A Stroll Around

RISC OS

on the

Raspberry Pi

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A Stroll Around RISC OS

Many years ago, sometime towards the end of the neolithic, I was introduced to an Archimedes computer, and on that Archimedes was a graphical user interface. That (and everything else) was run on RISC OS, and that ran on a specially designed processor called the ARM

Apple had their own GUI and operating system on a Motorola chip, and used a one-button mouse. Microsoft had Windows running on an Intel chip, with a two-button mouse. Acorn, inventors of the Archimedes and RISC OS, had the ARM and used a three-button mouse.

Time passed, Microsoft achieved World Domination, Acorn sold itself to others, and the ARM became a separate entity. RISC OS became a backwater, supported by a few British companies and available only on a few idiosyncratic machines, and used by a dwindling number of die-hards.

Now we've got RISC OS on the Pi. Most people who come along to try it are Windows users, and have got their head round at least some of Linux – they can see some of the similarities, and some of the differences, their world-view takes in both, and they're open to new ways of doing things, and are expecting another take on the same thing. But RISC OS is *very* different. In fact after a while you'll think Windows and Linux aren't just siblings, but identical twins!

Drop the latest RISC OS image onto an SD card - go on, you know you want to - and boot your Pi with it.

The Desktop

At first sight it looks familiar – there's a picture on the screen, and a bar across the bottom. But differences soon become apparent.

In Windows or Linux, if you were to, say, open a web-browser window, or a folder, there'd be something on that bottom bar. Open two text files in Notepad, and there would be two things on that bar, one for each. Not on RISC OS.

On Windows, you've got that system tray on the right, where (some of) the things that are running appear, and the start button and quick-launch things on the left for getting things going.

On RISC OS You don't.

On the right, if some app is running – a web browser or !Zap or !Draw – then there'll be an icon (probably! - more in a later lesson!) From there you can open a new document, or configure your browser. Or the switcher (far right) lets you do things like switch off.

On the left you've got what may loosely be called facilities. Here you've got access to storage devices – CDs, network drives, hard discs, floppy discs, a Ram disc, and printers – and the Apps that the system knows about.

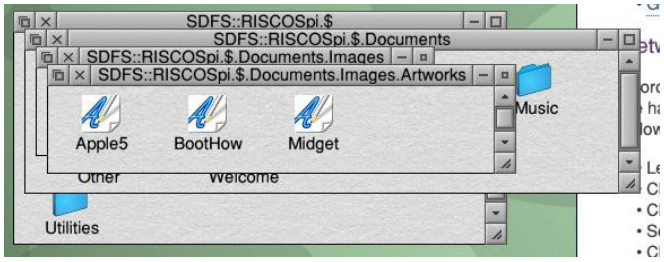
A minor note here. If you left-click (or right-click) on that Apps icon you'll see that everything begins with an exclamation mark. Apart from normally calling that a pling, you'll discover that just about all apps have that. It's very important, and something that separates RISC OS from all the rest. But we'll get to that shortly!

And the usual way of identifying the mouse buttons is Select for the left button, Adjust for the right button, and Menu for the middle button (or the scroll wheel which acts as a button if you press it) When I first got a three-button mouse I used a

magic-marker to label them S M A. It was not lost on me that my daughter at a few months old was on a baby formula called SMA

Windows and Linux use the two mouse buttons differently – the right button is used for menus quite often. Having a separate menu button on RISC OS means the right button can be used for more subtle things. We'll see some of them shortly.

Filer Windows



OK, lets look a bit deeper. Click on one of those storage icons, try the one that looks like an SD card. A window opens as you'd expect, with several folders displayed. Try double-clicking on one of them – lets try Documents. Inside that, try Images, and inside that, Artworks.

You've got four windows open. Windows doesn't normally do that – though you can set it to do so – it normally reuses explorer windows. RISC OS opens each folder in a new window.

But suppose you don't like this. Shut the last three down (uh oh! Where's the Close icon?! Top left!) Now Adjust-double-click (right mouse button) on Documents, then Images then Artworks. Is that what you wanted? But how do you go back up the tree? Easy – Adjust-click the Close icon. That closes the window, but in addition opens the parent. That works on most windows – close a document window with adjust on the Close icon, and the filer window for the folder it came from - or was last saved to - will open. (This doesn't always happen – we'll come across one that won't in a minute!)

