

MCB304

Sony led the industry in quickly recognizing the importance of mobile use and starting to work on developing megapixel class camera modules.

Today, the shift to the megapixel class camera in camera cellular phones has become the mainstream.

The newly-developed MCB304 described here integrates, in a single package, all CCD camera functions, from the high-sensitivity image sensor, high-performance lens, and multifunction camera DSP that are hallmarks of Sony camera modules, to the power supply IC, AFE, and other functions. At the same time, the MCB304 is provided in a miniature low-profile package.

The MCB304 is truly the definitive 1.3M-pixel CCD camera module.

- High-sensitivity, low-power 1.3M-pixel CCD image sensor developed for mobile applications
- Compact all-in-one package includes all required circuits, including a power supply IC, AFE, and a camera DSP
- High-resolution, high-performance 3-group 3-element lens
- AE and AWB functions based on Sony extensive digital still camera experience provide natural image rendition.

The MCB304 is a camera module based around a 1.3M-pixel CCD area sensor that was specifically developed for mobile applications. At the same time as refining the performance of the high picture quality high-performance blocks that have been well-received in the market, the MCB304 provides the further miniaturization demanded in mobile applications, the MCB304 was developed under the concept of creating the definitive 1.3M-pixel CCD camera module, and that could thus be used by our customers with complete confidence.

■ High-Resolution, Low-Power CCD Image Sensor

The MCB304 adopts a diagonal 5 mm (Type 1/3.6) interline type CCD image sensor that was developed specifically for use in mobile camera modules. It features a total pixel count of 1.34 million pixels, 1.28 million effective pixels, and the ability to create images with up to 1280H × 960V recording pixels. This high resolution has already been well received by customers who have adopted Sony camera modules. Also, Sony made special efforts to achieve even lower power consumption levels when specializing this sensor for mobile use. Thus the sensor contributes to the reduced power consumption in the camera module as a whole.

■ High-Performance Lens

The MCB304 adopts a 3-group 3-element lens (GPP) that includes a macro function. It achieves low TV distortion (less than 1%) and is designed to take maximum advantage of the high resolution of the 1.3M-pixel sensor.

■ Miniature All-in-One Package

Sony provides the MCB304 in a compact all-in-one package that includes all functions, not only the sensor, lens unit, and camera DSP, but the power supply IC and the AFE system as well. The MCB304 is a device that collects its components in a shield case mainly used to minimize spurious radiation with package dimensions of 12.8 mm × 15.9 mm × 8.7 mm (H × W × D)*. Thus the MCB304 achieves the smallest size of any module in the Sony product line of 1.3M-pixel CCD camera modules that provide a macro function.

