

CX93510 JPEG Encoder with BT.656 Camera Interface and Optional Microphone Input

VideoSmart Product Brief



Low-Power Solution for Wireless and Battery-Operated Cameras

Product Overview

Conexant's CX93510 is a monolithic mixed-signal ASSP that is specifically designed for low-power cameras and motion sensors with visual verification. The encoder is controlled through a simple register set using the microprocessor interface. The variety of available interfaces, such as SPI, UART, and I²C, allow for wide flexibility in microprocessor selection.



Combined with an external CMOS sensor, the CX93510 retrieves and stores compressed JPEG and audio data in an on-chip 256KB/128KB frame buffer so no external memory is required. The ASSP enables low-cost, low-power PIR surveillance camera applications with visual and audio verification.

Upon a motion event, the host processor wakes, configures the CX93510, and then begins image/audio captures within 100ms of motion being detected. The chip has both digital and analog photocell sensor inputs available to facilitate the measurement of ambient light, and uses an on-chip LED driver to control an external infrared LED during low-light conditions. The CX93510 supports JPEG and MJPEG-DPCM image compression. An optional 2:1 scaler provides QVGA images from the VGA input. The device processes both color and black and white images up to 30fps.

With the elective microphone input, the CX93510 records a 2-bit or 4-bit ADPCM audio session simultaneously during image captures. The frame buffer can be optionally configured to contain a 4KB contiguous memory area for audio data storage. When not enabled, this 4KB block reverts to video memory use. The stored images and audio data are then passed on to an external microprocessor.

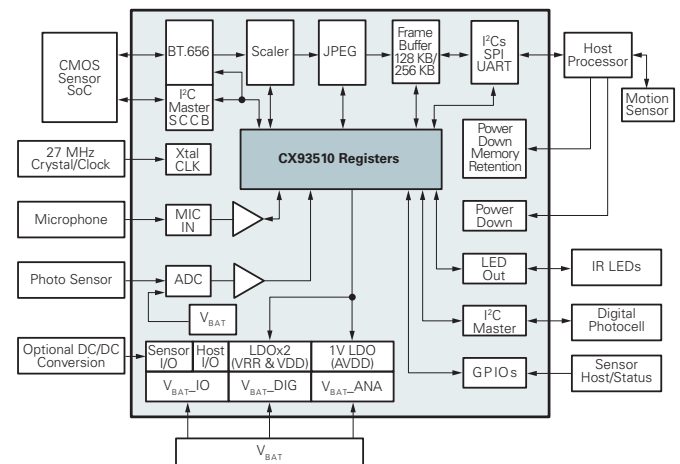
The CX93510 allows for flexible power management options with its internal voltage regulators and I/O connection options. To conserve power, the CX93510 can remain in a very deep sleep during idle periods until awakened by the host processor. For systems that are battery powered, the CX93510 can operate between 3.6V and 1.8V. A battery measurement input allows the host to monitor the battery level and alert the user if battery replacement is needed.

The CX93510 is a flexible, cost-effective, and low-power ASSP that is ideally suited for security applications requiring visual verification.

Applications

- Passive infrared camera wireless camera
- IP network camera remote home monitoring
- Personal emergency response system
- Baby monitor nanny/pet camera Smart meter
- Video intercom/monitor security intercom

System Block Diagram



Key Features

- Integrated mixed-signal design for analog-to-digital image processing
- On-chip 256KB/128KB frame buffer
- Supports JPEG and MJPEG-DPCM image compression, and processes both color and black and white images
- Supports low bandwidth
- Low sleep mode power of 10nA
- Low operating power of 12mA
- Integrated analog components (ADCs and LCD driver)
- I²C, SPI, and UART interfaces for flexible connectivity
- Register-driven device
- Optional microphone input records audio session simultaneously during image captures

Additional Features

Supported Applications and Operating Modes for PIR Sensor with Video

- Visual verification of intruder through the image sensor interface
- VGA—Black and white or color at up to 30fps
- VGA to QVGA filtered half resolution scaling
- JPEG and MJPEG-DPCM image compression (ISO/IEC 10918-1/2)
- Continuous streaming and variable image modes
- 256KB or 128KB frame buffer for compressed images (no external memory)

- Interface to external μ P through SPI, UART, or I²C
- Variable IR illumination control port
- A/D for photocell sensor, battery voltage monitor, and microphone inputs
- Sleep mode—ASSP is off except for the frame buffer in retention mode
- 12mA in operational mode
- 10nA in sleep mode

Interfaces

- Sensor I/F
 - 8-b 4:2:2 YCrCb with BT.656 embedded timing codes or frame/line sync support up to 27MHz, progressive mode
 - Resolutions: VGA (640x480) and QVGA (320x240)
 - 27MHz clock output
 - 2/3 wire control I/F: I²C master port or SCCB
 - Four-wire I²C/SPI/UART slave port to ext μ P
 - Eight GPIOs (five dedicated pins and three shared pins)
 - IR illumination with variable DAC
 - Microphone input, microphone boost 0dB–36dB in 6dB steps, and 2-bit and 4-bit ADPCM
 - DC measurement battery monitor
 - Photocell sensor input—analog or I²C (shared with GPIO)
 - Support for battery operation: 3.6V to 1.8V

- 48-pin eMLF/QFN
 - 6mm x 6mm lead-less package
 - 0°C to 70°C ambient
 - 0°C to 100°C junction
 - Also available in an industrial temperature range of –40°C to 85°C

Benefits

- No external components required for image conversion
- No external RAM required
- Provides excellent image processing up to 30fps
- Differential JPEG reduces file sizes by up to 80% for faster transfer time
- Longer battery life
- Energy-efficient design generates less heat
- No analog components required
- Allows for wide selection of microprocessors
- Simple operation—No CPU
- Provides complete A/V solution with flexible frame buffer for audio and video data storage

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