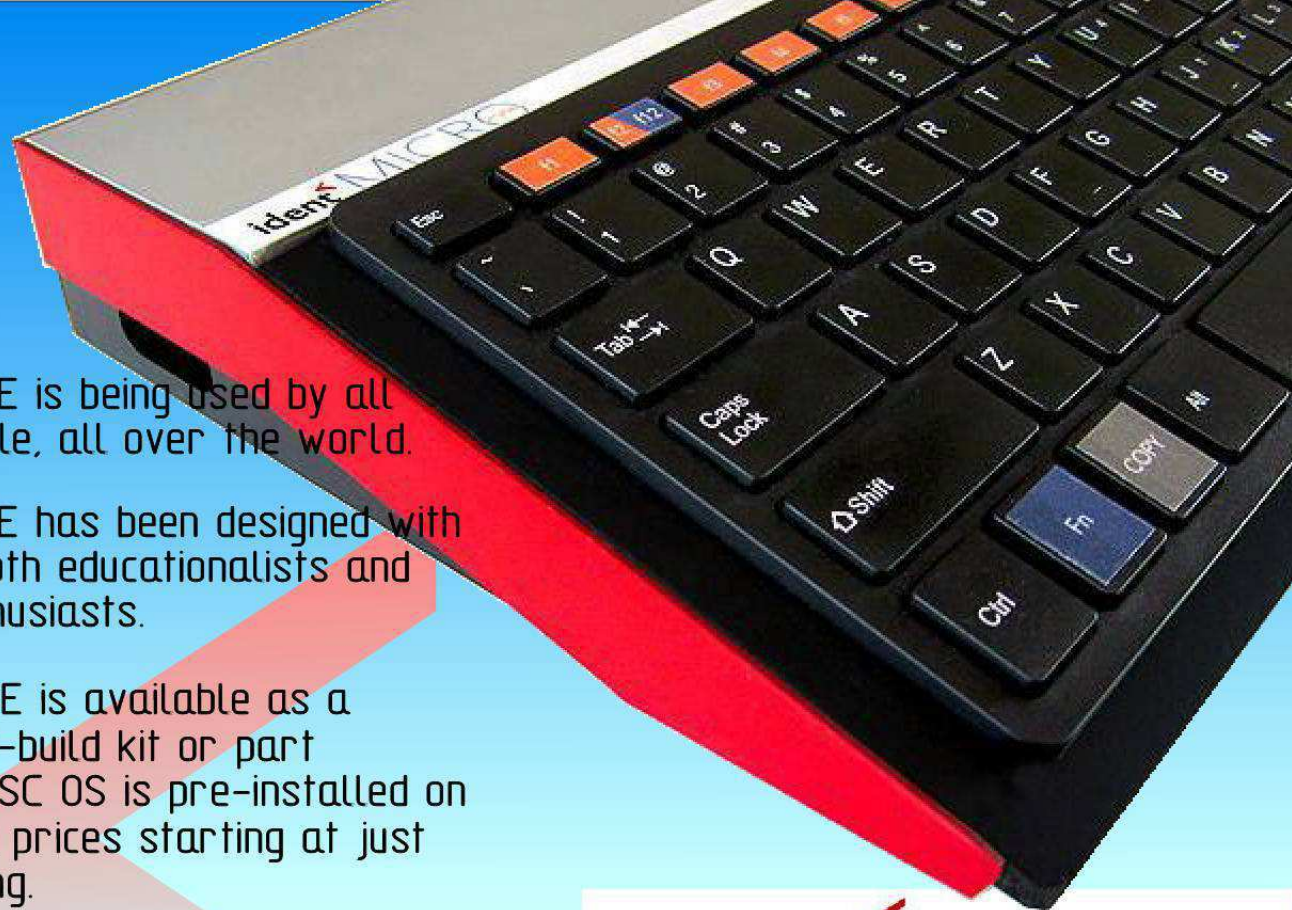
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The MICRO ONE is being used by all sorts of people, all over the world.

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