

CXD4127GG, CXD4816GG ICX672AKA/ICX673AKA

High-Sensitivity, High-Resolution Camera Systems for Security Cameras Based on Diagonal 6.0 mm (Type 1/3) 480K/570K-Effective Pixel Color CCD Image Sensors



*: "ARM" is a trademark of ARM Limited.

In June 2009, Sony released the "Effio" System (CXD4112GG + CXD4813GG), which achieves the high sensitivity and high resolution considered critical in security cameras market.

This article introduces the "Effio-E" System (CXD4127GG + CXD4816GG), which is an entry-level model of the "Effio" Series. By combining this system with the ICX672AKA/ICX673AKA newly-developed CCD image sensors, users can take the lead in the security camera market, which now requires high sensitivity and high resolution.

"Effio-E" System CXD4127GG, CXD4816GG

- Extensive functionality and high picture quality
- Built-in OSD functions

Effio™

*: "Effio" is a trademark of Sony Corporation. The "Effio" is a signal processor chip from Sony employing processing modes that deliver high resolution, high S/N ratio and excellent color reproduction.

"EXview HAD CCD II" ICX672AKA/ICX673AKA

- Horizontal (effective) resolution: 960 pixels (960H CCD image sensor)
- High sensitivity and high saturation signal

EXview HAD CCD II™

*: "EXview HAD CCD II" is a trademark of Sony Corporation. "EXview HAD CCD II" is a CCD image sensor that realizes sensitivity (typical) of 1000 mV or more per $1 \mu\text{m}^2$ (Color: F5.6/BW: F8 in 1 s accumulation equivalent) and improves light efficiency by including near infrared light region as a basic structure of Sony's "EXview HAD CCD".

"Effio-E" System CXD4127GG, CXD4816GG

The "Effio-E" System is an entry-level model camera system that is designed for easy introduction into end products from design through mass production and that inherits the basic picture quality characteristics that

are features of the "Effio" Series, that is, high sensitivity, high resolution, and excellent color reproduction. The "Effio-E" System has a simple, 2-chip structure consisting of an analog IC (AFE: CXD4816GG) and a signal-processing IC (DSP: CXD4127GG) and supports a wide range of CCD image sensors, including 510H, 760H, and 960H CCD image sensors. (See figure 1.) These devices are provided in compact LFBGA packages and, due to the adoption of a new process technology generation, achieve a power consumption of 1/2 that of current systems. Thus the "Effio-E" System can contribute to miniaturization and reduced power consumption in camera products.

Extensive Functionality and High Picture Quality

Even though the "Effio-E" System is an entry-level model camera system, it includes not only a noise reduction function, but it also provides an ATR (adaptive tone reproduction) function (photograph 1) that improves contrast in bright/dark areas and a HLC (highlight compensation) function that suppresses strong headlights at night and improves visibility to provide clear images with superb picture quality.

In addition to the existing static method for white pixel detection and compensation, it also includes for the first time a dynamic method that can handle secondary white pixels. Furthermore, when combined with the ICX672AKA/ICX673AKA 960H CCD image sensors, it can provide the high horizontal resolution of 650 TV lines or higher. (See table 1.)

Built-in OSD Functions

The "Effio-E" System includes OSD (on-screen display) functions that allow camera settings to be made using the display. This function provides preset menus in eight languages (English, French, German, Spanish, Portuguese, Chinese, Russian, and Japanese) and allows camera settings to be made easily without using an external microcontroller.

"EXview HAD CCD II" ICX672AKA/ICX673AKA

The newly-developed ICX672AKA/ICX673AKA 960H CCD image sensors are "EXview HAD CCD II" devices. The "EXview HAD CCD II" technology is a further evolved version of the "EXview HAD CCD" in which "Super HAD CCD II"*1 technology has been incorporated. Compared to the current ICX638BKA/ICX639BKA, these new devices increase the number of horizontal pixels and achieve a high saturation signal level and high sensitivity that extends into the near infrared. (See figure 2, table 2, and table 3.)

* 1 See the Featuring section in CX-News Vol. 52.

V O I C E

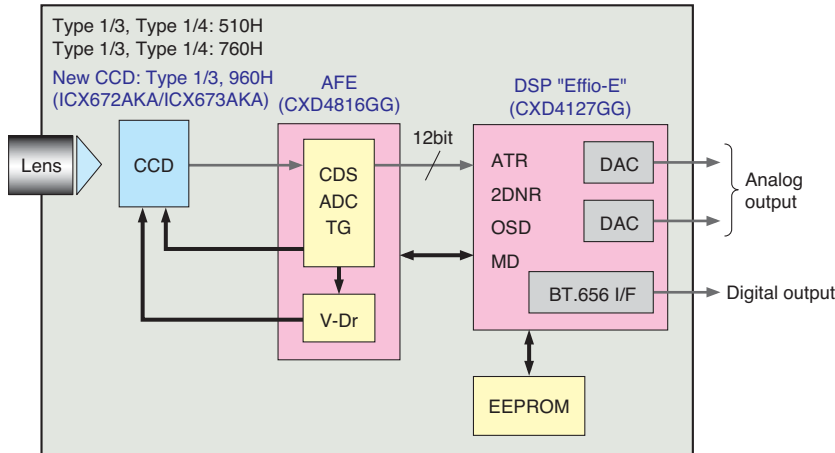
Under the name Create 960H World with "Effio" System, Sony now provides the new standard solution for the security camera market with the combination of a 960H CCD image sensor (960 pixels in the horizontal direction) and the "Effio" family devices. I strongly recommend that you look into this new world of security cameras.



