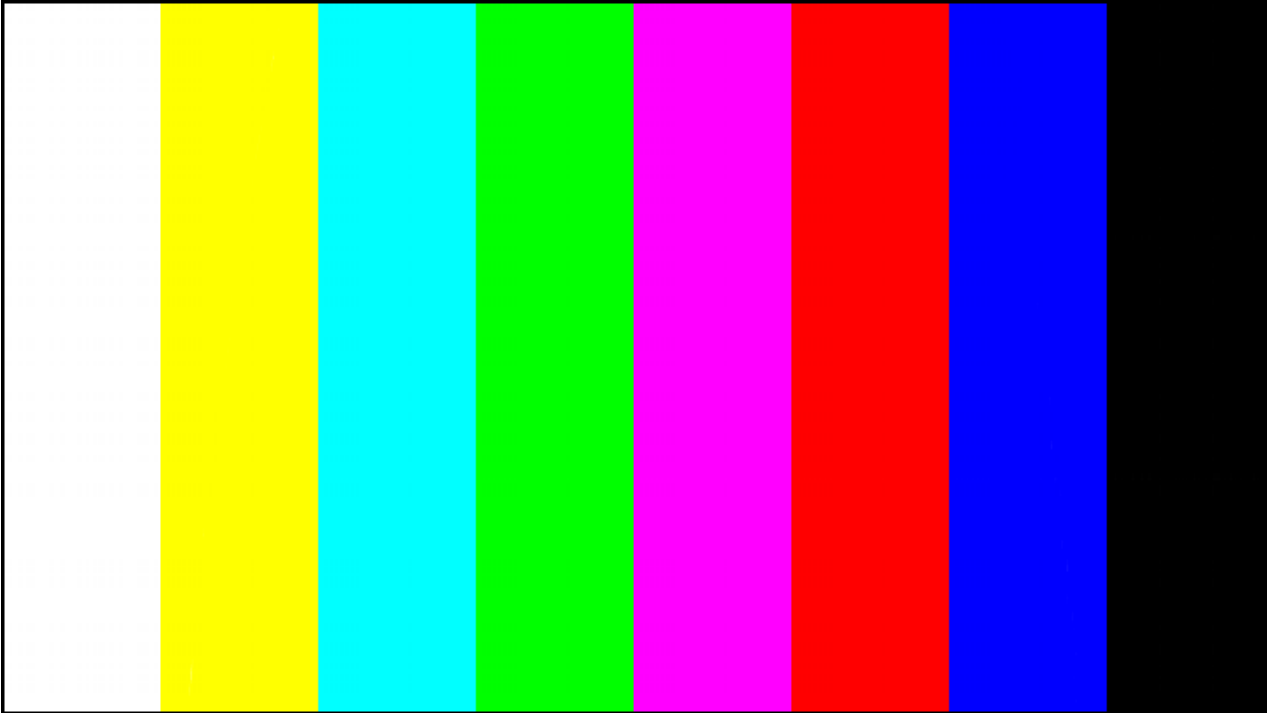


Color Bars

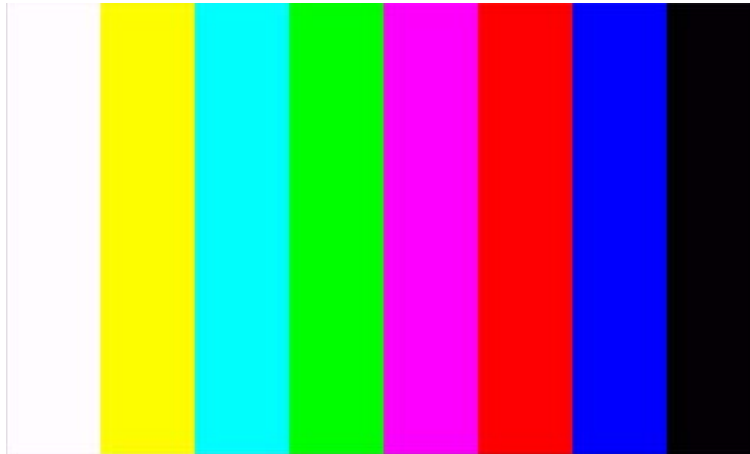


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Test Pattern: Color Bars



The color bars test pattern

The color bars test pattern gives a lot of possibilities for image calibration and quality evaluation without measurement devices. The test pattern elements are optimized for accurate reading precision. The following aspects of the playback quality you can perceive in the color bars test pattern or modify it by its help:

