



Choosing a Camera for your Polecam

In respect to both sensor size and overall performance, Polecam believe the Toshiba TU-63 to be the best cost-effective choice for the following reasons.

Both the Toshiba TU-63 and the Sony DXC-C33P use the same Sony 1/3" sensors and the fundamental resolution of the chip/sensors used is 560TV Lines for the Red, Green and Blue signals. Included below are extracts from Sony's specification document for the sensor. Although described as "suitable for CCIR (that's PAL to you and me) B/W cameras", please remember that a 3-CCD camera is simply three synchronised black and white cameras in one housing with a RGB prism for colour. Please also note that 1/2" PAL CCD's also have the same pixel count as 1/3" PAL CCD's thus the fundamental resolution is the same.

Description

The ICX259AL is an interline CCD solid-state image sensor suitable for CCIR B/W video cameras with a diagonal 6mm (Type 1/3) system. Compared with the current product ICX059CL, basic characteristics such as sensitivity, smear, dynamic range and S/N are improved drastically from visible light region to near infrared light region through the adoption of EXview HAD CCD TM technology.

Features

- Sensitivity in near infrared light region (+8dB compared with the ICX059CL, $\lambda \approx 945\text{nm}$)
- High sensitivity (+7dB compared with the ICX059CL, no IR cut filter)
- Low smear (-20dB compared with the ICX059CL)
- High D range (+5dB compared with the ICX059CL)
- High S/N
- High resolution and low dark current
- Excellent anti-blooming characteristics

Device Structure

- Interline CCD image sensor
- Image size: Diagonal 6mm (Type 1/3)
- Number of effective pixels: 752 (H) \times 582 (V) approx. 440K pixels

To realise a higher resolution both manufacturers use a technique called "spatial-offset" by displacing the Green sensor approximately 1/2 pixel horizontally, resulting in an artificial resolution of approximately 750 TVL "Y" signal. In essence what the Green CCD can't see/resolve the Red and/or the Blue will/may resolve and visa versa. Its this higher resolution figure that is quoted on product brochures. To be able to quote the higher value of 850 TVL, Sony have increased the off-set beyond the "norm" but at the expense of RGB registration so that they can claim 850 TVL of resolution. With normal subjects in white light you will technically benefit from the higher resolution, else the resolution remains at the 560TVL. But if the subject is only lit with a primary colour of Red, Green or Blue the resolution regardless of "off-set" will be just 560TVL (752 pixels * 0.75 = 564TV Lines for a 4:3 TV system).

All manufactures are guilty of introducing specification figures to the product brochure that are difficult to interpret or prove.

The primary advantage of using a 1/2" sensor over a 1/3" is image geometry. For the same angle of view, the image distortion is approximately 30% better with a 1/2" camera (lens dependant). There are other benefits albeit small with respect to blooming and high light handling but the big limitation of the 1/2" camera is lens choice. For the 1/3" prism camera the following standard focal lengths are available: 2.8mm, 4.0mm, 6.0mm, 8.0mm and 15.0mm. With the exception of the 2.8mm all these lenses can be complemented with a range of wide-angle converters or an anamorphic adapter for 16:9 applications. This results in angles of view ranging from more than 100 degrees horizontally being available.

The 1/2" prism camera does not enjoy the same degree of lens flexibility as the 1/3" with only 6.0mm, 8.0mm and 15mm options. Wide-angle adapters can be fitted but the resultant heavier lens combinations have a FOV limit of approx. 80 degrees. Zoom solutions with and without 16:9 capability are available for both the 1/3" and 1/2" cameras, but the widest focal length currently available for 1/3" and 1/2" prism cameras is 6mm.

Some final facts not to be overlook when comparing TVL specifications. The maximum transmitted resolution for the PAL TV system is 540 TV Lines. All standard 4:3 digital formats are 720 pixels horizontally (720 * 0.75 = 504 TVL). Even the broadcast SDI (Serial Digital Interface) signal distribution standard has a bandwidth limit of 6.25MHz (1MHz = 80TVL therefore 6.25 MHz * 80TVL = 500 TVL).
