DRAG'NDROP

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

Summer 2016 | Volume 7 Issue 4 | £3.50

GAME
Hay Jump

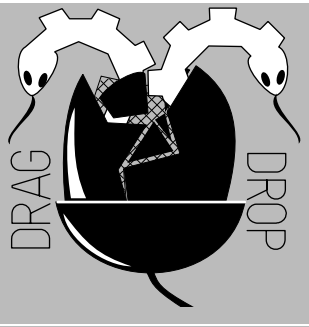
UTILITY
DrawJoT

PROGRAMMING
Wimps Ghostscript
Python Lua C

...TYPE 'EM ALL IN!

Vol.1-7 index

The world's only regular RISC OS mag!



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Produced on RISC OS computers

This issue has been blessed with contributions from the following people:
Gavin Wraith (Multitasking with Null Events)
Jon Robinson (RISC OS programming)
Paul Dunnington (Python Primary School)
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 the summer issue of *Drag 'N Drop*, a bit later than usual owing to it being the holiday season.

You can try your hand at being a tractor stuntsman, plan your public transport journeys with Netsurf, tidy up text in Drawfiles exported from !PDF, write a Wimp application and learn to program in several different computer languages on your Raspberry Pi.

There are many RISC OS apps around the globe being actively maintained by developers. Lots are free, others are priced very reasonably for good quality software. Please show your support by purchasing, using and sending feedback to the authors.

Chris.
Christopher Dewhurst

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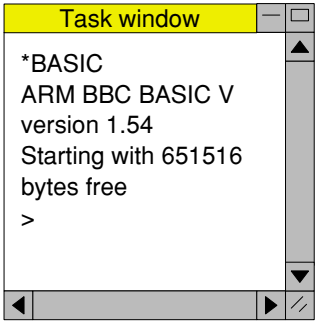
How do I...?

...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.



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.

...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.

...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 !EasyCSD application presented in *Drag N Drop* 6i1.

...open an Applcation Directory?

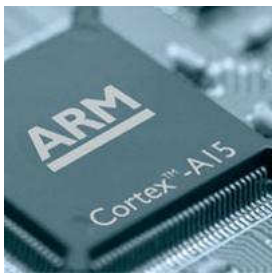
Application directories begin with a ! called 'pling'. Hold down shift and double click select to open the directory.

News and App Updates

Vol.8 Subscription offer

At this time of year we put on special subscription deals which you can buy through the *Drag 'N Drop* website. Pay for the whole of the upcoming volume 8 for as little as £13. This offer is on for a limited time only!

Japanese ARM deal



In what has been seen as a setback for Britain, ARM has been sold to a Japanese group for a reported £24bn. ARM chips power all RISC OS machines from the first Archimedes machines in the 80s to the Raspberry Pi as well as billions of mobile phones.

Recursion 16

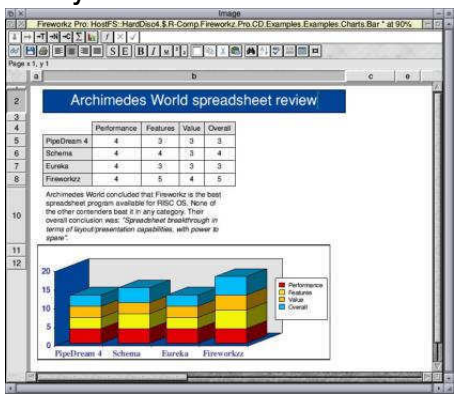
The second Recursion computer fair took place on Saturday 2nd July 2016 in Stratford-upon-Avon. The show was 'all-format' for young and old (both machines and people!) including 8-bit micros like the BBC, 16 bit Amigas, and modern 32 bits OSs like Android, Raspberry PI running its various OSs including of course RISC OS.

PiTop batteries

Some Pi-Tops have faulty batteries which do not charge, if yours is suspect you are advised to email the Pi-Top company directly for a replacement at support@pi-top.com. Allow a couple of months at least for the new battery to arrive.

