

Introduction.

This document describes three different connection means between video equipment:

1. Composite.
2. S-Video.
3. RGB (Red, Green, Blue).

Each of these video signals can be found in Home-Cinemas.

Overview.

In a home-cinema, there are various different source of video information – DVD players, VCRs, Laserdisc players and most recently Digital Set-Top boxes. Each of these provides one, two or all three possible video formats discussed here.

Composite video is identical to that contained in analogue television transmissions. In a Home-Cinema, composite would be found with standard VHS VCRs (videocassette recorders) and compatible equipment. Composite is a sub-set of S-Video with S-Video being higher in quality. S-Video can be found on S-VHS VCRs, DVD players and video switching for S-Video is provided in most Audio/Visual amplifiers. RGB is a high-quality video format that is typically found on DVD players and Digital Set-Top Boxes.

Composite Video.

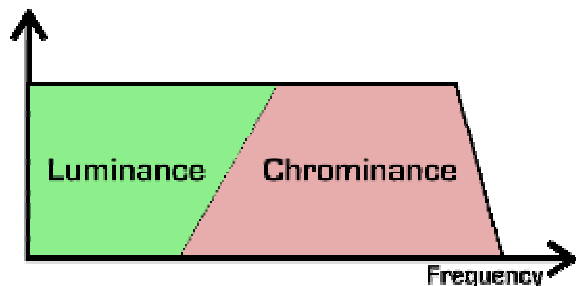


Figure 1a: Frequency spectrum of Composite Video.

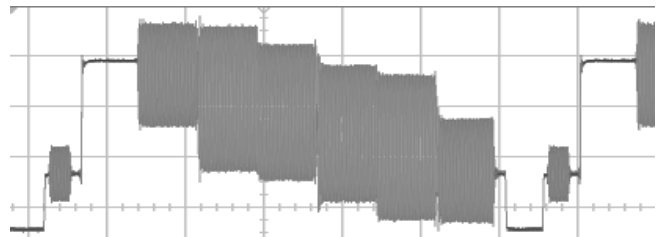


Figure 1b: Time domain of one video scan line.

Composite video, as the name suggests, is a mixture of two signals, Figure 1b. Luminance is the black and white video information, while chrominance is also present in the same frequency spectrum, Figure 1a. The difficulty with Composite video is when attempting to separate the colour information from the luminance. While it is possible to extract most of the picture information, total separation is not possible. This results in an artefact known as cross-colour interference. Visually cross-colour interference appears at boundaries of sharp colour changes and looks like a hatching pattern overlaid on the boundary.

S-Video.

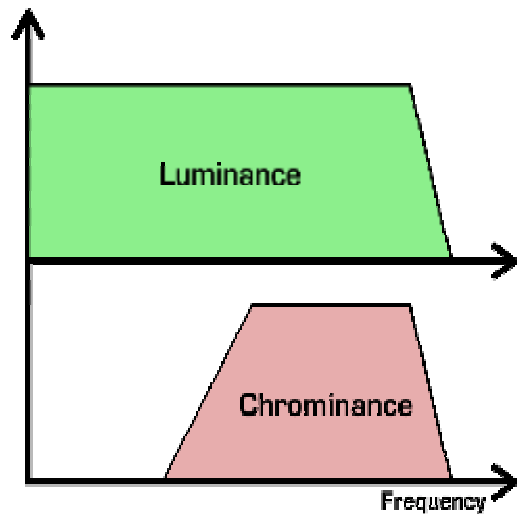


Figure 2a: Frequency Spectrum of S-Video with separated luminance and chrominance.