Or try Menu-click somewhere on the window, and you've got a menu – choose Open parent.

And that's brought up another difference. For menus, Windows has a bar across the top of each window. RISC OS doesn't – it uses the menu button. When you get used to it, it'll become second nature, but can be disorientating.

Another difference – there's no way to minimise a window. Beside the title bar at the right hand side, there's a button to maximise the window, just as on Windows, and on the left there's a button to close the window. There's also a button in the top left corner, which you can use to send a window to behind all other windows on the desktop, which Windows won't let you do, and we'll find out in a minute what use it is. But you can't minimise a window.

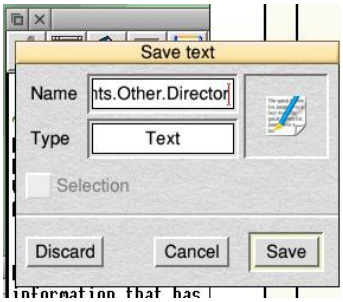
What you could do, if you had set things up that way is “iconise” a window. You would have another button next to the maximise button, which would close the window and put an icon on the desktop. But we haven't got that far yet!

Oh and another thing. If you drag something from one window to another, you'll always get a copy, not a move. Windows gives you a move if it's on the same drive, and a copy onto a different drive. If you want a move, hold down shift *before* you start the drag, whether it's to the same drive or a different one.

Editing and saving

Let's try something else. First, in the Artworks folder, select-double-click the one called BootHow. A large picture should open. Now go back to the documents folder, and open Other. Select-double-click on the file called Director. It should open in !StrongEd, and there'll be a new icon bottom right, and a window opened with the text in it. If you Adjust-double-clicked, the filer window will have closed. It should be partly covering the Director window, but so that you can see some of the text. Click somewhere on that text.

Did that surprise you? Did you expect that window to pop to the front? Well it won't! But if you try typing into it, it'll still work. If you can see some of the title bar, you'll see it's gone yellow – that means it's got input focus. Grab the title bar, it'll come to the front. Click the top left icon, it'll go to the back. But you can still type into it - try it.



Now try to close it (X icon, top left) You'll get a menu-window, giving you the option to save it (you don't want to, but you could), a name field and an icon that looks like a pen on paper. You could have found that window by pressing F3 or by menu-clicking somewhere over the window and going sideways from Save – it does almost the same thing.

There are a couple of things you could do. Save it under the original name and place - click "Save and close" - or type something new into the name field, or you could save it somewhere else.

Something to note. Unlike Windows, if you try to highlight the text in an icon, and then over-write it, it won't. You'll have to delete the text first with backspace or delete.

One more important thing. That name has the folder names and the file name separated by full stops (periods to US readers) instead of back-slashes or forward-slashes. That is true also in the title bar of the file. In fact looking at that, SDFS: points to the filing system, :RISCOS means the disc under that filing system, $ is the root, and the rest is the full path in that. Director is the leaf name, under which it'll be saved, where-ever you save it. Just clicking "Save and close" uses the whole path.

Finally, you'll also see if you've altered the file, that there's an asterisk at the end. This just means that it hasn't been saved yet.

To save it somewhere else, drag that pen-and-paper icon to the folder you want it to go in.

And that's something new to a Windows user – you need to be able to see the folder you want to put it in. Actually that's not quite right, you can drop it onto a disc on the icon bar, and a window will open for the root of that disc.

Open the SD card again, and go into Public. Now drag that icon onto the Public window.

Other uses for Adjust

While we've got a couple of windows open, try a few other things. We know we can bring a window to the front by clicking on its title bar, and we can change its size with the bottom right corner icon, which will also bring it to the front.

Now lets play with the other window, the BootHow picture.