Fireworkz Pro 2.10

The advanced version of the spreadsheet application has been released with even better Excel import, support for more 'industry standard' graphics files and sundry bug fixes. Fireworkz Pro can be purchased from !Store for a very reasonable £39.00.



ARMX6 and TiMachine

OS Updates to the ARMX6 (machine supplied by R-Comp, update 4) and TiMachine (machine supplied by Elesar, update 8) are available from R-Comp support scheme and can be downloaded from the user

area detailed in your registration.

The support scheme for the Raspberry Pi appears to have been dropped.

CJE/4D vacancy

Do you fancy being PAID to work with RISC OS? The leading stockist of Acorn/Raspberry Pi equipment, based on the south coast, is looking for an IT Support Technician, which could be a college-based apprentice. Find out more at http://www.cjemicros.co.uk/blog/?p=200

ConvImgs 1.10

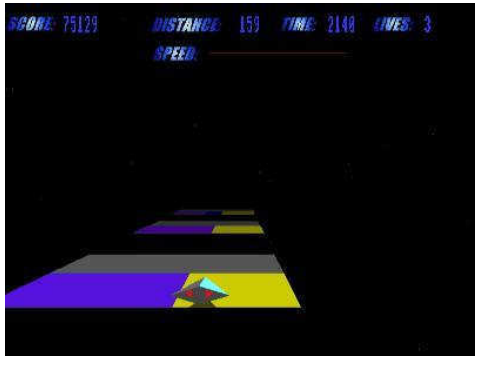
ConvImgs (Convert Images) by Chris Johnson is available for free download at http://www.chris-johnson.org.uk/software/convimgs.html. It batch processes image files as sprites, JPEGs, PNG, or TIFFs, with options to transform, scale, adjust colour in the process.

Snapper 1.31

Also available for free from Chris is version 1.31 of the screen-grabbing application. The entire screen, an area (coordinates are now auto-updated, a window, or just a window's contents can be snapped (with key combination if needed). Latest addition include ability to save in RISC OS 3.5 format if needed for older machines.

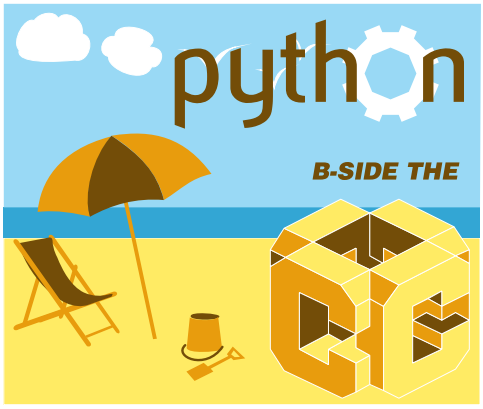
3D vector game

Xeroid is an exciting new game from Amcog in which you oontrol a spaceship travelling along a highway in outer space. See this issue for full review. Price is £9.99 from !Store.



RISC OS London Show

And finally a date for your diary, the show where big things happen - the RISC OS London show will take place on Saturday 29th October 2016 at the St Giles Hotel in Feltham., More details at http://www.riscoslondonshow.co.uk/. See you there!



In the Autumn 2015 edition of *Drag 'N Drop* (volume 7 issue 1) at the C-side there was a program to convert Arabic numbers to Roman numerals in C and Basic.

I thought a Python version would be of additional interest to Python Primary School pupils and having written the program (roman/py which is listed here) it uses a few functions new to us so a quick explanation is in order.

Remember you do not type in line numbers, unlike BBC Basic, they are there for reference.

If you are using StrongEd to type in listings you can turn on line numbers for display purposes by clicking Menu > BasicMode > Choices > LineNos > Logical.

Edit does not have this facility but you can quickly see which line number you are on by tapping the F5 key and looking at the current line box.

