

Connecting AV Units – Part 1

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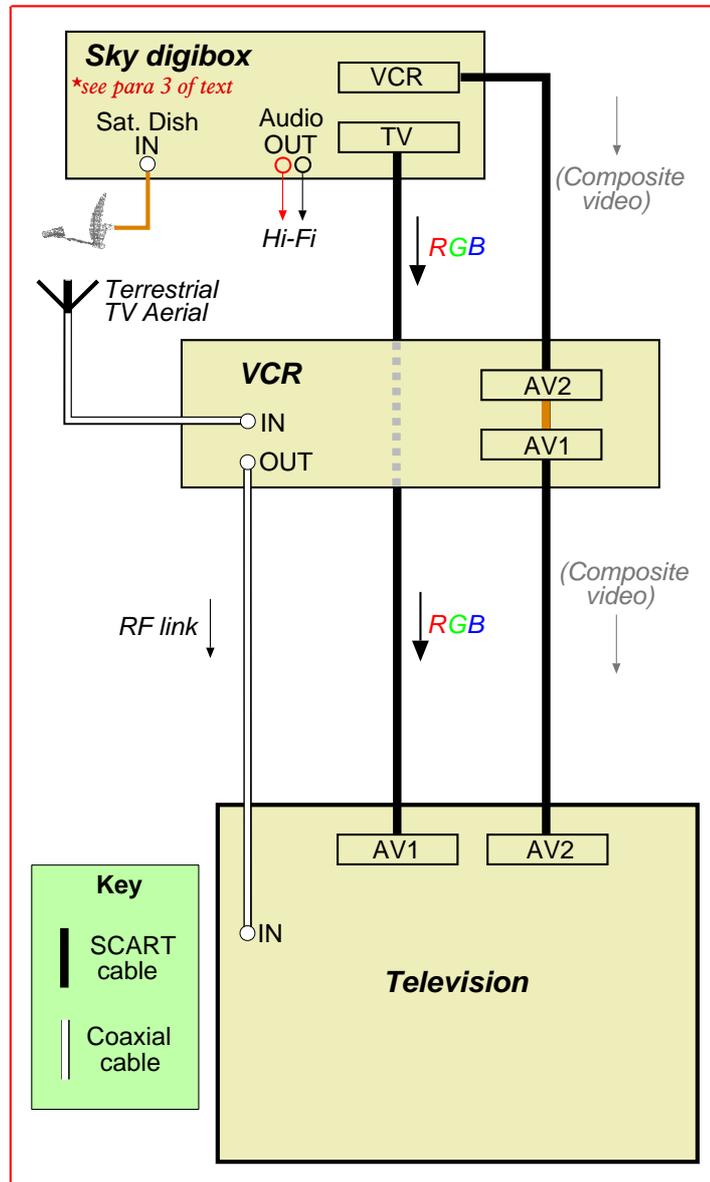
[Note: This series of four articles was originally published in *Living with Technology (LwT)* magazine in 2003 and is included on the *AVLine CD* with the kind permission of the joint authors and Archive Publications.]

Colin Sutton's series of valuable articles about *Making the Most of your Digibox* introduced us to the concept of listening to Sky's high-quality digital radio channels by connecting the digibox audio output to a hi-fi unit, giving much improved *audio* reproduction compared with that given by the speaker(s) in your average TV (LwT 1.4 p26).

These articles are along broadly similar lines, looking at how multiple audio-visual (AV) units may best be interconnected, not only to ensure they perform all the necessary record, play and display functions, but at the same time to optimise the *video* quality.

We'll start with the typical and reasonably straightforward domestic setup illustrated; a VCR and a TV, to which has been added a Sky digibox (*or an *ITV Digital* or *DTT/Freeview* box, to be discussed further in Part 2) to take advantage of the so-called Digital Revolution.

This arrangement is most probably detailed in one or more of the respective user-guides but in this part we'll be looking at how the units and cabling have been configured to optimise video and audio quality.



In later parts we'll add, say, a DVD player – or even a DVD recorder – building up in steps to provide a relatively complex but nevertheless capable and flexible setup.

