

The WROCC

The Newsletter of the
Wakefield RISC OS Computer Club
For all users of the Acorn and RISC OS family of computers

Volume 30 – No. 9 – December 2012



Super Hi-Vision Olympic Preview

DIGITAL REFLECTIONS

by Colin Sutton

During the recent Olympics, Super Hi-Vision – the ultimate audio and visual experience – came to Bradford for a series of public viewings.

Historically the Olympic Games have provided some technology landmarks in broadcast television. In the 1948 London Games the BBC made its first major TV outside broadcast in Olympic history: a mammoth undertaking given that television transmissions had been closed down during the Second World War period. In 1964 NHK, the Japanese state broadcaster, introduced colour television at the Tokyo Olympics together with the use of a satellite to transmit live pictures across the Pacific Ocean. The Los Angeles Games in 1984 provided the opportunity for demonstrating to the world the new High Definition concept. Nowadays colour, multi-channel sound, satellite communication and HD are all accepted as the norm around the world.



Bradford's Super Hi-Vision installation in the National Media Museum's Cubby Broccoli cinema

So what can our own London 2012 Games provide to better current technology? It is Super Hi-Vision (SHV) – a state-of-the-art technology preview co-hosted by NHK of Japan, OBS (Olympic Broadcasting Services) and the BBC. Special public screenings could

Our Next Meeting – Wednesday 9th January 2013 Annual General Meeting

The WROCC AGM will be held on the 9th January rather than the 2nd to avoid clashing with the seasonal celebrations, and members within reasonable travelling distance are urged to attend – see page 10. A free light buffet will be provided. *Please note that this is a members-only event.*

only be seen in London, Bradford and Glasgow along with three locations in Japan and only one in the USA: and that was a private invitation only event.

Bradford viewing

The Bradford viewing of Super Hi-Vision was located in the National Media Museum (NMeM), in the Cubby Broccoli cinema specially adapted for this two-week event.

A special flat screen and support frame had been erected in front of the regular cinema screen; necessary because cinema screens have tiny holes (perforations) to allow the sound to pass through and so would degrade the picture quality when viewed close up. The new screen was without perforations and measured approximately 18 feet wide and 10 feet high – ie. nominally 16:9 aspect ratio. The sound system was 22.2 multi-channel for 3D spatial sound and infinitely superior to the 5.1 surround system currently commonplace.

The array of Italian RCF TT+ High Definition loudspeakers were arranged in three layers. The lower layer was a bank of speakers and bass woofers on the floor beneath the screen; the middle layer was at screen mid-height positioned across its width and around the auditorium. The upper layer speakers were placed above the screen across its width and around the auditorium – to achieve this, a special rigging frame was installed around the rectangular auditorium.

The specially modified JVC DLA digital projector was mounted on a stand at the rear of the auditorium for all to see. The model SH7NLG D-ILA display with a JVC mechanical shutter mounted in front of the lens to reduce perceptual motion blur of content involving fast moving targets.



The SHV projector in place at the back of the cinema, and part of the 22.2 sound installation arranged around the projection screen



Wednesday 9th January

Annual General Meeting & Free Buffet – Members Only

Wednesday 6th February

Tablet Computers

Wednesday 6th March

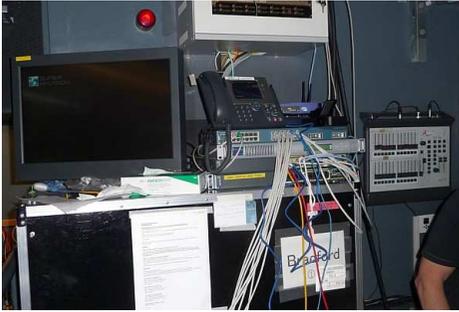
Raspberry Pi Evening

Wednesday 3rd April

Meeting – Details to be announced

Saturday 20th April

Wakefield Acorn & RISC OS Computer Show 2013



Part of the network infrastructure required to move SHV images across the country

Mind boggling figures

SHV has a pixel count 16 times greater than our current full HD: $1920 \times 1080\text{px}$ (aka 2k) is circa 2 million pixels but SHV achieves circa 33 million pixels based on a display of $7680 \times 4320\text{px}$ (aka 8k) with 120Hz progressive scan frame rate, 12 bit depth wide RGB colour gamut.