If you are wanting to use Zap (another text editor) and are encountering problems there are some hints and tips at the end of this article.

roman/py listing

```
 1# Converts arabic to roman
 2# Paul Dunnington
 3# (c) Drag 'N Drop 2016
 4import sys
 5v = 1000,900,500,400,100,90,50,4
0,10,9,5,4,1
 6r = "M","CM","D","CD","C","XC","
L","XL","X","IX","V","IV","I"
 7n = int(raw_input("Enter the ara
bic number "))
 8print"In Roman, ",
 9for i in range(13):
10   while n>=v[i]:
11      sys.stdout.write(r[i])
12      #print r[i],
13      n-=v[i]
```

Lines 1-3 are comments to explain the programs use, line 4 **import**s the built in module **sys** for the final line 11's use of **sys.stdout.write()**.

Lines 5 and 6 define two tuples which holds the data.

Notice we don't need to tell Python the size of the tuple, the assignment takes care of it for us, and no string indicator on line 6 either.

Tuples are immutable, which means we cannot change the individual elements as we could in Basic with v(1) = 999. If you try something like v[1] = 999 in Python it gives an error.

A tuple is like an array of constants.

If we need to change individual elements we would use a list in Python.

Line 7 needs the **int()** function as **raw_input** returns a string and we need an integer for line 8.

In line 8 the comma is similar to the semicolon in Basic. It keeps the next **print** statement on the same line but it inserts a space before each subsequent **print** statement.

Line 11 gives us a value of 0 to 12 for **i** in Python.

We could set a start value as Basic does but Python will start at 0 by default, and the step value also defaults to 1 as in Basic.

The colon in line 9 is needed in

Ghostscript on RISC OS (2)

In the last issue of *Drag 'N Drop* we looked at how we can use Ghostscript commands to achieve some tasks including converting PDF pages to images, separating and joining PDF pages and extracting text.

Lots of PDF files these days contain font definitions in what is known as 'Type 1' format, something which the RISC OS PDF viewer, !PDF, can't currently handle.

!PDF will try to stretch and squash the built-in fonts (Homerton, Trinity, Corpus) to produce an approximation of the fonts which always doesn't produce satisfactory results.

There are four ways round this: convert the PDF to Postscript and print to a Postscript 3-compatible printer (useful only if you want a hard copy), convert the pages to bitmaps, extract the fonts and try to convert them to RISC OS ones, or use another Ghostscript command to convert the fonts to outlines (vectorize the PDF).

The first method just involves commands given in the last article, which is what the 'Bitmap' mode of !PDF does (Menu > Display > Bitmap Mode, or Ctrl+B).

Printing the PDF

If you only need a hardcopy of the PDF (for example an instruction manual you might have downloaded from the internet) then you can export it as Postscript in !PDF by choosing Menu > Save > Postscript and drop the postscript file onto your printer's icon, assuming it is Postscript 3 compatible. Your printed copy will look exactly as expected because the printer understands Type 1 fonts.

Note that this is different from using !PDF's printing facilities which will just output a hard copy of distorted fonts as seen on the screen.

Extracting fonts from PDFs (1)

For the third method we'll use a free example PDF from internet (a booklet containing warm-up exercises).

In normal mode (figure 1) !PDF renders the text in Trinity and Homerton.

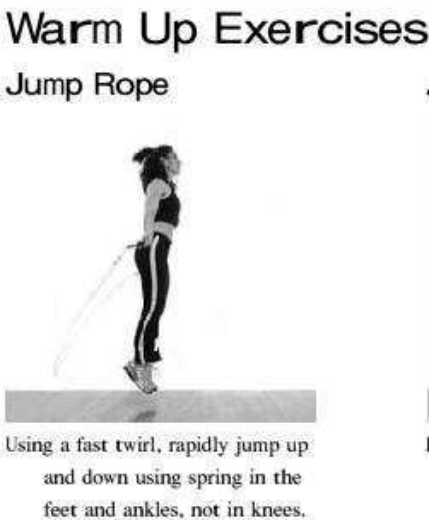


Fig.1

In bitmap mode (figure 2) the true fonts are revealed. (Incidentally all !PDF is doing is calling the

DrawJoT

If you export a page from a PDF file as a Drawfile using !PDF the characteristics such as font size, colour, coordinates and so on are stored for each and every letter in the text.

This is extremely wasteful of space and makes amending of text impossible because only one character at a time (not words or sentences) can be edited.

