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EDN China Innovation Award
EDN 创新奖
电子设计技术 CHINA 2010
FINALIST

CONEXANT

CX93510 JPEG Encoder with a BT.656 Camera Interface and Optional Microphone Input
Low-cost and low-power solution for wireless and battery-operated cameras

Conexant's CX93510 is a monolithic mixed-signal Application Specific Standard Product (ASSP) specifically designed for motion sensors with visual verification. The encoder is controlled through a simple register set via the microprocessor interface. The variety of available interfaces, such as Serial Peripheral Interface (SPI), UART and I^2C, 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 256 KB/128 KB frame buffer so no external memory is required. The ASSP enables low-cost, low-power Passive Infrared (PIR) surveillance camera applications with visual and audio verification.

Upon a motion event, the host processor wakes and configures the CX93510 and begins image/audio captures within 100 ms 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 Quarter Video Graphics Array (QVGA) images from the VGA input. The device processes both color and black and white images up to 30 fps.

With the elective microphone input, the CX93510 records a 2- or 4-bit Adaptive Differential Pulse Code Modulation (ADPCM) audio session simultaneously during image captures. The frame buffer can be optionally configured to contain a 4 KB contiguous memory area for audio data storage. When not enabled, this 4 KB 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, it 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 3.6 V and 1.8 V. 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 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

Key Features	Benefits
Integrated mixed-signal design for analog-to-digital image processing	No external components required for image conversion
On-chip 256 KB/128 KB frame buffer	No external RAM required
Supports JPEG and MJPEG-DPCM image compression and processes both color and black and white images	Provides excellent image processing up to 30 fps
Supports low bandwidth	Differential JPEG reduces file sizes by up to 80 percent for faster transfer time
Low sleep mode power - 10nA	Longer battery life
Low operating power -12mA	Energy-efficient design generates less heat
Integrated analog components (ADCs, LCD driver)	No analog components required
I_2C, SPI, and UART interfaces for flexible connectivity	Allows for wide selection of microprocessors
Register-driven device	Simple operation, no CPU
Optional microphone input records audio session simultaneously during image captures	Provides complete A/V solution with flexible frame buffer for audio and video data storage

Part Number CX93510

Description JPEG Encoder with aBT.656 Camera Interface and Optional Microphone Input

CX93510 Features

Supported Applications and operating Modes

- PIR Sensor with Video
  - Visual verification of intruder via image sensor interface
  - VGA - Black and white or color at up to 30 fps
  - VGA to QVGA Filtered ½ res Scaling
  - JPEG & MJPEG-DPCM image compression (ISO/IEC 10918-1/2)
  - Continuous streaming and variable image modes
  - 256 KB or 128 KB frame buffer for compressed images (no external memory)
  - Interface to external µP though SPI, UART, or I^2C
  - Variable IR illumination control port

- A/D for Photocell sensor, battery voltage monitor, and micro-phone inputs
- Sleep mode - ASSP off except frame buffer in retention mode
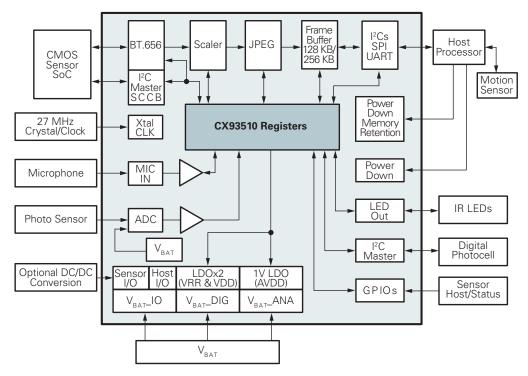- 12mA in operational mode
- 10nA in sleep mode

Interfaces

- Sensor I/F
  - 8-b 4:2:2 YCrCb with BT.656 embedded timing codes or frame/line sync support up to 27 MHz, progressive mode
  - Resolutions: VGA (640x480) and QVGA (320x240)
  - 27 MHz clk output
  - 2/3 wire control I/F: I^2C master port or SCCB

- 4-wire I^2C/SPI/UART slave port to ext µP
- 8 GPIO (5 dedicated pins, 3 shared pins)
- IR illumination with variable DAC and PWM control
- Microphone input, mic boost 0-36 dB in 6 dB steps, 2- and 4- bit ADPCM
- DC measurement battery monitor
- Photocell sensor input - analog or I^2C (shared with GPIO)
- Support for battery operation: 3.6 V to 1.8 V

48-pin eMLF/QFN

- 6 mm x 6 mm lead-less package
- 0 to +70 oC ambient, 0 to +100 oC junction

CX93510 Functional Block Diagram

Conexant Product Portfolio

Conexant's comprehensive product portfolio includes solutions for imaging, audio, video surveillance, and embedded modem applications.

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