I'm told there were only three prototype SHV cameras in the UK and these were moved between London 2012 locations along with the prototype 22.2 globe microphone rig said to contain 22 microphones in its central ball.

The video signals were sent to the NHK special outside broadcast (OB) truck and audio to a separate control vehicle. The OB output was uncompressed at 24Gbits/s and sent via optical fibre to the SHV Production Centre at the BBC Television Centre in West London, thence to the International Broadcasting Centre (IBC).

However it was a compressed version of the signal with audio AAC encoded and video H264 encoded at 280Mbit/s that was sent from BBC TV Centre via JANET (the Joint Academic Network) to the Bradford site. In fact, the network link to the NMeM needed to be significantly upgraded beforehand.

Behind the scenes

Crammed into the projection room of Bradford's Cubby Broccoli cinema were racks of receiving/decoding gear and a stack of amplifiers. Local HD disc storage of enormous

capacity was available as backup should the live streaming develop problems. This operational setup was not normally available for public viewing so I was privileged to be able to have a close look, take photos and talk to the most helpful BBC and NHK technical guys. The specifications are mind boggling, as is the cost: rumoured to be in the region of £1 million for just this Bradford installation.

Installing and setting up some three tonnes of prototype gear took almost a week and with 22.2 3D sound you can only imagine the care needed with its relative levels and audio time delays for each position and angle of loudspeakers.

The performance

There were six SHV screenings each day throughout the Games, each lasting around 45 minutes and consisting of edited recordings streamed from London covering an intro to SHV, highlights of the Opening Ceremony and a varied selection of event highlights – obviously changing from day to day.

The best viewing position was central to the screen on the first three or four rows of the seven-row c100 seat cinema arranged in a single block stepped 'stadium' style.

The image quality at such close quarters was absolutely stunning. The SHV cameras provided a wide angle view of the scenes just as you would see it in reality – you really felt as



A 22.2 surround sound system needs quite a bit of kit to make it work

if you were there live with natural sounds all around you. It felt like 3D without the hassle of glasses and the truly immersive experience was well worth more than one visit. NMeM say almost 6000 tickets were booked but many did not actually turn up so places were always available for latecomers.

The future

SHV screenings were a demonstration of state-of-the-art television and indeed of future cinema. London 2012 provided the ideal launch platform for public viewing. It is technically superb and very expensive, so where will it all lead?

This is clearly work-in-progress and a very long project of some ten to twenty years. Technically it outstrips anything I've seen on the regular cinema screen – IMAX excepted.

It is not yet 100% perfect: I did spot some video 'noise' in the very dark picture areas and the audio, whilst superb, was sometimes 'confusing' in relation to the image on screen – but then mixing and balancing 22 channels is an entirely new artform still to be mastered. As for smaller venue viewing there are prototypes of SHV 85-inch LCD and 145-inch plasma display panels used to monitor the London 2012 SHV material.

As for us home cinema and computer buffs, there is no need to start saving just yet as we

have yet to experience the new 4k monitors now appearing together with the roll-out of 4k digital cinema projectors in the multiplexes. SHV is a case of "we have the technology, now what can we actually use it for?"

...and finally

London 2012 has provided another unique record for Great Britain in that we are the only nation to have staged the Games three times: in 1908, 1948 and 2012. Our Queen is the only Head of State to have opened two Games: in 2012 and in 1976 in Montreal where she is Canada's Head of State.



Colin's sense of humour could probably be represented by this picture of a branding "cock-up", that he spotted on the internet and sent through with the article above and the note "Just a bit of fun, if you have a spare corner of a page."
What year was London 2012, again?

Colin Sutton • 1937–2012

Colin's funeral took place just after the previous newsletter went to press, and a donation was made on behalf of the Club to the British Heart Foundation. A few things came to light that may surprise you. As a member of the Bradford Odeon Rescue Group (or BORG), he was so famed for his untiring research efforts on their behalf that he earned the nickname "Mr Beaver". Oh, and not only was he interested in organs – he could actually play them as well.

