Interactive Media Systems

CD-I

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TECHNICAL INFO

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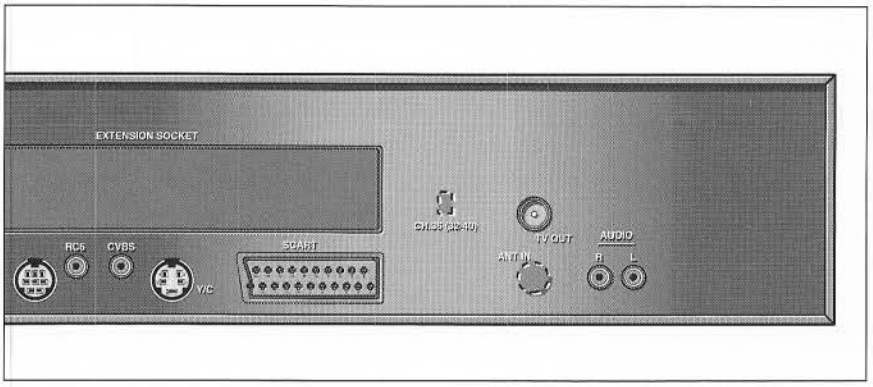
Technical Info
CD-I Picture Quality



How to get the best possible pictures from your CD-I player

CD-I offers digital picture quality. The digital video system of CD-I (and Photo CD) offers colour pictures, text and graphics of a quality superior to the best television broadcasts, and a lot better than other video sources, such as VHS videorecorders.

But how is this high picture quality best realized on the TV screen? In theory, by making sure that the full quality of the pictures, as generated by the CD-I player, is delivered to the TV screen, without losing definition, and without picking up noise or distortion along the way. In practice, by connecting the player to a modern, high-quality TV receiver or monitor, via the highest possible quality input.

Choosing the right connection

Most of today's TV receivers have four possible picture input connections. In order of picture quality, these are:

1. RGB;
2. S-Video (Y/C);
3. Video (CVBS);
4. Antenna in (RF).

The first choice for picture quality is thus RGB, via a SCART connector (also known as the Euroconnector or, according to IEC, Peritel). The last choice for picture quality is the Antenna input. And since this input never provides stereo sound either, it is not really a choice at all for CD-I.

The causes of varying picture quality

The differences in picture quality arise from the different degrees of signal processing affecting the four types of connection. And the reasons for these differences are historical as well as technical.

All colour video pictures are composed of separate Red, Green and Blue (R, G and B) components, and can be fed in that form directly from a high-quality video source (such as a CD-I player) to TV set with RGB input.

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If, however, the pictures are to be broadcast, the RGB components have to be signal processed , and then modulated on to a radio-frequency "carrier" wave. And because of television history, this has to be done in a special way.

Television broadcasting began with black and white pictures; when colour arrived, the colour information had to be fitted in to the existing broadcasting standard, so that the existing black and white sets could still be used.

The solution adopted (and still used) is to process the R, G and B signals into a Colour Video Blanking Synchronization (CVBS) signal consisting of brightness (luminance) and colour (chrominance) components, together with synchronization (colour burst). This CVBS signal is frequency modulated on to the radio-frequency carrier wave for broadcast transmission.

To reproduce a broadcast picture, the TV receiver demodulates the CVBS signal from the carrier wave, reconstitutes the R, G and B components, and from these generates the picture on the screen.

Each of these signal processing stages, before, during and after transmission, introduces opportunities for noise, interference and distortion - and corresponding degradation of picture quality.

The situation today

Unfortunately, this modulation and demodulation process, being the existing standard, was adopted for home videorecorder systems as well as for TV. Old TVs, in fact, had only one input: the antenna input. And that led to the present situation, in which the vast majority of videorecorders are still connected to the TV via the antenna input.

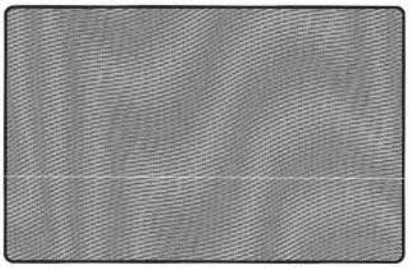
This is definitely not the answer for CD-I

RF

In the first place, the radio-frequency signals used by CD-I players (as well as by videorecorders and Laser Disc players), have to occupy one of the channels specially reserved for them and for cable TV. In this densely populated band, there is always the danger of interference being caused by cross-modulation with terrestrial broadcast signals, in combination with cable line amplifiers. This, added to the distortion inherent in the RF modulation and demodulation processes, can seriously degrade picture quality.

CVBS

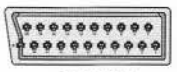
In the second place, the CVBS signal processing can debase picture quality. Time delays arising during encoding and decoding can cause colour displacement (spillover of colours from the objects they belong to). The luminance and chrominance bandwidths of the CVBS signal are relatively low by modern TV standards, and this limits both the resolution and the colour quality. These effects are at least as noticeable with text and graphics as with colour pictures, and not at all desirable for CD-I. Insufficient separation of the luminance and chrominance carrier signals causes cross colour, clearly visible as the so-called "Moiré" effects in a.o. "Herringbone" patterns in the pictures.



Simulated moiré effect.

Y/C

The Y/C (S-Video) connection was developed as an improved version of CVBS. Its wider bandwidth and increased luminance and chrominance carrier signal separation offers better resolution, as well as suppressing cross colour effects. But Y/C remains vulnerable to colour displacement.



SCART

The optimal connection for CD-I is thus RGB, as provided via the SCART connector. The red, green and blue components are fed directly from the source to the picture tube, ensuring full dynamic range, maximal signal-to-noise ratio and minimal distortion. And the result is excellent resolution, natural colours and no colour displacement.

To get the most out of a CD-I player, always use the connection that will ensure the best possible picture quality from the available TV set.

The new Philips TVs are the perfect match for CD-I!

Colour TV picture quality has perceptibly improved in recent years. It is particularly noticeable in the new 100Hz Digital Scan TV receivers - for which seeing is believing!

The new Philips Black Line TVs, with wider bandwidth and higher dynamic range, are ideal partners for Philips CD-I. The narrow shadow mask pitch produces higher resolution. Picture contrast, even under extreme light conditions such as direct sunlight, is increased; black is really black and white is really white, with a fine graduation from light to dark. Cross colour interference is powerfully suppressed by using a so-called comb filter. And CTI (Colour Transient Improvement) technology markedly enhances the colour transient performance.

Make sure, then, that your CD-I player realizes its very best picture quality via the RGB SCART connection to a new Philips TV.

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