High-Resolution Diagonal 6.64 mm (Type 1/2.7)
2.02M-Pixel Digital Still Camera CCD

ICX284AK (complementary color, DIP)
ICX284AQ (primary color, DIP)

The demands for higher resolution and further miniaturization in CCDs continue to grow stronger in the rapidly expanding digital still camera market. To respond to these demands, Sony has now developed a new high resolution miniature CCD image sensor and added it to the product line.

The ICX284AK/AQ takes full advantage of Sony's fine fabrication technology to concentrate 2.02-million effective pixels in a diagonal 6.64 mm (Type 1/2.7) optical system, and thus can contribute to the miniaturization of high resolution digital still camera products. Additionally, the ICX284AK/AQ provides a high frame rate readout mode which realizes angle of view verification in the LCD finder and increases the speed of feedback to the AE and AF control systems.

- **High resolution**
  Provides 2.02-million effective pixels (1636H × 1236V)
- **High sensitivity**
  Complementary color version: 260 mV (Y)
  Primary color version: 220 mV (G)
- **Miniature package**
  16-pin DIP (450 mil)
- **High frame rate readout mode (30 frame/s)**

The ICX284AK/AQ is a diagonal 6.64 mm (Type 1/2.7) 2.02-million effective pixel color CCD image sensor developed for use in digital still cameras. When used with a mechanical shutter, it can capture high-resolution images. Table 1 presents the device structure of the ICX284AK/AQ, and table 2 presents the image sensor characteristics.

V O I C E

The ICX284AK/AQ is a device whose miniature size allows it to create unique high picture quality digital still camera products for the rapidly growing digital still camera market. I hope you will look into developing commercial digital still camera products that take advantage of the features of this device.

High Resolution and Further Miniaturization

By developing a unit pixel of 3.275 µm square, Sony was able to concentrate 2.02-million effective pixels into a diagonal 6.64 mm (Type 1/2.7) optical size, the standard size in contemporary megapixel digital still cameras. The package used is the same size as Sony's Type 1/3 CCD area sensors. This device can also be provided in a thin-form 20-pin DIP or SOP package as well. This device allows the optical system of the 2-million pixel class digital still camera to be miniaturized even further, and allows our customers to create compact and high-resolution digital still camera products.

High Frame Rate Readout Mode

The ICX284AK/AQ provides a high frame rate readout mode that allows 30 frame per second readout of images with 305 vertical lines from the effective image area by reading out the signal for only 2 of every 8 lines. Use of this mode can realize angle of view verification in the LCD finder and can increase the speed of feedback to the AE and AF control systems.

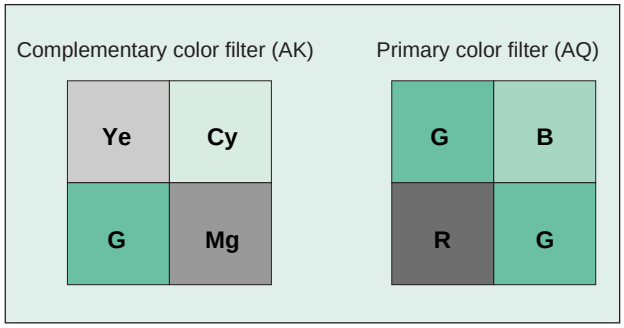
Timing Generator IC

The ICX284AK/AQ makes effective use of existing peripheral ICs and firmware assets by maintaining pixel structure and drive timing compatibility with Sony's Type 1/2, 2.02-million effective pixel CCD, ICX224. The Sony CXD2470R drive timing generator IC with built-in vertical clock drivers can be used with this CCD. This IC also supports the ICX284AK/AQ high frame rate readout mode. (See figure 2.)

