Gerald's Column
by Gerald Fitton

I have received some interesting feedback this month which I shall share with you.

MPEG Audio – 1

Richard Lambley has written to me. He writes:

Apologies if this is the 100th email to point this out, but MPEG 3 (your October column in Archive) is not an audio standard: it is an abandoned high-definition TV standard, http://www.fact-index.com/m/mp/mpeg_3.html.

The audio standard you're thinking of is MPEG Layer 3, commonly known as mp3. Another audio format in the same audio hierarchy is MPEG Layer 2, commonly known as mp2. This is the standard used for digital audio broadcasting via satellite, DAB and Freeview—television sound as well as radio—and is what arrives on your hard disc if you use a digital receiver card on a PC.

The mp2 format can in theory be played by any player which can do mp3, but many hardware players unfortunately don't recognize the mp2 file extension (of course, it's easy enough, if tedious, to rename your files). The mp3 format gives better reproduction at lower bit rates but mp2 is more resistant to errors caused by a fading radio path. http://www.mpeg.org/

MPEG Audio – 2

Rod Ferrari has written to me about the MPEG Audio Format. He writes:

Having just read your column in the October '04 issue of Archive I feel compelled to correct one significant factual inaccuracy.

MP3 has never been used by Sony MiniDisc products, they have always used ATRAC which is a Sony-developed compression algorithm. When MiniDisc was initially launched it was involved in a pretty high-profile format war with Digital Compact Cassette (DCC) to become the digital successor to the analogue Compact Cassette, it was generally accepted at the time that the PASC compression used by DCC did sound better than ATRAC; nevertheless, the benefits of a disc-based format over a tape-based one soon gave Sony a quick knockout victory over Philips in this contest.

During the intervening years there have been many generations of improvement made to the original ATRAC algorithm and these days it holds up very well against other compressed audio formats. As it is the default for all Sony products that use compressed digital audio (all their MiniDisc and solid-state memory audio products, some of their CD Walkmans, their online music store, etc.), considering the size of Sony's worldwide sales it may well be the most popular worldwide (in terms of number of devices sold) of any of the compressed formats.

AAC or MP3 or WMA

Rod continues by discussing the future of these two formats. He writes:

I'm not sure I agree with your opinion on AAC replacing MP3 in the long term, the advantage of MP3 is that it has no Digital Rights Management features, making it very easy to make copies for use on as many devices as you like, I think that when people start encountering the limitations enforced by the DRM-enabled formats they may well find them too much hassle to be bothered with and stick with MP3 as the most convenient option. Also, the fact that MP3 is pretty ubiquitous while the others are engaged in a battle for supremacy in the downloadable music arena, with Apple pushing AAC, Sony pushing ATRAC, and I assume Microsoft pushing WMA, all of them incorporating DRM features which may prove to be too much of a nuisance to end users, I would not be surprised to see MP3 remaining the single most dominant format, we shall see.

Lossless Encoding of Sound

Rod continues with: If you are planning to follow up this article I think it would be appropriate to include a mention of the Apple Lossless Encoder which is supported by the latest versions of the iPod firmware and iTunes, I can't understand why it has taken this long for someone to come up with a Lossless algorithm tailored for audio data, I wouldn't have thought it was that difficult. Although ALE only achieves about a 2:1 compression, hey.. it's lossless... great!

Video Standards

Steve Johnson has written to me: I'm afraid your article in Archive 17.12 p27 has rather put the cat among the pigeons! We've had queries in from a couple of readers and clearly there's some confusion over the numbers appearing in the article. It seems the primary hiccup is that you've used 532 as the number of lines using picture info in (presumably a PAL) display. Although I appreciate that you used this "somewhere near" number primarily to support your later calculations, unfortunately there's a knock-on effect with our own articles where it's important to work with an accurate figure (17.9 p47; 17.11 p67; 17.12 p26). Otherwise the re-scaling etc which we advocated won't work or have any beneficial effect.

We've double-checked with various sources and have been able to confirm the following for a 625-line PAL video system:

There are 2 video fields, each containing 288 horizontal lines of video information.
The 'odd' field carries lines 1, 3, 5... 575.
The 'even' field carries lines, 2, 4, 6... 576.
Each field takes 20ms to be displayed.
The two fields are displayed, alternately ("interlaced"), to form a complete video frame containing 576 horizontal lines of video information.
As it takes 2 x 20ms to display a complete video frame, the 'apparent' frame refresh rate is every 40ms (or 25fps).

Granted, TV displays are commonly stretched slightly in the vertical to eliminate any borders showing on the screen, but in practice you should still be able to see typically 560-570 of the 576 lines actually 'drawn'. To be honest, we're not sure where the figure 532 comes from (unless you took this as 2 x 266 instead of 2 x 288). [I didn't–GLF]

Similarly, we're unsure why your digital video camera is outputting 696 x 532 pixels as this is seemingly non-standard. We've gone through the specs of 12 digital video cameras and they output either a PAL video frame of 720 x 576 pixels and/or (in still 'snapshot' mode') 640 x 480 pixels. [My video camcorder is a Panasonic NVDS5–GLF]

Digital still cameras output 640 x 480 pixels or any higher multiple, depending on capability. (The first-generation analogue Canon Ion cameras used to output a full PAL frame of either 288 or 576 horizontal lines, depending on the model).

AVI standards depend on what setting(s) you pre-select before recording, but normally the 'high quality' setting is a frame of 640 x 480 pixels (no interlacing involved). This will match a typical computer display of 1280 x 1024 pixels without the need for re-scaling. However, if outputting to DVD, or to an RW digital video camera, the PAL standard of 720 x 576 pixels is used.

