Choosing & Using a TV/Video Card

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[This article was first published in Archive magazine in 2004 and is included on the AVLine CD by kind permission of Archive Publications. T.O.M.S. have updated it where necessary.

Note that the article was aimed primarily at users of the RISC operating system, so some of the hardware and most of the software titles mentioned will be 'foreign' to PC and Mac users.

There's a deal of duplication between this article and those on Connecting AV Units which originally appeared in Living with Technology magazine and which also appear on the AVLine CD. But repetition isn't necessarily a bad thing and, in any event, you may wish to refer to this offering as a stand-alone article.]

Computers are great tools for working on all things audio-visual (AV). Although ARM-powered machines have always lagged behind their PC and Mac counterparts in this area, nevertheless an expanded RiscPC was no slouch, thanks primarily to Irlam's range of AV podules such as *VideoDesk*, *RiscTV* and *i16*.

This encouraged development of third-party application software such as *Prosound* and *SoundDesk*; also most notably *Teletext Plus*, using a *RiscTV* or external box as the data source and, arguably, still the best analogue teletext solution for any platform.

So it's most unfortunate that neither Iyonix nor Omega can support these AV podules and, added to the fact that in the meantime, PCs have been developed to the point that they can record, edit and output video, all in the digital domain (including burning DVDs), there's a danger of users migrating away from the RISC OS platform.

Enter PCI TV/video cards

We don't have an Iyonix but were chuffed to read of Simon Wilson's splendid efforts to get a range of existing analogue TV/video PCI cards to work in this computer (reviewed by John Woodhouse in Archive 17.9 p15).

Let's hope this is only the first of many such initiatives to get 'foreign' PCI cards to run in ARM-powered machines, with the associated drivers and application software.

Additionally, with the general improvement in hard disc drive read/write and access speeds, maybe it will no longer be necessary to install a dedicated AV disc, with associated high-speed IDE or SCSI interface taking up a PCI slot?

Of course, TV/video PCI cards are available for the PC market and this article is aimed at not just Iyonix owners, but also *VirtualRPC* users whose host PC may have PCI card support.

TV/video?

Eagle-eyed readers will have spotted the repeated references to TV/*video*, rather than just TV cards. So what's that all about?

We prefer to look upon these items as video cards – which just happen to include a TV tuner... Watching television on the desktop is all very nice for those who wish to do that but, with wall-to-wall Wimbledon, footy, cricket and golf, it really can play havoc with productivity!

Which leads us to the "video" bit of the heading. As far as we can tell, all TV/video PCI cards have supplementary sockets on the rear panel, alongside the coaxial socket for the aerial lead, enabling one or more external *analogue* AV units to be connected (which can include a 'digital TV' adaptor).

Once the application is running, each external source can be selected instead of the TV tuner and viewed on the desktop.

Most importantly, in a PC, the video (or TV) signal is also fed – internally – to other applications such as AV editing software or direct to a DVD burner.

The type of supplementary video and audio sockets fitted on the rear panel seems to vary between PCI cards of different specification and manufacture but, generally speaking, they're of a fairly common type and we'll look at these in some detail.

Choosing a TV/video card

It wasn't necessary to decide which TV/video podule to install in the A5000/RiscPC as the only practical solution was Irlam's *RiscTV* (Yellowstone's *DeskTV* never overcame its initial limitations and quickly faded from sight). But Iyonix users are faced with a very good choice of analogue TV/video PCI cards (Archive 17.9 p17) and PC users have an even wider selection.

So which card to select? A fundamental question for PC users is whether to go for one with an on-board, conventional TV tuner, giving access to the five *analogue* programmes BBC1/BBC2/ITV1/Ch4/Ch5, or one with a *digital* TV tuner, giving access to all 'Freeview' channels including digital radio (listed in Living with Technology 1.10 pp36/37 which, with some minor tweaks, remains valid). Some cards with digital TV tuners can also receive analogue programmes.

Also for PC users, most if not all of the analogue TV/video cards include Teletext application software which, although not a patch on *Teletext Plus*, is nevertheless adequate. (Paul Skirrow of Octopus Systems commended the *Hauppauge WinTV* card to us, specifically for its analogue teletext application, and we're very satisfied with it.)