The funeral was very well attended, and it was very interesting to talk to friends of his from the other organisations of which he was a member. Many of us were very surprised to learn from family members that in his younger days, Colin had been a very accomplished ballroom dancer and gold medal winning ice skater! Truly, he was a man of many facets.

His final article, above, was submitted only a month before his death and should serve as a fitting tribute.

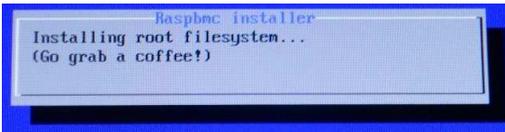
Rick Sterry

by Terry Marsh – terry@wrocc.org.uk

RISC OS 5.19 runs on the Raspberry Pi: the official SD card image can be downloaded from www.raspberrypi.org/downloads and put on to a suitable card: don't forget that you'll need an SDHC card reader for cards over 4GB.

There is a file tree diagram supplied in various formats to show off the various pieces of software bundled with the machine. As you can see from the pictures, it has all the items and icons we are used to on RISC OS 5 except for the SD card icon instead of a hard drive icon. I'm not sure what the fruit is on the spoon. ;-)

So like the Phoenix, we are again rising with the Beagleboard, Pandaboard and the Raspberry Pi, all running on various versions of the ARM chip.



Installing Raspbmc on the Pi

Other operating systems to run on the Raspberry Pi are Raspbian (which is based on Debian) and Arch Linux. The XBMC media centre can be run in its own Raspbmc distro, and you can upgrade your sound capabilities on the Pi with MPEG-2 and VC-I for a small fee (£2.40 and £1.20 respectively) available from the downloads page for the Raspberry Pi. Some enthusiasts are working to get Android 4 and Firefox to run on the Raspberry Pi and I believe that they have Fedora running on it also.

There is a wait of two or three weeks at the moment for the Raspberry Pi if ordered from Farnell/Element14 or R.S. The Gertboard, which was available in September in a DIY format, should soon be available ready-built from Farnell. It connects via the ribbon cable



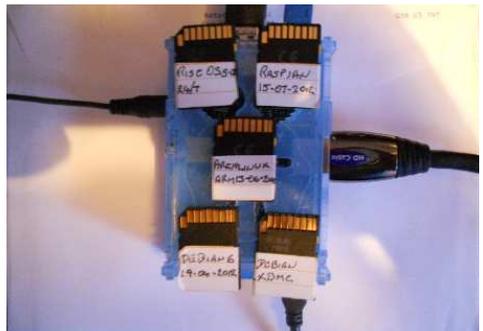
One of the pre-release builds of RISC OS on the Pi

from the Pi, and provides plenty of interfacing options.

There is also a YouTube video of a team of lads who launched a balloon with a Pi attached into the Stratosphere. The Pi was running a webcam and recording the pictures from it – from the pictures it appears that the Earth is round and not flat! You can find the videos in David Akerman's channel:

www.youtube.com/user/choccydonuts

A new Revision 2 board is now being manufactured in Pencoed, South Wales, having been transferred from China. So an all-British product with some foreign parts, with 30,000 Pis being made per month creating 30 new jobs. It won't be long before they appear as free gifts in cornflake packets.



A selection of the OSs on Terry's Pi

by Steve Fryatt – stevef@wrocc.org.uk

Pictures by Rick Sterry, Steve Fryatt and Colin Sutton

November's meeting saw a visit from Honorary Life Member Mike Cook, who had travelled across from the other side of the Pennines to show us a range of his latest hardware and software adventures. Although the Mac and Arduino still featured heavily in his work, the launch of the Raspberry Pi hadn't gone unnoticed – eagle-eyed early visitors were able to spot a couple of the diminutive computers on the table at the front before the meeting began.



The birth of Spoonduino

The first event that Mike had taken part in was the 2012 Beam Festival at Brunel University. He'd attended the event in 2011, taking advantage of their 'Beam Bursary' scheme to encourage newcomers to exhibit, and decided to return again this year. The festival itself is in June, but this time things got underway early with Beam Day in March: this featured a competition for original musical instruments, with the only requirement being that they had to have been completed within three weeks of the event.