Hopefully, you can still see its title bar so you can bring it to the front. Or you could use select on its size button, which will also bring it to the front, as well as changing its size. To send it to the back you can click on the Back icon. Try adjust-clicking that back icon – that also brings it to the front! Not particularly useful, but drag a couple of other windows in front of them, for example the SD card and the Public filer windows, and then try the same thing. Now try with the shift key held down.

With shift down, select on the back icon sends a window one step at a time down the stack of windows. Adjust brings it one step up on the stack. If you want to move a window, but keep it in its place in the stack, drag it around by its title window with Adjust. Resizing works the same, either with the Size icon (bottom right) or the Maximise icon (top right).

One more thing to try while we've got a stack of windows. That picture is bigger than its window, and has scroll bars side and bottom, and a couple of arrows at either end of those. I'm sure you're expecting what will happen with those arrows, but try it anyway. Yes, adjust reverses their action. Note that they don't bring the window to the front, or give it input focus.

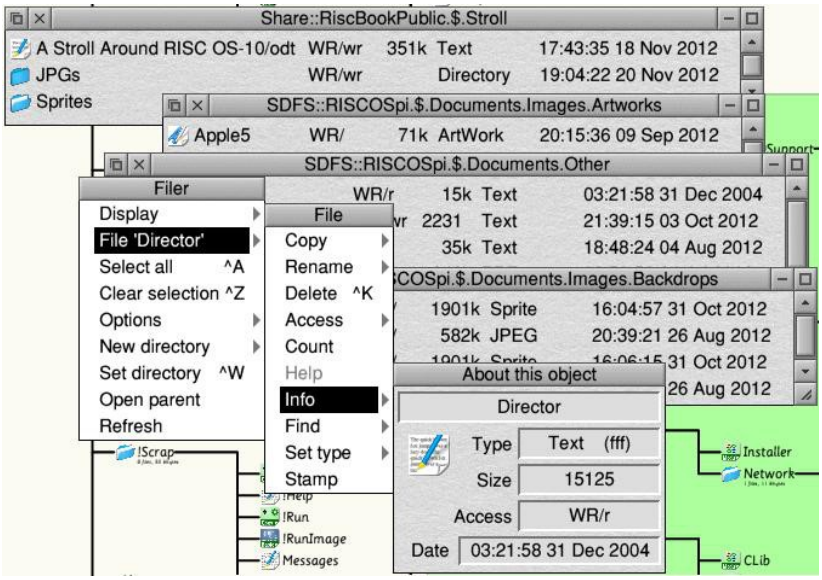
Now try dragging the scroll bars with Select. Just as you expected. Try with Adjust.

Using Select keeps the pointer on the scroll bar (Windows allows the pointer off the scroll bar, but ignores the axis it's not controlling) However Adjust turns the action into 2D, so you can use one scroll bar to go anywhere on the drawing.

One last thing with the BootHow drawing. If you close it with adjust, the directory it came from won't automatically open. This is one of the few places where the system falls down!

File Types

Okay, how does RISC OS know that the Director file was a text document, while that BootHow file was an !Artworks file? Maybe you aren't worried by that, but it'd be nice to know. After all, on a Windows machine every file has a three-character extension, though that may be hidden, and that tells Windows what it is. So .txt means text, and .exe means executable, and so on. What does RISC OS do?



It's down to the way RISC OS stores things, as against what Windows does. Instead of a three-character file-type extension in the file-name, RISC OS uses a three-hex-number file-type, stored separately. You can't easily see that (though if you choose Display > Full info from a filer-window menu, you can), but you can alter it, and RISC OS can use either the textual interpretation or the hex number. If you menu-click over the file you've saved in Public, and go to info, you'll see it's a text (fff) type. Go to Set type, and change what it says to ffb (and Return). Info will say it's a BASIC file. Double-click it and you'll get an error!

If your Windows machine is set up to hide the extensions, you could have a folder containing a text-file called Fred, and a picture called Fred, and a spreadsheet called Fred … That's because they're Fred.txt, Fred.jpg, Fred.ods … The same thing on RISC OS though – they would all be called Fred, with different file-types, and RISC OS wouldn't like it. What you could do is call them Fred/txt, Fred/jpg, Fred/ods … RISC OS knows what /txt and /jpg mean, but not /ods, so the first two will open correctly, but not the last. (Actually you can open it in !Sparkplug - it's a zip-file)

Configuring the desktop

We've been playing around, and we've found a few useful things, but how about setting things up how we'd like them?