Interconnections

The introductory article on the AVLine CD, *SCART – What's it all about?*, discussed the physical attributes of SCART connectors, routinely fitted to AV units nowadays, and how they are used to pass video signals at markedly different quality standards. We'll come back to that.

In this illustration, the coaxial cable linking the terrestrial TV aerial via the VCR to the TV is conventional. This is the minimum requirement for a simple VCR-TV setup but, with both video and audio components being passed along the same cable, the result is fourth-rate quality TV and VCR images, while sound is limited to monaural unless the TV itself has a built-in NICAM stereo audio decoder.

Once the digibox is added, a SCART cable is needed to connect the TV socket of the Sky digibox direct to the TV (AV1) to display Sky digital channels. A second SCART cable is taken from the digibox VCR output to the VCR so that the Sky programme may be recorded simultaneously (or it can be recorded while the TV displays terrestrial TV channels 1-5).

A third SCART cable *optionally* links the VCR to the TV (AV2) so that tape recordings can be viewed. Even if the digibox is not present, this SCART link is still recommended as it passes higher-quality video, with *stereo* audio, compared with the coaxial cable (otherwise known as an 'RF link').

Connector/cable types

Connectors and cables which are often provided in addition to or as well as the SCART system may not be familiar to all users, so it may help first to recap on what variations we might find. (Much of what follows has already been discussed in *SCART – What's it all about?* but we don't feel there's any harm in a modicum of repetition.)

– **RF link.** In the original system, with the terrestrial TV aerial connected to the VCR and TV via 50 ohm, coaxial cables and sockets, picture quality depends very much on the received signal strength, this being even more critical for a satisfactory integrated digital TV display. Interestingly, even the very latest AV equipments such as Sky digiboxes from the various manufacturers still provide coaxial sockets for RF links, although in that event the benefits of having digital quality video and audio are largely negated. (But see Colin Sutton's cunning scheme described in LwT 1.4 p27 for watching Sky transmissions in different rooms!)

– **Composite video link.** The combined RF video/audio link from the VCR to the TV is improved upon by using the relevant lines of a SCART lead, using 2- or 3-wire cables. One line carries the video 'composite' signal via phono sockets (usually yellow). Monaural audio is fed along a second line although, if the VCR has a NICAM decoder, L/R stereo signals are passed along 2 lines, again via phono sockets (various colours; typically red/black or grey/black). Many lo-band video camcorders and digital cameras have a composite video OUT socket for TV display or downloading to a VCR.

– **S-video link.** In the S-video system, the video signal is split into the highly detailed monochrome ('luminance') component and the lesser-detailed colour ('chrominance') component, fed with their respective earth lines via SCART connectors and/or via 4-pin S-video sockets (IN and/or OUT). The video quality is further improved compared with the composite video connection method. Often, equipments such as S-VHS VCRs, hi-band video camcorders and top-range digital cameras, plus some DVD recorders/players, have S-video connectors. Invariably, a composite video phono socket will also be provided, in parallel, along with stereo audio phono sockets.

– **RGB link.** The best video quality option of all is to separate the data stream into the three red, green and blue components – RGB – available (on AV units) only through SCART connectors. This is discussed in more detail in *SCART – What's it all about?*. It's important to appreciate that RGB can be either IN or OUT via a SCART connector, *but not both*, so units will often have two SCART sockets; IN and OUT.

– **Video switching.** As any one AV unit cannot simultaneously support all possible connector variants, it is often necessary to switch between, say, composite and S-video (generally by a physical switch) or between the composite video and RGB pins in a SCART connector (normally by software configuration). A SCART connector may be configured for either S-video *or* RGB, not both, and which will be either IN *or* OUT, not both.

– **Adaptors/adaptor cables.** It's not unusual to find that it isn't possible to connect up two units like-for-like; typically you may have a SCART connector free on one unit but not the other, although the latter could have a composite video or maybe even an S-video socket going spare (which must however be the correct 'hand', i.e. IN or OUT). In this case, the two units can be connected using either a composite or S-video lead, plus audio leads, in conjunction with a SCART adaptor. There are many adaptor variants; IN, OUT and switchable IN/OUT, with or without an S-video socket, to suit the particular requirement. Alternatively, adaptor cables are available with a standard SCART plug at one end but split at the other end to provide either a composite video or S-video plug, both variants with stereo audio plugs.