When he learned about this a couple of weeks before, Mike decided to enter – despite not having just completed the construction of an instrument, or even being in the helpful position of actually working on one at all. The solution was the Spoonduino, based around a small – and hitherto unused – flightcase that came as part of a set in a Christmas present from his son.

The Spoonduino is so named because it is played by a dessert spoon rubbed over a square of conductive plastic from an anti-static bag. Mike realised that by putting voltages alternately horizontally and vertically across

the plastic and then measuring the voltage on the spoon – via a wire connected to its handle – he could work out its position and convert that into a musical note. This could then be played via a speaker – salvaged from a Wakefield charity stall.

The Spoonduino contains an Arduino to control all of the analogue to digital conversions and handle the loading and selection of sound samples. It was fitted snugly into the flightcase using neatly drilled and varnished wood: it seems that his milling machine is still seeing good use. By connecting the instrument up to a



The literally-titled Spoonduino

computer via a cable, it was possible to configure the sounds that it made – Mike showed us a piece of software running on an iPad to allow different waveforms to be designed for playback.

The Spoonduino proved popular at Beam Day, with Mike winning the competition and taking away the prize of a MIDI keyboard. He subsequently returned to the full festival, and was able to introduce yet more visitors to the instrument.

Musical sequencing

Alongside the Spoonduino at the meeting was another of Mike’s custom instruments: the RFID Sequencer. Most of us are probably familiar – at least by name – with a conventional sequencer: samples can be loaded in, then ‘pegs’ are placed on a piano-roll-like grid to cause them to be played back in the correct order at the correct places in a tune.

Having played with ideas such as the Hexome, which can perform a similar role as we were to see later in the evening, Mike came up with a way to turn the humble sequencer into an interactive hardware project. The result was a large varnished wooden box with an 8 × 4 grid of clear perspex studs arranged on its gently-sloping lid. The studs were lit from below by multi-colour LEDs, and were just the right size to fit into the holes in a set of RFID keyfobs (the kind of thing you might have on a key-ring to swipe in to a modern door-entry system).

As the fobs all contained unique codes, Mike allocated groups of them to different instruments and configured the sequencer accordingly. Fobs could now be hung on to pegs on the grid, and as the sequencer stepped through the eight columns in turn it would play the sounds associated with the ‘instruments’ hanging there.

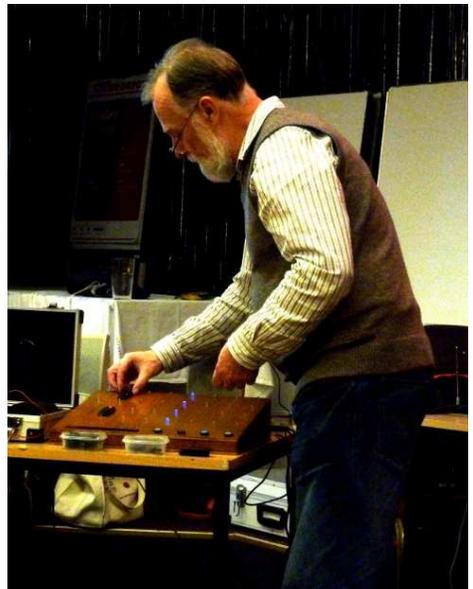
Although RFID is a fairly common technology these days (many of us will be familiar with the aforementioned door entry systems, where a card or ID badge is held against a small box by the door, or with electronic bus passes or



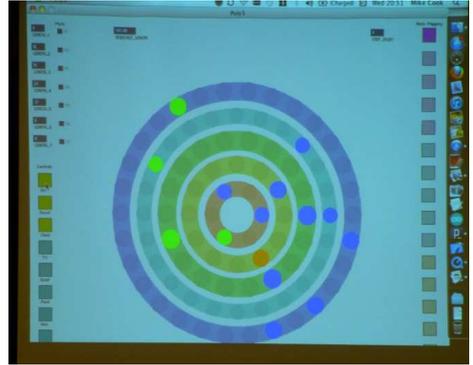
The RFID Sequencer

Oyster cards), the readers are usually kept well separated in RFID terms. Putting 32 of them into a confined space and then expecting to be able to read each device correctly is more of a ‘challenge’.