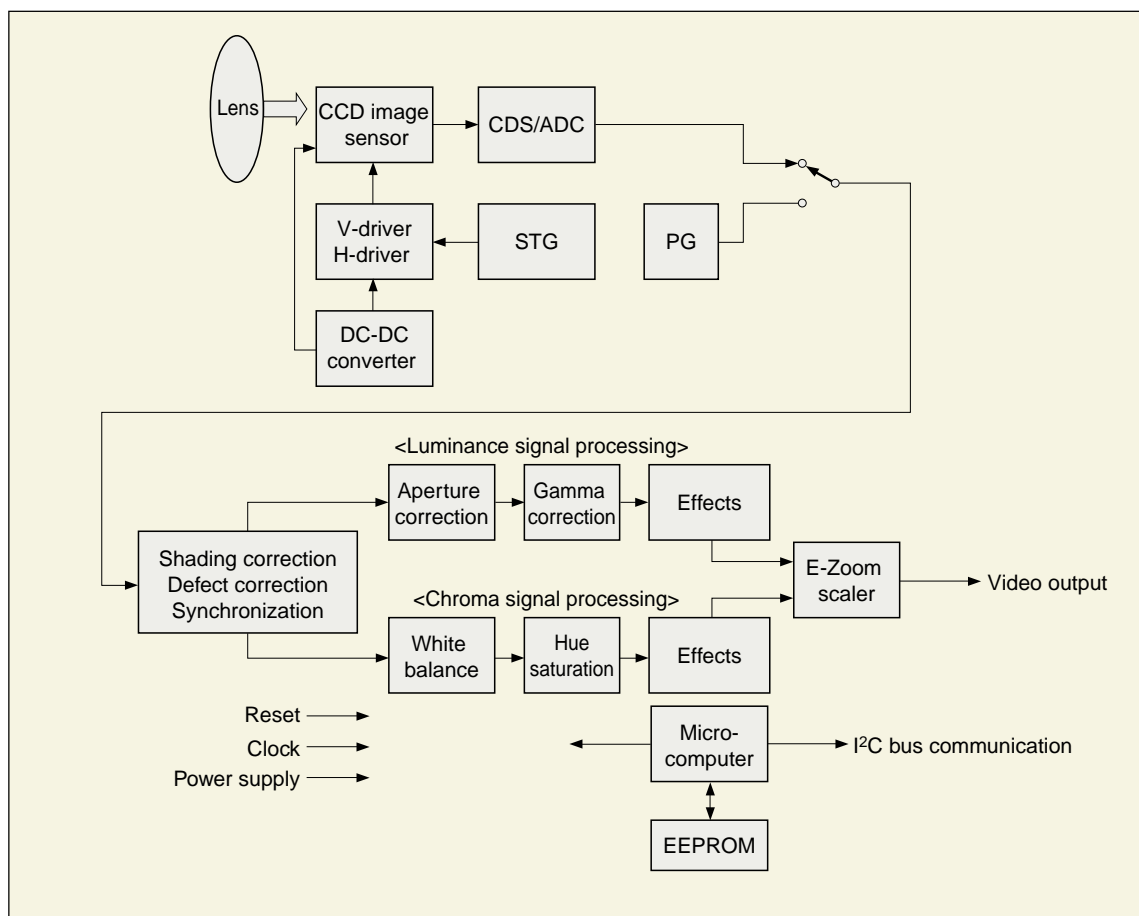
*: Excluding the largest protrusion.

■ Camera DSP that Supports Rich and Natural Image Expression

Now that the cellular phone with a megapixel class image sensor has become the mainstream in this market, serious “image creation” has become increasingly important. Sony’s camera module camera signal processing systems incorporate essential concepts based on the image creation concept from the Sony camcorders and digital still cameras that have continued to lead the industry. The Sony DSP ICs support natural image rendering with basic AE, AWB, and other settings.

V O I C E

Since we started working on this design and development last spring, we were constantly aware of the extremely large scale volume production required for the camera cellular phone market and the severity of the size and quality requirements. Although we had to work particularly hard during the period leading up to final mass production, I am proud that the result of the efforts of the design and the production groups working together as a single entity was that we were able to create an excellent module. I strongly urge you to consider using this product.



■ Figure 1 Block Diagram

■ Table 1 Specifications Overview

Function	1.3M-pixel CCD camera module for camera cellular phones	
Image sensor	Progressive scan readout diagonal 5.0 mm (Type 1/3.6) color CCD image sensor	
	Total number of pixels	About 1.34M pixels
Lens	Horizontal angle of view	54 degrees
	F value	1:4
	Subject distance	500 mm to ∞ in normal mode. There is also a macro mode.
Exposure control	Auto (normal and long time exposure modes), user setting, hold	
White balance	Auto tracking, all pull-in, user setting	
Data format	Uncompressed moving picture	
	Frame rate	Draft mode: 15.0 fps Capture mode: 5.0 fps (When CLKIN is 18.0 MHz)
I/O pins	Video signal output	YCbCr/8 bits/4:2:2 (With SAV and EAV)
	Control signal I/O	I ² C bus
	Connector	26 pins, 0.4 mm pitch, V notch product
Power supply, other items	Supply voltage	1.50 ± 0.1 V, 2.85 ± 0.15 V
	Power consumption	150 mW (Typ.)
	Operating temperature	-20 to +60°C
	Storage temperature	-40 to +85°C
	Package dimensions	12.8 mm × 15.9 mm × 8.7 mm (H × W × D) *: Excluding the largest protrusions
	Mass	2.9 g (maximum: 3.3 g)