Fig.1 is an information sheet which was emailed with my electricity bill. It was export to Draw and Ctrl+A pressed (select all). As you can see there are hundreds of objects, most of them individual letters of the text.

The file weighs in at just over 220K – a huge amount of memory just for an A5 sheet..

DrawJoT (standing for Draw Join Text) is a clever utility which joins up all the text. Fig.2 is Fig.1 after being processed by DrawJoT. It's only 9K large, just 4% of the original size!

Incidentally, this utility does much better than any existing

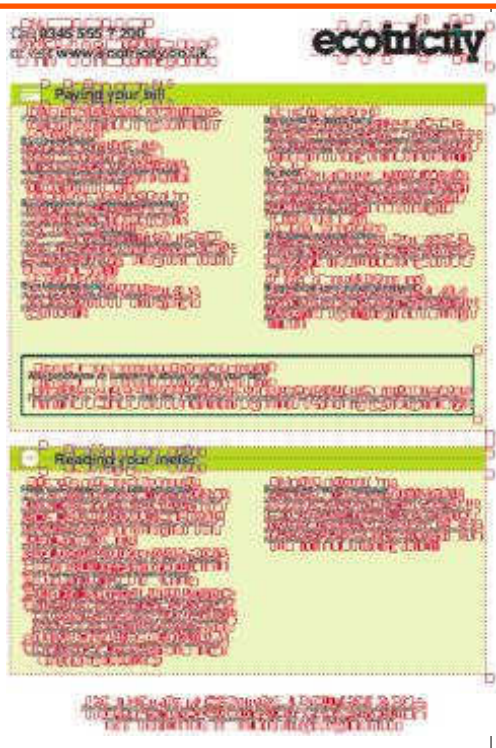


Figure 1.

Figure 2.

free applications of a similar nature because it joins whole lines and even takes into account columns.

Type in the listing and save it in the currently selected directory (CSD) along with Drawfiles to be converted. Double click, input the name of the Drawfile to be processed followed by return. The name of the converted file is the same as the original with an apostrophe (') added to the end, thus **DrawFile** becomes **DrawFile'** (the original **DrawFile** isn't erased.)

Multitasking with Null Events

When you peform some long process in a wimptask, then usually everything else has to stop until you have finished.

To make the process multitask, and not hold up other wimptasks, you need to break it up into small steps and interleave them with calls to the taskmanager.

This is a demonstration to show that this is not as complicated as it sounds – at least not if you are using RiscLua 6 which can be downloaded for free from http://lua.riscos.org.uk

Naturally, the actual example is a bit silly. The program "nullevent" extracts the contents of two files, "hello" and "dolly", concatenates the result and outputs it in an alert box.

The same methods can be extended to more than two files. If their sizes were huge, it would be better to output to a file in a non-blocking way, with a "writer" function analogous to the "reader" function given here. The same principles apply to piping data sent as intertask messages.

The program "nullevent" creates a wimptask called "nulltask", which only responds to null events. These are the responses from the taskmanager when not responding to the more urgent communications of other wimptasks. The program defines two "jobs", one for each file: repeatedly reading a fixed number of bytes from the file and storing the data.

When both jobs are completed the data read is concatenated and published in an alert box. Finally the task quits.

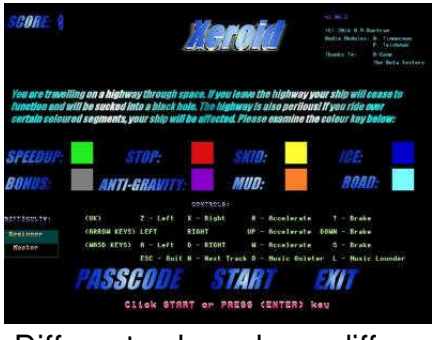
One job reads a byte at a time, the other five bytes at a time. In this example these numbers make little difference.