The technology behind RFID is fairly simple, at least in principle. The reader contains a coil, through which an alternating current is passed. When a card or keyfob containing a similar coil is brought nearby, a similar current is induced in that coil: this is enough to power a small



The RFID Sequencer in action



Then and Now: Mike and his Hexome at the November 2011 meeting, and the more flexible – if less polished – Processing software-based Polyrrhythmic Sequencer remix in 2012

chip embedded in the card. Once energised, the chip changes the loading on the card's coil in a way that represents a stream of binary data: this in turn affects the loading on the reader's coil and causes small fluctuations there which can be detected and read.

To make the sequencer work, Mike needed to be able to uniquely read each of the 32 possible fobs. His solution was a number of custom-made coils and some clever circuitry to filter the unwanted interactions. The design went through several revisions, as the photographs that he showed us made clear.

Despite the technical challenges, the end result worked well and Mike had taken it with him in September when he had travelled south to visit the Brighton Mini Maker Faire, taking place in one of the venues at the Brighton Dome. The "Grumpy Mike's Arduino Gadgets" stand had proved popular, and given a new southern audience the chance to see his creations.

Musical patterns

On previous visits, Mike has talked about his Hexome project: a hexagonal grid of illuminated buttons that can be used for a variety of different interfacing tasks. One of its abilities is to act as a sound sequencer similar to the RFID Sequencer: buttons can be turned on and off, and then the computer can cycle round them and play the selected items.

Although hexagonal, the Hexome really consists of a series of concentric circles of buttons: a single one in the centre, then six placed in a ring around its six sides. The geometry results in three more rings, of 12, 18 and 24 buttons working outwards. If points in each of the rings are played sequentially, then these numbers mean that the four sets will get back into step after 72 cycles (as 72 is the first number to have the factors 6, 12, 18 and 24). This results in a musical pattern which does not repeat for 72 notes.

By varying the number of points in each ring, the numerical factors can be changed and new patterns created. Given how long it took to build the Hexome, doing this in hardware would be nearly impossible – however, it's something that software is ideally suited to. Mike showed us a piece of software called a Polyrrhythmic Sequencer that allowed an infinite variety of 'Hexomes' to be created and experimented with, using different numbers of rings and buttons. Mike wrote the sequencer in Processing – from www.processing.org – and it can be found on his website at www.thebox.myzen.co.uk/Mac_Apps/Processing.html

It turned out that the RFID Sequencer could also be used to make similar kinds of pattern by adding different numbers of imaginary pegs to the ends of the rows. Although these couldn't

be used to make sounds, Mike pointed out that in practice whole sectors of the Hexome would often be left unused for this kind of work. We heard a selection of sequences: it was surprising just how rhythmic these apparently random groups of notes could be.

Two slices of Pi

To round off the evening, Mike had brought along a couple of Raspberry Pis. The small computer has a general purpose I/O connector similar to a user port along with an IIC bus, making it ideal for the kinds of project that used to feature in *The Micro User's* Body Building Course series. It also comes with a selection of programming languages, including Python.

Mike had joined the Raspberry Pi forums, where he had started to contribute. His name was finally spotted by Liz and Eben Upton who, it turned out, had both (independently) been fans back in the Body Building days, and a request was made to convert Liz's favourite project to the new hardware. This turned out to be the Magic Wand from July 1989, featuring a strip of LEDs on a stick which could be waved around to create messages using persistence of vision. The original had used a mercury switch to detect the extremities of the wand's travel, and new rules on dangerous substances looked like they could be a problem: fortunately, it turned out that Mike was OK so long as he didn't sell the wands! Once complete, Liz blogged that it was like "having a rock star you worshipped as a kid re-write a song for you".

Since then several of the projects have been 'ported', including the ubiquitous 'steady hand game' and an IIC Interface Board which featured a range of analogue input and output facilities. Using Linux on the Pi, Mike had been writing his control software in Python: although flexible, he

commented that it was prone to timing glitches when the Linux multitasking took control away at crucial moments (although, to be fair, RISC OS is even worse in this respect unless multitasking is abandoned in favour of a simple single-tasking BASIC program).