For Iyonix owners, the choice is presently limited to cards with analogue TV tuners as none of the current crop of digital TV/video cards are compatible with Iyonix. *[2006, and that picture doesn't appear to have changed.]*

But as we shall see, fitting a card with an analogue TV tuner in Iyonix, or in a PC, doesn't rule out viewing digital TV on the desktop, or listening to digital radio programmes.

We suggest you make the final choice by considering which external AV source(s) you may wish to connect to the card, now or in the future.

In all probability, this will indicate the type of video connections required and, therefore, which card(s) have the requisite connectors. In general, audio connections are easier to deal with.

Video standards and connectors

We included a detailed run-down on video standards and connectors in LwT 1.9 pp44-46 [see *Connecting AV Units*, Part 1, pp2-3] but it may help to review the options relevant to this article, listed in order of *increasing* quality:

– **RF link**. To watch analogue or digital TV programmes on the desktop, a coaxial cable will need to be run between a terrestrial TV aerial and the aerial socket on the TV/video card. Ideally, a dedicated TV aerial should be used but as, in all probability, the TV card will have to share the connection with a domestic TV, some sort of 'splitter' will be required.

If you're lucky, with bags of signal strength from a local TV transmitter, you might get away with a passive variant, typically consisting of an adaptor or flush/surface-mounted unit with two *UHF* coaxial outlets (*not* VHF/UHF) and a few components. These are available on the high street or by mail order, costing £2-£5.

More often, the unavoidable signal attenuation by sharing the aerial will adversely affect analogue TV display quality and can certainly screw up digital TV, so an active amplifier/splitter becomes necessary. You may need to obtain one by mail order from Maplin, etc.

You can connect some external AV units to the TV card, simply by looping the coaxial cable via the device. For example, the video from a VCR, with *mono* audio, will be superimposed onto the RF link and the TV card can be tuned into this extra 'programme' in the usual way. (This is normally on UHF channel **36** but the VCR may need to be re-tuned if it interferes with Ch5.)

– **Composite video**. In this system, the video signal is carried on a screened, single-wire connection from the external AV unit such as a VCR, and normally terminating in an RCA phono plug for connection to the phono socket on the TV/video card (often colour-coded yellow and not to be confused with a jack socket, often fitted for audio connections; see Fig 1).

Fig 1 Phono sockets (L) and 3.5mm jack sockets (R)

This direct connection results in a better quality display compared with the RF link and is to be preferred. (Note that audio is *not* carried on a composite video link and requires a separate mono/stereo connection.)

Not many external units using a composite video link will have a dedicated phono socket; a far more common solution is that the unit will sport one or more 21-way SCART sockets, which always carry a composite video OUT signal. (See the article on *SCART – What's it All About?* for more details.)

Fortunately, SCART adaptor plugs are readily available which make for easy connection to the TV/video card by a composite video link, terminated by a phono plug at each end. (Important: The SCART adaptor must be an OUT variant; some can be switched IN/OUT.)

Examples of external kit which invariably use a composite video link are: many digital (still) cameras; variants of VHS and 8mm video cameras; VHS VCRs; Freeview digital TV adaptors (but see also under S-video).

– **S-video** ('Super-video', sometimes mis-named Super-VHS or S-VHS). In this system, the video quality is enhanced by the signal being separated into two components: a high-resolution monochrome image (luminance) and a lower-resolution colour image (chrominance),

each with their respective earth lines. (The human eye is extremely sensitive to monochrome detail but much less so to colour.)

If the higher-quality S-video signal is available (in addition to composite video which will also invariably be provided), S-video is the preferred system.

The screened, 4-line cable terminates in a 4-pin mini-DIN plug and requires a matching socket on the TV/video card. Once again, the audio requires a separate connection.

If the external AV unit doesn't have an S-video OUT socket, a SCART plug adaptor can again be used. In this case, the adaptor must have an S-video socket and again must be an OUT variant (or switched IN/OUT).

Examples of external kit which can provide an S-video signal are: variants of S-VHS and Hi-8 video cameras; S-VHS VCRs; some Freeview boxes; DVD players; most DV cameras.