Optimising video quality

To date we've connected up the three boxes in accordance with the sundry user-guides, as illustrated, and it all works reasonably well. So far so good.

But what is not apparent is that the various guides routinely utilise the lines provided within SCART leads for the relatively low-quality, composite video link.

Can we improve on that by using S-video or, best of all, RGB to interconnect the units?

Reference to *SCART – What's it all about?* shows that fully-wired SCART connectors *always* have pins for composite video (and stereo audio pins) but, additionally, have further pins wired for S-video (IN or OUT) *or* RGB (IN or OUT) *but not both*.

Inspection of the user-guides will show that, in all probability, all four of the SCART connectors on the Sky digibox and the VCR can be configured for RGB, arranged in pairs; one IN and one OUT. On the TV, at least one of the connectors may also be configured to input RGB signals.

This finding allows us to reconfigure one of the main SCART lines to use the much-improved RGB link, instead of using the composite video line detailed in the user-guides.

In this case, it's from the Sky digibox TV socket (wired for RGB OUT) to AV1 on the TV (wired for RGB IN). The changeover is not automatic; we have to go into the *Sky digibox menus* and configure the box (*the DTT/Freeview box menus are slightly different and will be detailed in Part 2*).

– Press the **Services** button on the remote control to access the **System setup** menu.

– Select **Item 1 Picture Settings** and press the **Select** button.

– Select **Item 3 Video output** (the default setting is **PAL** which equates to composite video).

– Use the **L/R** buttons to change from **PAL** to **RGB** and press the **Select** button.

– Press the **Back up** button to leave the menus.

Optimising audio quality

The basic audio arrangement uses the TV's in-built speakers. But we can improve reproduction of the high-quality radio channels from the Sky digibox by cribbing Colin Sutton's idea of connecting the digibox Audio OUT sockets via a screened cable to a Hi-Fi unit, as shown in the illustration.

We agree with Colin that, even with a modest 2-speaker arrangement on the Hi-Fi, invariably there will be a considerable improvement in audio reproduction. Not mentioned was that the scheme may bring into play facilities such as Dolby 'Pro-Logic' on the Hi-Fi, which can drive an additional centre-speaker or, furthermore, a pair of synthesised surround-sound units.

As Colin discussed, the TV does not have to be switched on for this to work, but of course the same benefits of the improved audio apply equally when watching Sky programmes on the TV. It could in principle be possible to listen to *seven* speakers in all; two on the TV and up to a further five on the Hi-Fi!

Sit back and enjoy...

To summarise so far; we've optimised the quality of the main video link from the Sky digibox to the TV by configuring the digibox to use the RGB link.

Also we've improved the audio quality by making the link to a Hi-Fi. And *still* all at no extra charge...

Points to note

Unfortunately the RGB wrinkle cannot apply to the other SCART link (via the VCR) as the VCR SCART socket on the Sky digibox is connected for RGB IN, not OUT, nor will it output an S-video signal.

Thus we must stick with the 'default' composite video link (with stereo audio), although a standard VCR will be happy with that. Similarly, this is adequate to view programmes recorded on VHS tapes.

The brown link shown in the illustration between the two SCART sockets on the VCR represents the fact that the sockets are linked-through and remain 'live', even if the unit is switched off.

Although the feature is not used in this illustration, it appears to apply to all units with a pair of SCART sockets (e.g. the Sky digibox) and will prove to be invaluable in more complex arrangements, as we shall see in later parts. The link-through may be either hard-wired, or enabled in software, as will be discussed.

In all probability, the RGB arrangement illustrated will work for different makes of digibox; it is known to be OK for the Pace and Panasonic Sky units, and the Pace DTT/Freeview box, all three also having supplementary Audio OUT phono sockets. For other brands, the user-guide should specify whether or not the RGB links exist.

Even with this relatively straightforward three-box arrangement, we already need to use three SCART cables which, being 21-line, with individual and overall screening, are inevitably inflexible and contribute greatly to the "rat's nest" behind the units.

There was a plea for help with this in LwT 1.2 pp36/37 and, although there is no wholly satisfactory answer, there are a couple of wrinkles – such as using relatively short SCART cables – which we'll look at in Part 2.

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