The reason you're seeing a better display on a computer monitor (compared with a TV) is simply that, potentially, the screen resolution and refresh rate are so very much higher. For example, a typical 1280 x 1024 pixel display, refreshed at say 60Hz to 70Hz, will be streets ahead of a 576-line TV display refreshed at a true 25fps (although 'apparently' 50Hz due to the interlacing system).

Video Editing

Keith Hampton has written to me on this and other related subjects.

He uses a Windows machine to create his video productions. He finds that his major limitation is that his 160GB hard drive will store about 7 hours worth of video. I think that this is almost certainly in .avi format. He says that this limits him to one project at a time.

He writes that the hard drive uses the FAT32 filing system and that this restricts the maximum file size to 4GB or about 18 minutes worth of video. Of course, the NTFS filing system will store much larger files so he is considering upgrading his Windows OS.

Keith does not burn DVDs but, until he can afford it, directs the output of his masterpieces to VHS tape. Keith does not mean S-VHS tape but the standard VHS tape. He is dissatisfied with the quality on the VHS tape.

What Drives Hardware Upgrades?

Keith makes a very important point. He writes:

(This) proves that for me the need to upgrade has to be driven by the limitation of the existing system, which is driven by new software or hardware capability—digital photos, scans, video. We moved from our BBC B to an A3010 because DTP with View or SmartDTP(?) ... only allowed editing of a quarter of an A4 page at a time was too painful. The A3010 was a special from BEEBUG with 4MB RAM and 60MB HDD and Ovation. We upgraded to OvationPro and discovered that 4MB was too little to print out useful documents, so upgraded to the RiscPC.

Future Developments

Keith continues with: The desktop market could form around 'standard Windows PC' hardware but running Virtual Acorn without having to run on-top of Windows XP. This provides the enthusiast with 'cheap' hardware which can then form the basis of a RISC OS system. If Virtual Acorn can match or exceed the performance of the Iyonix even running on top of Windows XP, it stands to reason that a full version running directly on the hardware should really fly.

Castle have begun this migration by introducing the HAL to divide the OS from the actual hardware and therefore they might view this as their end goal. It removes the dependency on using ARM processors which are targeted at the low power consumption market and not the desktop market.

MIDI to CD

John Evans had a question for members of Archive on Line:

Has anyone found a good way of creating a music CD from a collection of MIDI Files? The floppy disk on our ROLAND WD-50 keyboard has broken and spares are no longer available. If we could replay from a CD player it would solve the problem.

My best idea so far is to record from (say) a PC midi player and then re-record onto disk; but a direct link (RISCOS, iMac or PC) would be better. The alternative of playing the midi file on a PC and linking to the WD-50 through a midi cable would probably work but would be bulky to transport.

What is really needed is a pocket MIDI player!!!

I replied with:

From this I guess that you have MIDI format files on a floppy disc and that you are using the Roland to play the MIDI files? I do not know this particular Roland but my guess is that it will have a couple of MIDI ports on the back of the keyboard?

If so then you should be able to connect a computer to the Roland keyboard via these MIDI ports and play the music from the CD on the computer.

If you do this then the Roland will receive the MIDI files from the computer and will render them (musically) in exactly the same way that they were rendered when you used the floppy directly in the Roland.

I think you mean a “direct link” from the computer to the Roland Keyboard? Certainly if you do this (as outlined above) then the sounds from the Roland will be exactly as they were before.

Of course a Laptop machine would be less bulky than a desktop machine.

The iPOD certainly fulfils that description (a pocket MIDI player) in that it is smaller than a Roland—but you would have to convert the files from MIDI to some other format.

A MIDI file is just a set of instructions to play certain notes (such as C, E and G) using certain (numbered) voices (such as guitar, violin, piano).

Not all violins sound the same and the violin produced by a Roland is not exactly the same as the violin played by a Yamaha. So, if you put your floppy into a Yamaha keyboard then you would find that the music would sound slightly different from the sound you are familiar with from the Roland.

So far as a computer is concerned, different pieces of computer software will render the different voices in slightly different ways so that the sound generated by one piece of computer software will be subtly different from the sound generated by another.

The Creative Sound Blaster Live software which comes with their later sound cards contains specific sets of voices for both Yamaha and Roland so that, if you are used to playing a MIDI file with a Yamaha (or Roland) then you can reproduce exactly the same voices as would be produced by a Yamaha (or Roland) keyboard. But you might like to try alternative voices with some of the MIDI files.

Often MIDI files are created using a musical keyboard and, if the artist has used a Roland in anything other than General MIDI (GM) mode then it is probably best to play back the MIDI file using Roland voices. Once you have decided on the set of voices to use (for example the 'standard' General MIDI voices or the more delicate Yamaha or Roland voices) then you can use computer software to convert the MIDI file to .wav or .mp3 or one of the MPEG 4 voices preferred for your playback machine.

If you want a plain 'old' CD then you will find software which will convert almost any of these formats to the .cda format of a music CD. It is best to create a .wav from the MIDI file (using your chosen – Roland? – voices) as the 'master version' before you burn to a CD.

If you use an iPOD as your playback device I recommend the AAC .m4a format as the format you should choose. As a by the way, the iPOD will play .wav and .mp3 format files as well as the .m4a and other formats.

Communication

Thanks for all your emails, letters and discs. These days I am finding an increasing number of my correspondents are sending me CDs they have burned rather than floppies. That is because the files they are sending me are much larger than can be fitted onto a floppy. I guess it is a sign of the times?

Please contact me by email (preferred) or by letter if you have any questions or comments. You can email me at <Archive@abacusline.demon.co.uk>.