- contrast / white value.....pages.....4, 5
- brightness / black value.....pages.....6, 7
- chrominance band width.....pages.....8, 9
- noise (subjective).....pages.....10, 11

Please check before using the test patterns the signal path and the light conditions so that all conditions come up to the following application. If you modify some parameters never forget to save the options. Please note the options of your image sender (e.g. DVD Player). Also try to get by with as few as possible of so-called image-improving features which distort the original image more than improve it.

Test Pattern: Color Bars

Subsequent you find the description of the individual image elements and parallel the effect of possible image failures on a real image „Jasmin and Sabrina“.



In addition to many abstract technical test images this real image shows the typical problems and its effect on real, complex images. To clarify these problems there are heightened cut-outs of this image. On this page you see the image in correct exposition.

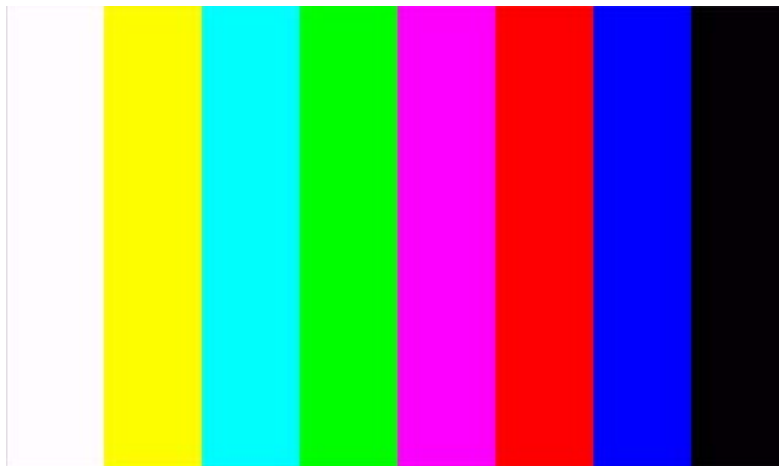
All images are evaluated based on the screen evaluation standard ITU-R BT500-11 and shown as stars. This should give you an intuition for the heaviness of the shown difference to the original image:

Excellent	Good	Fair	Poor	Bad
★★★★★	★★★★★	★★★★	★★	★
image is equivalent to original	No visible differences to original	Visible, uncritical differences to original	Highly visible differences to original	Image is not equal to original, indicate a loss of information

A very good playback string with applicable connections like HDMI or YUV component video should reach a quality of five stars, at worst four stars. Good digital sources over middle connections like scart-RGB or S-video shouldn't reach less than 3 stars on a good display, doesn't matter which technology – CRT, LCD, Plasma, DLP or projection. Correct wired, labeled devices should never fall to two or one star niveau at right adjustment. This is typically an unmistakable sign that there is a problem in the signal-string. It could be the configuration, calibration or other wrong adjustment or simply a defect. This needs to be checked once more.

Test Pattern: Color Bars

element-description



Color Bars, (100% saturation)

The color bars are used for evaluation of the color playback. The bars show white, black, all primary and secondary (complementary) colors in series of its luminance/brightness contingent: white, yellow, cyan, green, magenta, red, blue and black. All colored fields have a saturation of 100%.

correct exposition:

- The left field is maximum white
- The right field is maximum black
- All 8 fields are shown clearly separated to each other and interference-free in maximum saturation
- All fields are same-sized and displayed without noise

Typically failures

- The left field is gray instead of white – contrast adjusted too low. Warning: With this test pattern it is not possible to find out if the contrast is already adjusted too high. If you didn't know whether the contrast is adjusted optimal, please use an another test pattern like „faces“. (fig. 1)
- The right field is gray instead of black – brightness adjusted too high. Warning: With this test pattern it is not possible to find out if the brightness is adjusted too low. If you dind't know whether the brightness is adjusted optimal, please use an another test pattern like „faces“ (fig. 2)
- Two or more color fields are not sharply separated to each other – lacking band