Review

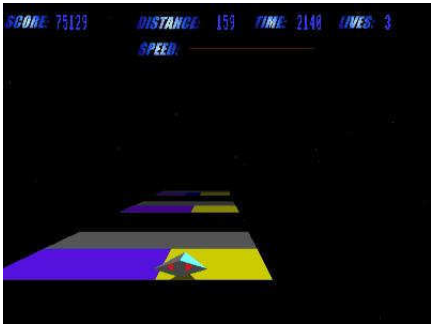
Product: Xeroid
Category: Gaming
Price: £9.99 (PlingStore) also available on DVD at shows
Supplier: Amcog games www.amcog-games.co.uk

Xeroid is the third game for RISC OS computers written by Tony Bartram of Amiguous Contrasts Games (Amcog).

One of my favourtie BBC Micro games was *Sphere of Destiny* and Xeroid runs along the same lines: you are travelling along a space highway made up of coloured tiles.

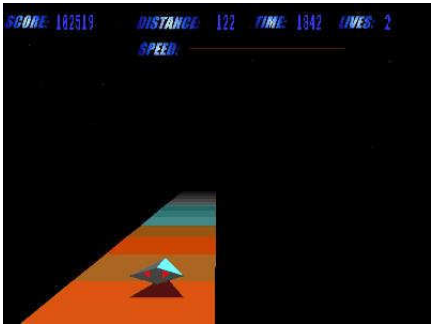


Different colours have different effects on your ship: green for example causes you to accelerate while red stops you dead and, of course, black is just a black hole in the Xeroid universe – fall down one of theses and you lose a life.



You can move left or right and accelerate along the lanes under keyboard control. There are three sets of keys but strangely no mouse option. I thought this game would have lent itself rather well to mouse control.

There are several enjoyable synthesizer sound tracks providing audio accompaniment, the volume can be turned up or down. Tony composes and records these original tracks in his studio and they are included as MP3 files in the game directory so you want to listen to them with !DigitalCD too.



The game is listed as being compatible with all RISC OS 5 machines though I only was able to test it on a couple of Raspberry Pis.

Overlord is well worth £9.99 even better value if you come to the RISC OS shows to buy it on CD which contains a voucher for updates delivered over PlingStore.

Hay Jump

It's a sultry August afternoon in the fields, your hay is stacked up nicely, but your tractor's now out of control! The only way to avoid crashing is to jump over the hay stacks.

There is just one control in this game: tap the space bar or click a mouse button to leap over the hay as your tractor move down the screen.

Run into a stack and the game's over. Good luck, in later levels the haystacks get bigger!

Hayjump listing

```
   10REM ** Hayjump **
   20REM (c) Drag 'N Drop 2016
   30MODE 320,256,8
   40TINT 2,0
   50OFF
   60PROCinit
   70REPEAT
   80 CLS
   90 PROCfield
  100 D%=0
  110 tx%=0:ty%=376
  120 IF L%>4 speed%=2 ELSE speed%
=1
  130 REPEAT
  140  PROCtractor
  150  PROCscore
  160  tx%=tx%+speed%*3
  170  IF J%<>0 ty%=ty%+J%
  180  PROCdelay(1)
  190  MOUSE X%,Y%,B%
  200  IF B% OR INKEY-99 PROCjump
  210  IF J% PROCjumping
  220 UNTIL D%
  230 IF D%=2 PROCexplode
  240 L%=L%+1
  250UNTIL D%=2
  260PROCmssg("GAME OVER",30,300,3
,4,40)
  270END
  280:
  290DEF PROCjump
  300IF J% ENDPROC
  310J%=1
  320ENDPROC
  330:
  330:
  340DEF PROCjumping
  350RECTANGLE FILL tx%,ty%+36,60,
12
  360K%=K%+1
  370IF K%=61 J%=-4
  380IF K%=76 J%=0:K%=0
  390ENDPROC
  400:
  410DEF PROCfield
  420FOR Y%=0 TO 3
  430FOR X%=0 TO 9
  440PROCsprite(X%*64,Y%*24*5,226)
  450NEXT
```