A return to RISC OS

When RISC OS Open started to make builds of RISC OS available for the Raspberry Pi, Mike began to experiment with the familiar environment. The presence of BBC BASIC opened up the possibility of dusting off the original software from some of his projects, and one of the first to be looked at was the IIC Interface. It turned out that the desktop front-end that had appeared in *Micro User* worked fine on the Pi – or it had done on the pre-release builds of RISC OS. Foolishly Mike had upgraded to the official release version just before coming through to Wakefield and hadn't tested things: when he tried to demo it, the software didn't work correctly for reasons that we couldn't diagnose on the night.

Despite this, we were able to see the Pi running RISC OS successfully with the now-official SD Card image. Mike said that he was looking forward to investigating its capabilities, so watch this space!



Mike had already managed to get some of his old Body Building and Run The Risc projects working on the Raspberry Pi

Club News

Annual General Meeting & Possible Constitution Change

The WROCC Annual General Meeting will be held on Wednesday 9th January 2013 at the West Yorkshire Sports & Social Club, commencing at 7:45pm. Please note that the date is the 9th January rather than the 2nd. A light buffet meal will be available free of charge, but please also note that this is a members-only event. Members within reasonable travelling distance are urged to attend, as this is a very important opportunity to have your say on how the Club is run.

The committee has just one specific proposal to put forward at the AGM, under item 6 “Changes to the Constitution” – please see the accompanying AGM document which contains copies of both the Agenda and the Constitution. The proposal is to replace the words in brackets “by letter post” in clause 7.1 with the words “by letter post or electronic mail”. This is designed to bring it in line with the current distribution methods of the newsletter, with the associated savings in costs and administrative effort.

Members who are unable to attend the AGM

The committee is very conscious of the fact that a majority of our members are unable to attend the AGM simply because they live too far away. Proxy or postal votes are impractical in a club such as ours, not least because it is usually not known exactly what is being proposed and voted upon until the AGM itself. However, if any member not able to attend (for

whatever reason) would like to submit their views or questions in advance, by email or by post, these will be read out at the AGM on their behalf. Please send these care of the Chairman, whose contact details can be found on the rear page, in plenty of time for the AGM on Wednesday 9th January.

Proofreaders required for *The WROCC*

We're currently looking for additional proofreaders to help with the production of the Club's newsletter, *The WROCC*. Our proofreaders play an important role in keeping up the quality of the publication: each month a draft copy is circulated for checking, and this gives a chance for corrections to be made. We're looking for bits that are wrong or just unclear: there's no need for an in-depth technical knowledge of the subjects we cover, as it's equally important to have someone highlight the bits that don't make sense!

This is an area where members unable to take an active part in meetings or the committee can help out: the newsletter is produced via email, with the draft copies being circulated in PDF format. Despite being a monthly publication, there is no requirement to be able to proofread every month – although being available more often than not would obviously help! If more than one volunteer comes forward, then it might even be possible to share the workload out. Contact the Editor, whose details are on the back page, if you think you could help.

New committee members wanted

In order to keep in touch with the needs of the membership, and come up with fresh ideas, the Club committee needs a gradual turnover of members – i.e. ‘fresh blood’. This has not really been happening over the past few years, and we have the situation where some members have been staying in post for substantially

longer than they would like. This is not a healthy situation, and it is only a matter of time before the committee becomes depleted because of insufficient new people coming forward to replace those standing down. It threatens the future of what is still a very active and nationally respected Club.

We really could do with at least one new committee member this year, and the same again next year. People may be reluctant to come forward for fear of taking on too much of a commitment, and this is quite understandable. However, the committee works by sharing the load, which avoids individual members being overburdened. In fact, the best contribution a new member can make is simply to be another person to take part in discussions and help come up with ideas.

Although we usually hold seven round-the-table committee meetings during the year,

committee business also takes place via the committee email server, “in the comfort of your own home”. Committee members are allocated an @wrocc.org.uk redirection address for ‘official’ use.

So, even if you are a little apprehensive about dipping your toe into the water, but willing to give it a go, please make yourself known to the Chairman – ideally before the AGM, though this is not a formal requirement. Obviously, all nominations for committee members are subject to approval at the AGM, but it seems rather unlikely that this would be a problem!