There's a large range of things you can configure, but getting to that isn't obvious - at least to me when I started out. On Windows, you would go to Start, and choose the control panel. A similar thing is available from the Switcher – that raspberry far right on the icon bar. Select- or adjust-clicking will give you a display of what's

going on in the machine. Menu-click and click choices, and you get the configuration window. Or you can double-click the !Boot folder in the SDFS::RISC OS.$ window.

You remember I mentioned above that you could have an iconise button on windows? Click on the "windows" icon (single click here – it's not a filer window even though it looks like one) and tick the box.

If you want filer windows to have small icons by default, click the Filer icon and choose that from the drop-down menu.

Under Discs is where the RAM disc is enabled. I find a ramdisc of 16MB is about right for me, but I do strange things. I had an app that ran on three or more Risc PCs (the last but one of the classic RISC OS machines) and controlled each other over the network, sharing their ramdiscs. But I digress.

You want a different picture on your desktop? Try Screen – no! Windows? No! Actually it's under Pinboard. Drop a picture on here, and it'll work. But if it's on a removable disc, next time it boots it may not be able to find it. So where would be a good place to keep your picture?

Actually what's happening, is that a file called PinSetup is being altered. Nearly everything in RISC OS is done with a script, generally by an Obey file, with type &feb. This one says

```
Backdrop -S Boot:^.Documents.Images.Backdrops.Abstract -Colour &77967700 -TextColour &0
```

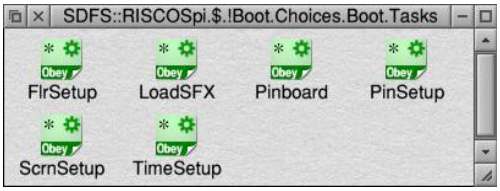
so a good place to keep your picture would be there. Boot: is a path that was set up during the boot-up, and the ^ means up one level. Look on the SD card, look in Documents.Images, you'll find it!

The Choices directory

Where did I find that PinSetup file? That's a good question, and the answer isn't obvious. Open the !Boot folder and you'll see … Hang on! When I double-click that folder and get the Choices window!

That's another thing with RISC OS, and it's down to that naming scheme we came across. Any folder with a pling at the start of its name, and that includes !Boot, must be an app. Double-clicking it runs it. If you want to see inside it, hold down shift while you double-click it. If you do the same with a file, what ever type it is it'll open in your text editor.

There's another way, if it's set up that way, as it probably is by default. Simply hold the second click of a double-click. If by chance it isn't set up, go to the Configuration window, choose Filer, and tick the box.



So open the !Boot folder. Inside is a folder called Choices, then Boot, then … What we want is called

```
SDFS::RISC OS.$.!Boot.Choices.Boot.Tasks.PinSetup
```

Its icon tells us it's an Obey file, and if we shift-double-click it, we can read it. Most of the stuff in Choices can be read in the same way.

In other versions of RISC OS there Choices tree is more complicated, with Hardware, Default, and Users sections. The idea is the same, though.

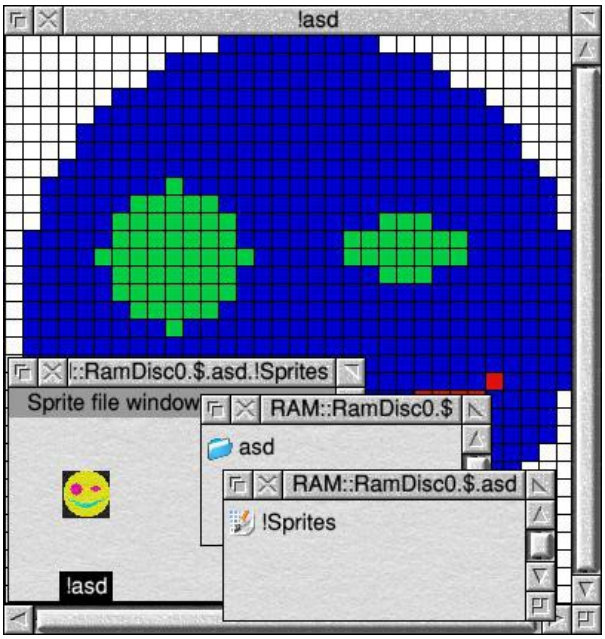
Part of the boot sequence is reading and acting on the files in the ...Choices.Boot directory, and its subdirectories, and the one called Tasks is dealt with after the desktop starts. If you want to do something odd, quick and dirty, you can put something here. Don't be surprised if you break something, though!