Test Pattern: Color Bars

- width of the chrominance signal processing. (fig. 3)
- one or more color fields don't reach the full color saturation without overdriving of other colors – lacking adjusted chrominance signal processing
 - One or more fields are noising – bad signal transfer of the source or bad signal processing in the source and/or image sender. (fig. 4)

Test Pattern: Color Bars

Color Bars (100% saturation)

Typically failures

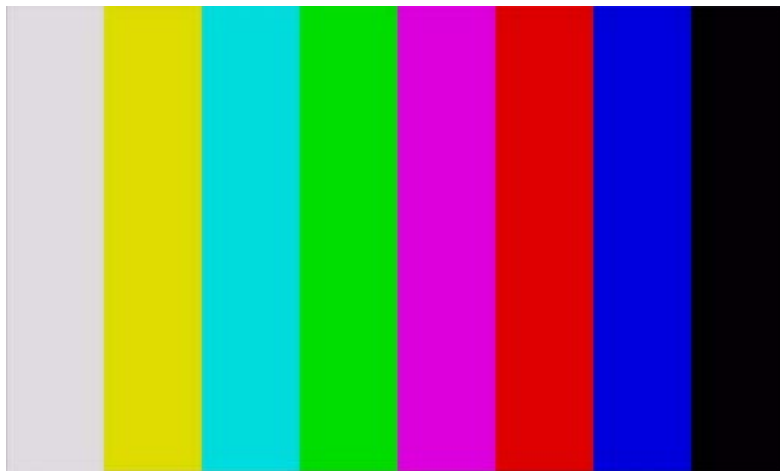


figure 1: contrast / white value too low

The quality of this image is „poor“ ★ ★



Too low adjusted contrast control brings a loss of the maximum brightness and brilliance of the image.

Test Pattern: Color Bars

Color Bars (100% saturation)

Typically failures

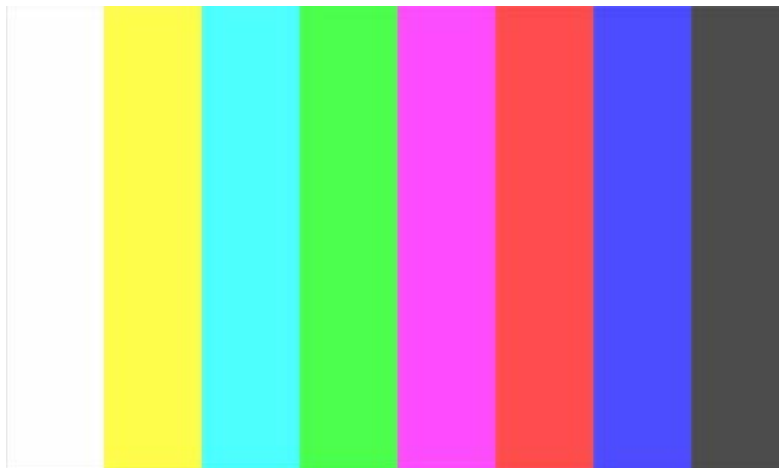


figure 2: brightness / black value too high
The quality of this image is „poor“ ★★



In case of too high adjusted brightness control (black value) the darkest image parts brighten up. In this case the image depth and contrast become less.

Test Pattern: Color Bars

Color Bars (100% saturation)

Typically failures

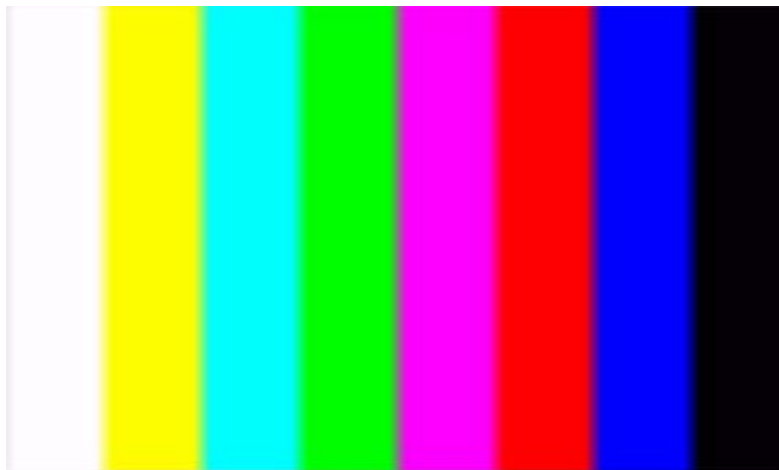


figure 3: lacking chrominance band width, you can see this easily on the change-over green/magenta