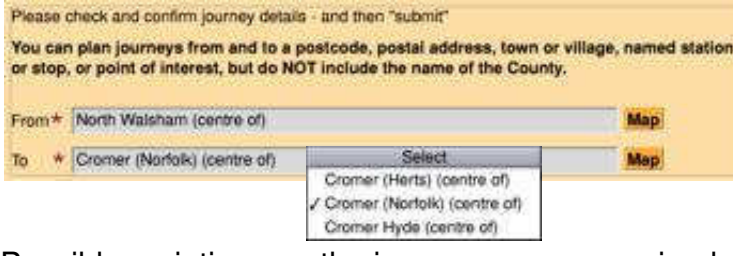
Weblog: Traveline

If you travel regularly by bus and train in Great Britain then www.travelinesoutheast.org.uk should be among your firm Netsurf favourites.

You might think it only relevant to travel in a particular part of the country (having"south east" in the URL) but it's linked to a national database so can in fact be used for planning travel from A to B anywhere in Britain.

Note this site is different from the similar looking www.traveline.info which doesn't work with Netsurf – try it on a browser on a 'foreign' operating system and it proves to be rather useless anyway.

Town names and/or postcodes are accepted and if a locality needs to be narrowed down you can click Menu over the From/To and select the relevant public transport stop before clicking the submit button a second time.



Possible variations on the journey are summarised at the top of the page with icons showing how many legs are involved (walking, bus, train, tube etc.). Details of each alternative are given further down the page. The 'Details' button is a shortcut to the r

elevant journey and doesn't work on Netsurf but you can simply scroll down to find the one you need.

The PDF icons on the right hand side can be clicked to download A4-sized maps in PDF format, from regional ones showing the whole route (not available if it's a very long journey) to localised maps (bus stops in the town centre and the like). A textual summary is given with distances as well.

9. Doing the Conversion

Over the last eight parts of this tutorial we've learnt how to get a desktop program to load, how to design a program screen, how to detect an incoming file, how to get drag and drop working and how to update the file path icon properly.

But one question that hasn't been answered yet is why do we need a PDF text extraction program when we can just do Save > Page as Text, from !PDF?

The answer is that it's true that you can save text from !PDF but it doesn't work particularly well. It's fine as long as the text you are trying to extract has been formatted into only one column.

But what happens when it's been formatted into two or more columns? Try it out on your favourite RISC OS magazine and see.

!PDF simply scans from left to right and gives you first line, first column – first line, second column – first line, third column – second line, first column – etc.

You then have to start cutting and pasting or dragging blocks of text about repeatedly to separate the text out into its original columns again.

It's bad enough having to do this with one page but do you really want to waste hours of your life doing it with ten?

Luckily there is a program called PDFToText which has been ported to RISC OS from open source software by Chris Gransden.

It is supplied as part of the !PDFUtils suite which can be downloaded from http://www.riscos.info/packages/DocumentDetails.html.

Now, it's not at all unusual to use open source software from another platform as the 'engine' of a RISC OS program.

The !JClean program for example (something I use nearly every day) is simply a RISC OS front end that has been built around two open source programs called JPEGTran and WrJPGCom.

It allows you to perform all the operations that these two programs provide much more conveniently from the desktop, rather than the command line.

In our case what the PDFToText does that the !PDF viewer doesn't is that it tries to analyse the page *first*, *before* it starts to write any text.

If the page has been formatted into several columns, the program should detect this and go straight down the first column before starting on the second one – just as we want it to!

It can still go wrong, however. If there's a picture caption that spans two or more columns the program will take that as the width of any columns that are underneath and, once again, mess up the text that is in those columns.

Generally, however, it produces much better results than !PDF does.

Python Primary School

This term I have selected a mixture of SWIs to try out with Python.

You may not have some SWIs yet, they are supplied in RISC OS 5.23. Or you might have the SWIs but not the hardware to try them on, for example there are several thermometer and barometer sensors available on the maket which you can connect to your Pi's GPIO port.

MPL3115A2 pressure sensor (left) and LM75AD thermometer (right)

IIC_Temp/py listed below demonstrates various SWI calls in Python.

Line 6 imports the modules we will be using then lines 8 to 21 read a LM75AD temperature sensor connected to the IIC bus, using IIC_Control (see PRM 1-979).