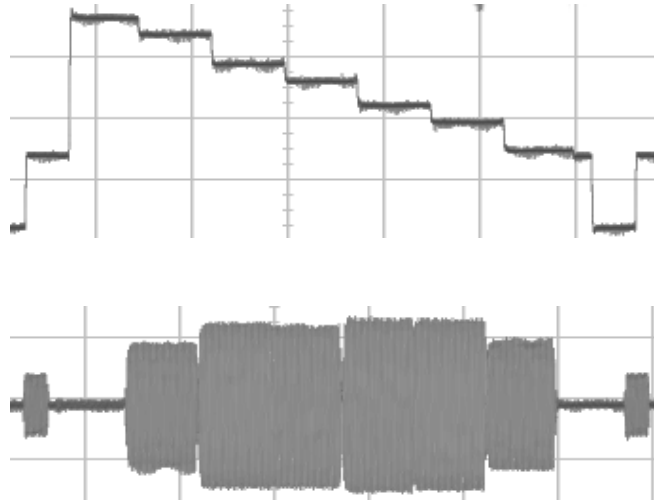


Figure 2b: A scan line of S-Video. Top, luminance and bottom chrominance.

S-Video is very similar to composite, but the luminance and chrominance are kept separate, Figure 2b. Since there is no chrominance signal present in the luminance frequency spectrum, Figure 2a, cross-colour interference does not exist.

RGB – Red, Green, and Blue.

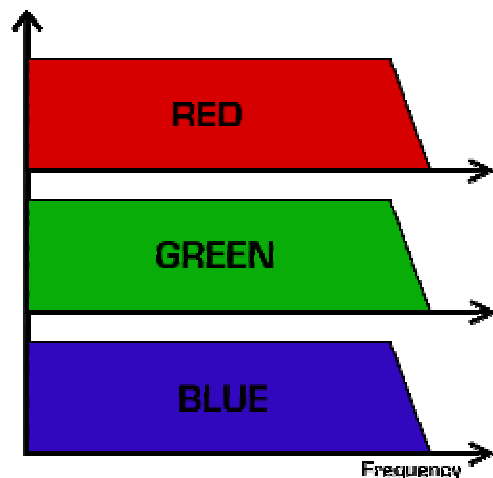


Figure 3: RGB are completely separate signals.

RGB is for the discrete Red, Green, and Blue signals used to create the picture. Since each signal is kept separate, Figure 3, it does not suffer from the cross colour interference found with Composite.

The Physical Connector.

Each video standard typically has their own connector, however each of the can be carried on the SCART connector [Sim, J. 2001]. Composite can be carried on a phono connector, Figure 4, S-Video is via a 4-pin mini DIN connector. RGB is typically exclusive to the SCART connector.

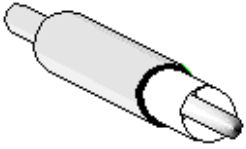
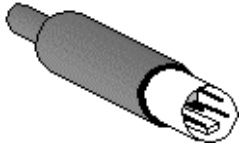
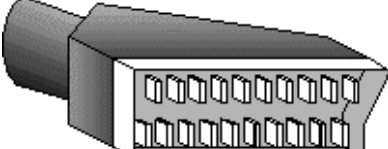
		
Phono Connector for composite.	4-pin Mini-DIN for S-Video.	SCART for Composite, S-Video and RGB.

Figure 4. Three different connectors with their video carrying capability.

Conclusions.

Home-Cinemas can have a mixture of connection solutions. Cross-colour interference is inherent in composite video, and as such composite is best avoided in a Home-Cinemas. Both S-Video and RGB are high quality video signals that do not suffer from cross-colour interference. Some Home-Cinema equipment requires S-Video. RGB can be used by most modern SCART equipped TVs, but not with all Home-Cinema equipment such as Plasma screens, projectors and especially S-VHS recorders. It is possible to convert RGB to S-Video.

References:

[Sim, J. 2001] "The SCART Connector." Dr John Sim, J.S. Technology, 2001.

<p>Version: 1.00 Release Date: 10/2001 Author: Dr John Sim</p> <p>J.S. Technology can not be held responsible for any loss, damage, or injury arising from use of this information. All information is believed to be accurate. If in any doubt, check before attempting any electronics work.</p>	<p>J. S. Technology. The Bungalow, Cunninghamhead Estate, Kilmarnock, Ayrshire. KA3 2PE United Kingdom.</p>
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