

see [IC3D Digital Camera](#)

see [High definition three chip camera](#).

A three-CCD camera is a [camera](#) whose imaging system uses three separate charge-coupled devices (CCDs), each one taking a separate measurement of the primary colors, red, green, or blue light. Light coming into the lens is split by a trichroic prism assembly, which directs the appropriate wavelength ranges of light to their respective CCDs. The system is employed by still cameras, telecine systems, professional video cameras and some prosumer video cameras.

Compared to cameras with only one CCD, three-CCD cameras generally provide superior image quality through enhanced resolution and lower noise. By taking separate readings of red, green, and blue values for each pixel, three-CCD cameras achieve much better precision than single-CCD cameras. By contrast, almost all single-CCD cameras use a Bayer filter, which allows them to detect only one-third of the color information for each pixel. The other two-thirds must be interpolated with a demosaicing algorithm to 'fill in the gaps', resulting in a much lower effective resolution.

To compare the image quality of a standard definition (SD) three-chip camera with a new [high definition three chip camera](#). In five neurosurgical interventions, an SD three-chip camera and an HD three-chip camera were used with the same endoscopic equipment. Both cameras were used while performing one endoscopic third ventriculostomy, one endoscope-assisted microvascular decompression, one endoscope-assisted removal of a vestibular schwannoma, and two endonasal pituitary surgeries. To provide comparable conditions, the outputs of both cameras were displayed on the same flat screen and were recorded on hard disk with an appropriate workstation using a visually lossless codec. Both cameras were used with full light intensity and maximal zoom. The cameras were connected to the same rod-lens endoscopes (2.7- and 1.7-mm lens) one after the other. The image quality of the HD camera was far superior in all applications. Especially in pituitary surgery, the difference was striking when the tumor had to be differentiated from the normal pituitary tissue. Improved resolution and color information explained the better images in HD imaging. Additionally, because of the 16:9 aspect ratio, the viewing field of the HD camera was larger than with the 4:3 aspect ratio of the SD camera. The progressive image processing of the HD camera provided a much clearer image than the interlaced image processing of the SD camera, especially with a modern flat panel screen. HD imaging provides a much better image quality compared to SD imaging. Therefore, we recommend use of HD cameras in neuroendoscopic procedures ¹⁾.

1)

Schroeder HW, Nehlsen M. Value of high-definition imaging in neuroendoscopy. Neurosurg Rev. 2009 Jul;32(3):303-8; discussion 308. doi: 10.1007/s10143-009-0200-x. Epub 2009 Apr 16. PubMed PMID: 19370368.

From:

<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:

https://neurosurgerywiki.com/wiki/doku.php?id=three_chip_camera

Last update: **2025/04/29 20:21**