Connecting an LCD Monitor to a RiscPC

HARDWARE

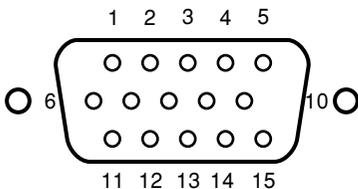
by Ian Stanley – member@stanley86.fsnet.co.uk

It’s possible to connect a VGA LCD monitor to a RiscPC, although there are a few things to consider. First, not all VGA cables have pin 11 (Id0) connected. Pin 11 should be connected to ground to set the RiscPC to VGA mode.

Before connecting the LCD monitor, set the RiscPC’s display to 800 × 600 at 60Hz if possible, then turn the computer off. Connect the monitor and turn on the computer, then adjust the display size as required. Lower refresh rates – such as 60Hz – are better for LCD screens.

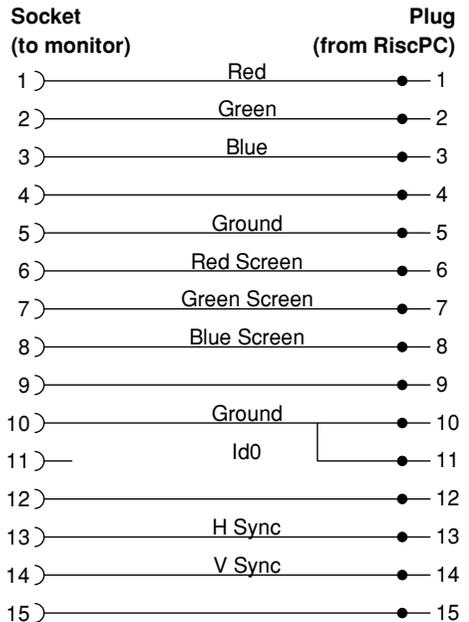
A monitor definition file can be made by editing the *Acorn.AKF85* definition file and taking out any mode with a high refresh rate.

If the monitor does not have a changeable cable then you can make an adapter as shown here:



The pins of a 15-way D plug, viewed from the front

most of the lines should be connected straight through, but the Id0 signal on pin 11 should be connected to ground (pin 10) on the RiscPC side.



The connections required in a monitor adapter for a RiscPC.

James Slater

Sadly, during October we lost yet another long-standing member, but this time it was at the remarkable age of 98! James was a regular at our meetings back in the 1980s and 90s, but ill health had kept him away from meetings for a good many years though he remained a paid up member to the end. When I last saw him at his home a couple of years or so ago, he told me how much he enjoyed reading the newsletter, and how much he appreciated the efforts of those who wrote the meeting summaries and other articles. The funeral had already taken place by the time James's relatives found our contact details. No photo of James was available, but nevertheless those of us who knew him will remember him with affection.

Rick Sterry

Correction

There were two slight mistakes in my article last month on Richard Ashbery's talk at the October meeting, though the news media would probably refer to them as "blunders". The first one was that I referred to it in the very first line as being the September meeting, rather than October. The second was that I confidently stated that there is a choice of 14 artistic line profiles in all, whereas the screen shot on the right-hand side of page 2 clearly shows that there are in fact 21, i.e. 14 'standard' profiles, 4 repeating ones, and 3 constant ones. The archived copies, including those available on the web site, have been corrected.

Rick Sterry

*The deadline for contributions to the next issue of the newsletter will be **24th December 2012**.*

Disclaimer: The Editor and committee of the Wakefield RISC OS Computer Club are not responsible for the contents of any article, letter or e-mail contained within this newsletter. All views expressed are those of the individual concerned, and do not indicate that WROCC, the Editor or the committee agree with any statements made.

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Full Membership	£7 in first year
	£14 per subsequent year
Printed Newsletter	add £6 per year
Meeting Visitors	£2 per meeting

Change your membership details (contact information, newsletter preferences, etc) by email: membership@wrocc.org.uk

Monthly Meetings

West Yorkshire Sports & Social Club
Sandal Hall Close, Sandal
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7:45 p.m. on the first Wednesday in each month

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