The quality of this image is „poor“ ★ ★

Test Pattern: Color Bars



In case of lacking chrominance band width only the color contingent is blurred. In spite of sharp contours the colors wash up in nearby areas like here the skin tones in the white teeth or the textiles and the skin with the background. A curious washed-up image impression accrues.

The quality of this image is „poor“ ★★

Test Pattern: Color Bars

Color Bars (100% saturation)

Typically failures

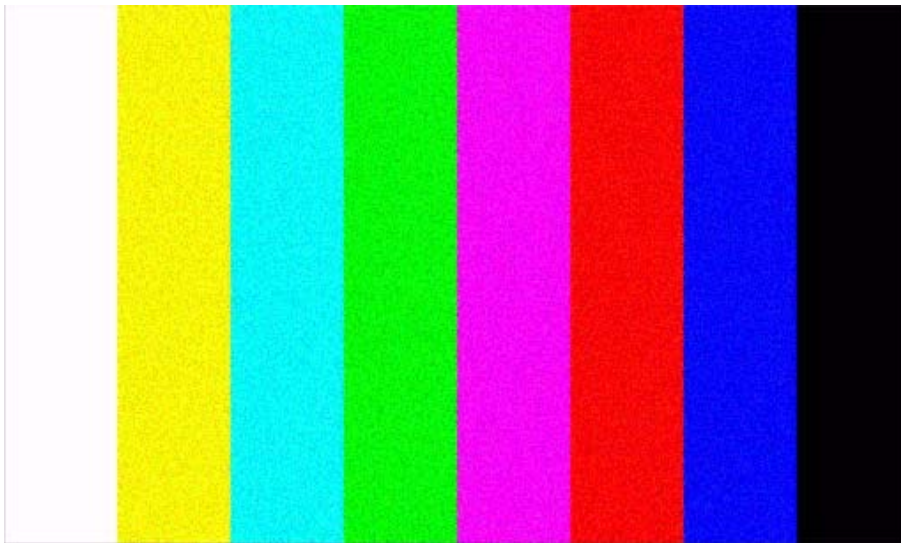


figure 4: noise

The quality of this image is „poor“ ★★

Test Pattern: Color Bars



Noise in a image could have a lot of reasons and differs in compression artifacts by itself own grain.

The quality of this image is „poor“ ★ ★

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Test Pattern: Color Bars

Test Pattern: Color Bars

Standards are helpful and important

For a correct playback of a film or a video or even of an image there have to be a neutral transfer. You often hear the argumentation that these isn't necessary because the vision of every human is different and so a objective playback isn't possible. As a matter of principle is this argumentation right. Admittedly there will be ignored that it's only possible if the signal transfer acts neutral and straight. Only when the expressed image is similar to the recorded image by the camera, the human is able to perceive what he would saw at location by his individual sensation.

The transfer itself have to behave neutrally. Big worldwide institues look after the standards so that the neutrality is warranted.

In german speaking countries is the institute for broadcast engineering of the public broadcasting corporation of ARD, ZDF, DLR, ORF and SRG/SSR mainly responsible for the standards:

www.irt.de

For the whole european area the European Broadcast Union, EBU in Switzerland handles superordinate to the local development institutes:

www.ebu.ch

On international floor established in 1865 in Paris the International Telecommunication Union, ITU is included:

www.itu.int

For best image evaluation and calibration you use the test pictures from this document. It works also with real, filmed motives but with reservations. The big advantage of test patterns from Burosch Audio-Video-Technik is the knowledge how the test patterns have to look and the knowledge how to reproduce them. Only this way the neutrality of the transmission and the playback can be measured exactly and if necessary to correct it:

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Test Pattern: Color Bars

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We thank Mr. Prof. Dr.-Ing. M Planthold / application area: television systems University Wiesbaden for his help at the reasearching of the reference-testsignals for evaluation of the image quality from LCD and Plasma displays.

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