Note that, although some units such as DVD players can output the highest-quality RGB video, this cannot be used by TV/video cards.

It will often be necessary to configure the SCART socket specifically to output an S-video signal instead of composite video or RGB, either by a physical switch, or in software via the menus.

Note also that DV cameras can output a *digital*-format video signal via a 'Firewire' connection to a PC, but this cannot be utilised with TV/video cards.However, Iyonix (and PC) users can connect a DV camera to a card by using the alternative, analogue S-video link.

The final choice
So in essence, the choice of which TV/video card to install boils down to:

– Firstly, PC users should decide whether you require digital and/or analogue TV (noting that some digital TV cards will also handle analogue programmes, but not always analogue teletext).

– Secondly, Iyonix and PC users should decide whether a card with either a composite video or S-video socket would match the external AV unit(s) you're likely to connect to the card.

If all this blether still doesn't help to finalise the decision, for future-proofing we'd recommend selecting a card fitted with both composite video *and* S-video sockets, e.g the *Pinnacle PCTV Rave* card reviewed by John Woodhouse and stocked by CJE Micro's. This would allow two different AV units to be connected, each selectable via the TV/video card controls.

Audio standards and connectors

All TV/video cards and the majority of external AV sources will support stereo audio. The signals are carried on screened, two-wire leads, generally terminating in a pair of RCA phono plugs, usually coloured either red/white or grey/black.

However, presumably to save space, TV/video cards often have a 3.5mm stereo jack socket instead (not to be confused with a composite video RCA/phono socket, see Fig. 1).

If the external unit doesn't sport audio phono sockets, one can always plug into a SCART socket, using an adaptor plug.

All the composite video or S-video OUT (or switchable IN/OUT) SCART adaptors previously described will include a pair of stereo audio phono sockets.

Cables and adaptors

Variants of composite video, S-video and audio cables are readily available on the high street or by mail order, as are some odd-balls we might require, e.g. a stereo audio cable with phono plugs at one end and a 3.5mm jack plug at the other. (Hint: make sure the jack plug is *stereo* and not mono.)

'Cheap-and-cheerful' can be a false economy in AV situations so, if your budget will run to it, go for oxygen-free cables (OFC) and connectors/adaptors with gold-plated contacts.

Using a TV/video card

Having fitted the card, there are a number of things we can do to enhance its use and/or improve the display quality.

Digital TV/radio

Even if PC users have decided to install a card with an analogue rather than a digital TV tuner, that doesn't stop us viewing digital TV on the Iyonix or PC desktop – or listening to digital radio channels – and there are various solutions:

– **Freeview and ONdigital receivers**. Any Freeview digibox can be used by connecting the composite video and stereo audio sockets on the TV/video card to the TV SCART socket on the Freeview box, using a SCART adaptor.

Refugees from the defunct ITV Digital service can connect up their ONdigital box in exactly the same way.

The coaxial cable from the terrestrial TV aerial needs to be connected first to the digibox and thence looped to the aerial socket on the TV/video card.

However, unlike VCRs for instance, the Freeview programmes will *not* be superimposed onto the RF link, so there's no need to re-tune the TV bit of the TV/video card.

The digibox signal is selected by clicking on the Comp button on the TV/video card controls (alternatively called AUX 1, C or 1).

Better still, if the Freeview digibox can output an S-video signal, use an S-video connection instead and select it by clicking on AUX 2, S or 2.

If a Freeview or ONdigital digibox is connected, the Freeview programme guide, interactive services and digital teletext will be accessible in both these installations, using the zapper, but probably not via a digital TV/video card.

– **Digital radio**. Even if you don't watch the digital TV programmes, you can still listen to the digital radio channels which avoids the need for a separate radio aerial and receiver.

PC users can 'hide' the TV/video window by clicking on the Minimise button, but the radio programme will still be heard (as it will with *VirtualRPC* running).

An alternative ploy for both Iyonix and PC users is to connect the supplementary audio OUT sockets on the digibox to an amplifier and speakers (or active speakers), which avoids having to have the computer running.