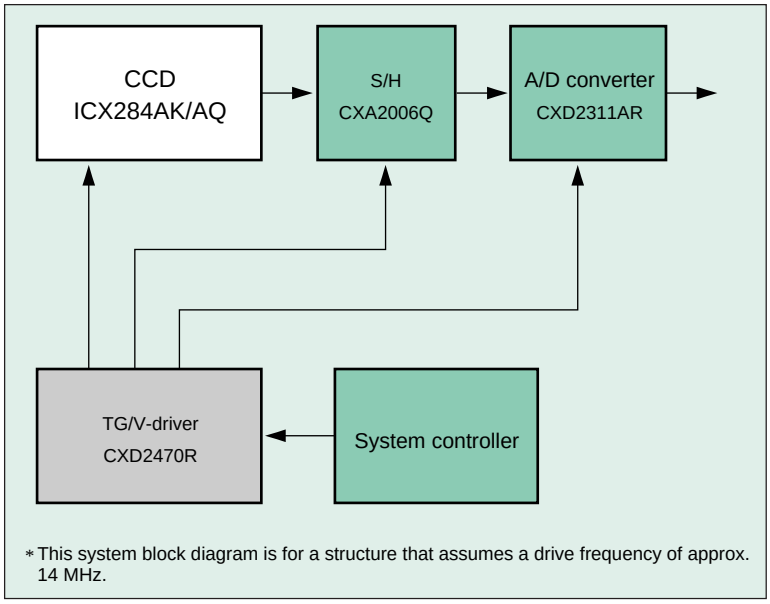
Extensive Lineup

The addition of the ICX284AK/AQ creates a truly extensive over-megapixel digital still camera CCD product line. (See figure 3.) From the Type 1/1.8, 3.24-million pixel CCD, ICX252AK/AQ, which boasts the largest pixel counts in a consumer product CCD to the ultraminiature Type 1/3.6, 1.25-million pixel CCD, ICX232AK/AQ, which features the industry's smallest cell size, Sony provides a wide variety of over-megapixel CCDs for digital still cameras. With these products, Sony is responding to the many needs of the consumer digital still camera market, including the needs for higher resolution and further miniaturization.

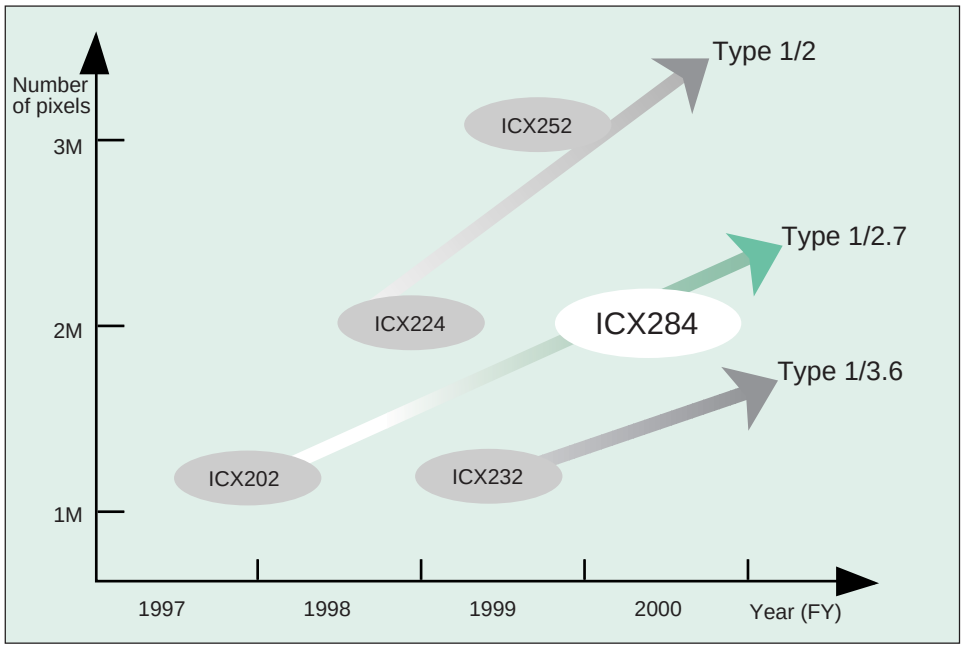
New Products



■ **Figure 1 Color Filter Arrangement**



■ **Figure 2 System Block Diagram**



■ **Figure 3 Digital Still Camera CCDs**

■ **Table 1 Device Structure**

Item	ICX284AK/AQ
Image size	Diagonal 6.64 mm (Type 1/2.7)
Format	4 : 3
Transfer method	Frame readout interline transfer method
Total number of pixels	Approx. 2.11 M (1688H × 1248V)
Number of effective pixels	Approx. 2.02 M (1636H × 1236V)
Number of active pixels	Approx. 1.98 M (1620H × 1220V)
Chip size	6.17 mm (H) × 5.17 mm (V)
Unit cell size	3.275 µm (H) × 3.275 µm (V) square pixels
Horizontal drive frequency	18.0 MHz
Package	16-pin plastic DIP

■ **Table 2 Image Sensor Characteristics**

Item	Typical values	Remarks
Sensitivity	ICX284AK: 260 mV (Y signal) ICX284AQ: 220 mV (G signal)	3200K, 706 cd/m², F5.6, 1/30 s accumulation
Saturation signal	420 mV	During frame readout
Smear	Frame readout: –91 dB High frame rate readout mode: –79 dB	None when a mechanical shutter is used
Frame rate	Frame readout: 7.5 frame/s High frame rate readout mode: 30 frame/s	When an 18.0 MHz drive frequency is used