IIC also called I²C stands for Inter-Integrated Circuit, used for attaching bits and pieces of hardware stuff to your Raspberry Pi.

LM75AD sensor

The LM75AD is set to return an 11-bit temperature value at power on so to read the temperature we just need to set up a memory block and call the SWI.

Line 9 creates a block of four bytes (one word) named *iic* and sets it to zero.

Line 10 sets *temp_address* to 0x96 which is 1001 0110 in binary. To indicate hexadecimal in Python we use the '0x' prefix instead of the customary & in BBC Basic and assembler.

It's the write address of my sensor (pin 8, 7 and 6 – 5volts, pin 5 and 4 – ground, pin 3 – not connected, pin 2 – IIC clock and pin 1 – IIC data).

Lines 11 to 20 define the **try** clause that displays the temperature or reports an error. Line 12 is the call to IIC_Control, passing three parameters, *temp_address + 1*, which is the read address, a pointer to the block *iic* to store the values returned and the length of the block in bytes.

The IIC protocol uses the top seven bits for the address and the bottom bit for the read bit (&97 is the read address, &96 is for write).

Line 13 uses the **swi.integer()** function to read the four bytes into an integer variable *highbyte* passing **iic.start** as the address. Line 14 sets **lowbyte** to the top three bits of the second byte which gives us the fractional part of the temperature in 1/8ths of a degree C.

Line 15 shifts this value 14 places to the right and multiplies by .25 giving us a 1/4 degree resolution.

iic block which is the temperature in degrees.

Line 17 adds *highbyte* to *lobyte* giving us the temperature in the variable *temp* and line 18 prints the value on the screen. Line 19 catches the **swi.error** and line 20 uses **sys.exc_info()** to print the error text on screen.

Line 21 prints a blank line to separate this from the next SWI. Technically the LM75AD returns a two's compliment value so it can indicate below- zero degrees C.

JPEGs

Line 23 to 27 display the pixel width and height of a JPEG picture using JPEG_FileInfo (see PRM 5a-151). Pixel width is returned in R2 and height in R3, I've chosen not to use the other four values this SWI returns here.

R0 is set to 1 to return dimensions, and R1 gets a pointer to a path name. The semicolon separates the entry values from the returned values, and the 2 full-stops skip R0 and R1, R2 and R3 returning integers. Then comes the file path in quotes. I have used a JPEG called Seat but you can use one of your own or try **Documents.Images.Backdrops.Abstract/jpg** if you haven't one.

Lines 25 and 26 print the results of the call.

Program Environment

Lines 29 to 42 calls OS_GetEnv to get environment parameters (see PRM 1-303). It takes no input values but returns three values so there's nothing before the semi-colon and **iii** after it.

Line 31 retrieves the string pointed to by R0. Lines 32 and 33 would print the string and the Ram limit returned in R1 but I've hashed them to stop them printing.

The environment string returns the path to the Python interpreter and the path to the program *IIC_Temp*, it takes up a lot of space on screen.

Line 34 sets a variable to the SWI name we will be calling and line 35 declares a block to return the time string in.

Lines 36, 37 and 39 were my first successful attempt at calling **tcsdt**. I had tried passing R2 instead of *t_stamp* but that failed. I then came up with line 38 instead of lines 36 and 37, registering *t_stamp* as a block of two words starting at address R2 and using line 39 to call the SWI.

I finally realised my error, passing R2 with the **b** descriptor instead of an **i** and line 40 is the the result. Line 41 prints the start time using **swi.string()** again. Line 42 prints a blank line.

Memory usage

Lines 44 to 51 use OS_Memory and OS_ReadSysInfo to display information on memory usage, (see PRM 5a-62 and 1-748).

Line 45 calls OS_Memory 8, eight in the low byte (PRM 5a-69), with one in the third nibble for DRAM as the type of memory, which gives us 0x108 to pass in R0.

Lines 46 to 48 print the info returned in R1 (number of pages) and R2 (page size) and the total, (R1*R2) in bytes.

Line 49 calls OS_ReadSysInfo

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