Applications

While we're into interesting things, try this. Open the Ramdisc root folder - click on its icon on the Icon bar.

If you haven't yet set up a Ramdisc, then go to Configuration (either double-click !Boot, Double-click the icon on the desktop or Menu-click on the switcher and click Choices...) click Discs and tick the Enable box.

Menu-click over the folder window and choose New directory, and give it a name – I've called mine “asd” for “all singing and dancing”. Then open it.



Now we need to put something in it. Back in Apps, run !Paint, and click on its icon to open a new sprite-file. Make the size something like 32 × 32, and give it the name !asd.

Now draw something in the window that appears. Menu > Zoom may make it easier. Close that window, and save as !Sprites in the asd folder - menu-click over the window and go right from save, type "!Sprites" into the name, drag the icon to the asd folder window.

Side note: Windows calls them 'folders', RISC OS calls them 'directories'. Linux prefers 'directories' but there are references to both. I find it's quicker to type 'folders'.

Back to the root of the Ramdisc, and rename the folder !asd. The window that showed what was inside asd disappeared – not surprising as that no longer exists, but what you may not have been expecting was that the icon for !asd has changed. Pretty isn't it! Well, maybe not depending on your artistic talent.

If you've had a look in other applications, you'll have noticed there are a couple of other files in most apps. You'll have seen one called !Boot, and another called !Run. Both will be obey files, and if you look at them (shift-double-click), they have things like Set CloseUp$Dir <Obey$Dir> - this is from the application !CloseUp in the Apps folder of the SD card.

Obey files are just scripts, text files that do much the same as their cousins in Linux and Windows. They're parsed by the OS and tell it what to do.

Just about anything you could do in a task window you can do in an obey file, plus there's a system variable set up while it's being run called Obey$Dir. You can use that to set up other system variables, as here, or you can set up any other variable you like. They can then be read by a running program to vary how it works.

We could write our own !Boot file, and we could set up a variable ASD$Dir to point to our own directory with a line such as

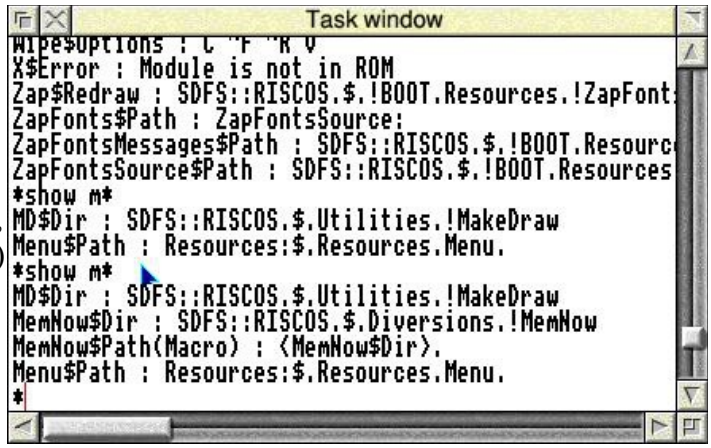
```
If <ASD$Dir>="" then Set ASD$Dir <Obey$Dir>
```

Then, if we were to move our application to a different folder, or a different disc, our variable will point to the right place. If we've got two versions in different places, the first one seen sets our variable. Double-clicking our folder would run the !Run file - if there was one - which wouldn't have the test at the start of the line, so our variable would point to the running folder.

```
Iconsprites <ASD$Dir>.!Sprites
```

tells it to load whatever is in that file into memory.