– **Satellite TV**. If your Sky digibox and computer are in adjacent rooms (and if Management will approve DIY hole-through-the-wall work...), you can connect the two and watch satellite TV! This cunning ploy was detailed by Colin Sutton in LwT 1.4 p27.

Briefly, the satellite dish and terrestrial TV aerial are connected to the Sky digibox, in the normal way. A coaxial cable is then run from the auxiliary RF Out-2 socket on the rear of the digibox, through the wall and to the aerial socket on the TV/video card.

This RF link will then carry not only the five analogue TV programmes BBC1/BBC2/ITV1/Ch4/Ch5, but *also* whichever satellite channel the Sky digibox is selected to.

You will need to re-tune your TV card to access this sixth programme (normally on UHF channel 68).

Note that, although you're accessing a digital satellite TV channel, the signal is being passed via an RF link, so quality will be no better than with the five analogue TV channels and sound will be *mono*. However, as you're using the auxiliary aerial socket on the Sky digibox, a separate aerial amplifier/splitter is not required.

Note also that, if a digital radio channel is selected on the Sky digibox, you will still need to run the TV/video card application to listen to it. However, you don't need to switch on your domestic TV to change channel on the Sky digibox. As Colin described, you can do this 'blind' by using the digibox zapper.

Scaling the TV/video display

Anyone using *RiscTV* on their A5000/RiscPC will know that Irlam mechanised the PAL display to 'snap' into place so that its size (in pixels) exactly matches the underlying desktop display, at fixed ratios of 1:2, 1:1 or 2:1.

This scaling greatly reduces the visible 'artefacts' on the TV/video display and is very effective.

The phenomenon doesn't seem to be so pronounced on a typical Iyonix or PC display, perhaps because the underlying screen resolution is often higher and/or because of increasing use of LCD displays, and there's some debate as to whether it's worthwhile re-scaling the window. This is because none of the TV/video PCI cards seem to have *RiscTV*'s 'snap' feature so it's necessary to re-size the window manually by dragging a corner. However, very few give any indication of the resulting display size and, as the scaling has to be spot on to eliminate artefacts, setting an exact size isn't feasible.

But some cards (e.g. Hauppauge) do give a readout of the X×Y TV/video display size, in pixels, and allow a fixed 4:3 aspect ratio to be set, so manual re-scaling is quite easy. If you get it spot on at 768×576 pixels (1:1), 1152×864 (3:2), or especially at 1536×1152 pixels (2:1), the improvement is quite evident.

On PCs, the display size and position are often stored automatically and reproduced next time the card is run, even if the machine has been re-started. This applies also to Iyonix but the settings are lost when the machine is re-booted.

Widescreen TV

If you install a digital TV card, or connect up a Freeview/ONdigital/Sky digibox, many programmes will be shown in 16:9 widescreen format. In this case, you can deselect the card's 4:3 aspect ratio setting and re-scale the display to, say, 1024×576 pixels, which gives a *very* impressive, artefact-free, widescreen display.

Audio recording

As we were drafting this article *[2004]*, news of Christian Ludlam's *AudioIn* analogue audio recorder came in. Briefly, the application digitises any analogue audio signal connected to an Iyonix.

The arrangement uses the machine's in-built audio hardware, and outputs a *WAV*-format file ready for replay, editing, burning to CD, etc.

This is another splendid initiative which further enhances the Iyonix's capabilities, particularly in the context of this article.

Some of our favourite 'DIY' CDs started life as the soundtracks of TV programmes, videos or DVDs, and we find it much easier to start and stop the source audio recordings, at the desired point, by reference to the video image.

With RiscPC and PCs – and now Iyonix – this is easily mechanised by calling up the TV programme on a TV/video card, or by connecting the external video/DVD source to the card, and there you have it.

More please...

Updating what our gaffer said about *RiscTV* in Archive 10.8 p42, *way* back in 1997, our enthusiasm for both the TV/video PCI card and *AudioIn* initiatives for Iyonix is not so much what they can do now, but what further developments might lead to.

The price of readily-available PCI cards is a small fraction of the cost of equivalent podules for RiscPC and its predecessors. So what's next? Analogue teletext? Analogue video recording? Firewire? Digital video recording? Video/audio editing? Burning to DVD/VCD? Can't wait...

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