SMART IR : EVENLY SPREAD INFRARED BEAM

Have you ever experienced with any infrared cameras get blind by their own intense and strong IR light in close range. Smart IR is designed to cover both close and long range infrared shot.

Figure 1 "Effio-E" System Configuration



* CCD = CCD image sensor

Photograph 1 ATR Function Sample Images

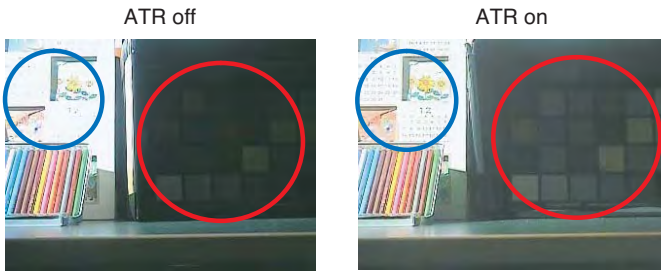


Figure 2 Spectral Sensitivity Characteristics Comparison

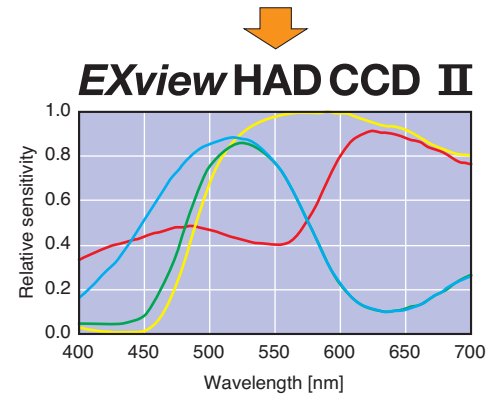
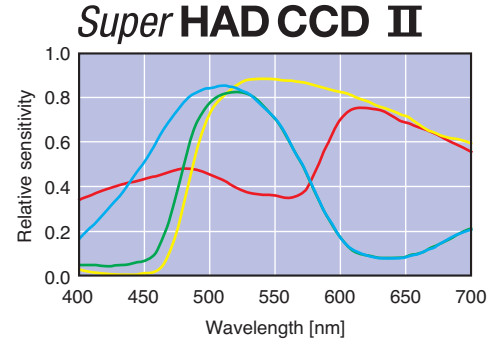


Table 1 Main "Effio-E" System Specifications

Item	"Effio-E" System	
Supported CCDs	510H, 760H, 960H CCDs	
System configuration	2 chips (DSP/AFE)	
Functions	Resolution	Over 650 TV lines (horizontal)
	ATR	✓
	Noise reduction	2D-NR
	Day & night	✓
	Privacy mask	8 marks
	HLC	✓
	AF detector	✓
	Motion detection	✓
	White pixel detection and compensation	Static and dynamic
	OSD	✓ (English, French, German, Spanish, Portuguese, Chinese, Russian, and Japanese)
	Port driver	16 ports
	Automatic mechanical iris adjustment	✓
	External sync	LL
Outputs	Analog outputs	Y/C separate, composite
	Digital outputs	ITU-R BT.656 standard output (27 MHz), CCD image size (CCD drive frequency)
	Dual analog and digital outputs	✓
Supply voltage	CXD4127GG: 3.3 V, 1.2 V CXD4816GG: 3.3 V, VH, VL	
Packages	CXD4127GG: 97-pin LFBGA CXD4816GG: 80-pin LFBGA	

* CCD = CCD image sensor

Table 2 ICX672AKA/ICX673AKA Device Structure

Item	ICX672AKA	ICX673AKA	
Image size	Diagonal 6.0 mm (Type 1/3)	←	
TV format	NTSC	PAL	
Transfer method	Interline transfer method	←	
Total number of pixels	Approx. 520K pixels (1020H × 508V)	Approx. 610K pixels (1020H × 596V)	
Number of effective pixels	Approx. 480K pixels (976H × 494V)	Approx. 570K pixels (976H × 582V)	
Unit cell size	5.0 μm (H) × 7.4 μm (V)	5.0 μm (H) × 6.25 μm (V)	
Optical blacks	Horizontal	Front: 4 pixels, rear: 40 pixels	←
	Vertical	Front: 12 pixels, rear: 2 pixels	←
Number of dummy bits	Horizontal: 12 Vertical: 1 (Only in even fields)	←	
Horizontal drive frequency	18 MHz	←	
Package	16-pin Plastic DIP	←	
Supply voltage V _{DD} /V _L (typical values)	+15.0 V/-7.0 V	←	
Horizontal register and reset gate clock voltage (typical values)	3.3 V	←	

Table 3 ICX672AKA/ICX673AKA Image Sensor Characteristics

Item	ICX672AKA ICX673AKA	ICX638BKA ICX639BKA	Remarks
Sensitivity (F5.6)	Typ. 2450 mV 2400 mV	2250 mV	3200K, 706 cd/m ²
Saturation signal	Min. 1400 mV	1000 mV	T _a = 60°C
Smear (F5.6)	Typ. -110 dB	-110 dB	V/10 method