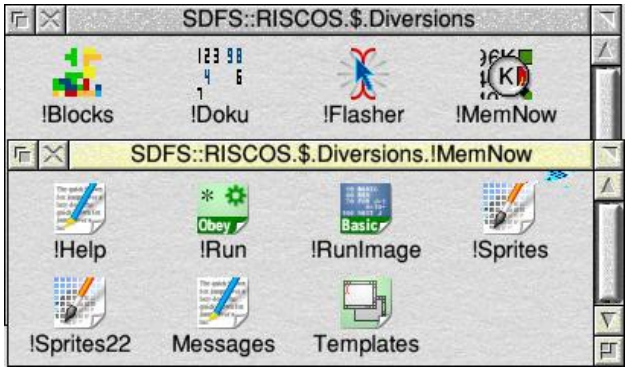
The Task Window



Menu-click on the switcher (icon bar, far right) and choose Task window. You could instead try control+F12, which I've just used, because my monitor refuses to show the bottom right corner.

You've now got a window (opened in !Edit, another text-editing app, just like !StrongEd) with an asterisk, and you can type commands into it, just like the one you get in Windows Start > Run Cmd, or the similar idea in Linux. So type Show

What you're seeing is a list of all the system variables that RISC OS knows about. Let's start with something simple.



Type Show m* - the asterisk is a wild card, and you should just get a short list. Now open the SD card, and then Diversions, double-click !MemNow. Go back to the Task window and type Show m* again.

You should have a couple of extra things, including MemNow$Dir and MemNow$Path.

Now shift-double-click !MemNow, and you'll see that there's a file called !Run. When you tell RISC OS to run !MemNow, it looks inside for that file, and runs that. Since it's an obey file, it does what it's told. That tells it to set up those two system variables, and also load whatever sprites are in the !Sprites file, then run the file called !RunImage – which is a BASIC file.

I chose !MemNow because it was one of the few things that Boot doesn't set up by default. Unfortunately !MemNow is one of the few things that doesn't have a !Boot file, which is annoying. If there had been a !Boot file, then as soon as RISC OS saw the app – when you opened the Diversions folder – it would have run the !Boot file. As it is, there isn't one to find, so it just looked for a sprite to use for the app.

If you want to break this bit of RISC OS, you could change !Run from an obey file to a text file, then reboot your Pi, go into Diversions, and try running !MemNow. Go on, try it. Now change it back!

And Finally - BASIC!

What many people of an older generation recall is the nostalgia of a BBC micro, booting in seconds to a BASIC prompt. Days of typing in code from a magazine, to attain the nirvana of

```
Syntax error at line 930
```

But there's more to BBC BASIC than that.

Since that time, BASIC has grown, and is capable of fully multitasking applications, interacting with the OS and with hardware.

But where to start?

There are a number of ways to begin programming in BASIC, depending on what you want to do.

If you wish to look at or maybe modify an existing program then shift-double-clicking it will open

it in your favourite text editor, and will save your changes as a program for you to run. You can write your own from scratch as well, just make sure you set its filetype to BASIC before saving it - menu-click over it and choose set type.

You could open a task window, and at the * prompt, type BASIC. To get back to the * prompt, type QUIT

Or press F12. This takes you out of the desktop, and again gives you a * prompt, where you can again type BASIC. QUIT gets you back out, and return on an empty * prompt gets you back to the desktop.

For those who desire a more hard-core retro experience, you can modify one of the files in !Boot.

At the end of SDFS::RISCOS.$.!Boot.Utils.BootRun is a line

```
/Choices:Boot.Desktop
```

Change that line by putting a pipe character (|) at the front - that's a shifted backslash on a UK keyboard - so that it's treated as a comment.

You will find when you reboot that you're in a small window, with many of the desktop facilities missing. There's still things going on in the background, and to get rid of those requires delving into the boot sequence - things that have been put there to prevent you doing what you want to do! But there are ways round it! All you need to do is look at the entire boot structure and disable what you don't want. RISC OS is breakable if you try hard enough, nothing is hidden!

HAVE FUN!