OA8000 video processor product brief

OA8000 Artificial Intelligence Video Processor

lead free

available in
a lead-free
package

OmniVision's OA8000 is the industry first, ultra-low-power artificial intelligence video processor targeting battery powered intrusion cameras and video doorbells capable of deep learning inferences on the edge. The OA8000's core consists of a powerful neural processor unit (NPU) with 1K MAC of neural network (CNN) acceleration at a high frame rate and low power consumption. Harnessing OmniVision's unique low-power design, the OA8000 pushes the limits of computational power per mW, making it possible to achieve deep learning inferences in a battery-powered edge device.

Additional improvements include a quad-core ARM® Cortex® A5 CPU with NEON® technology for accelerated audio and video functions. This high-performance core enables more advanced video-analytics algorithms to be done on-chip, which reduces false alarms and increases battery life. Thanks to this powerful processor core and integrated audio CODEC, high-quality audio with noise reduction and echo cancellation is integrated without extra cost.

To address the vital need for cyber security, the OA8000 provides features for secured bootup and live streaming.
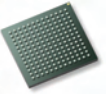
Find out more at www.ovt.com.

OmniVision®
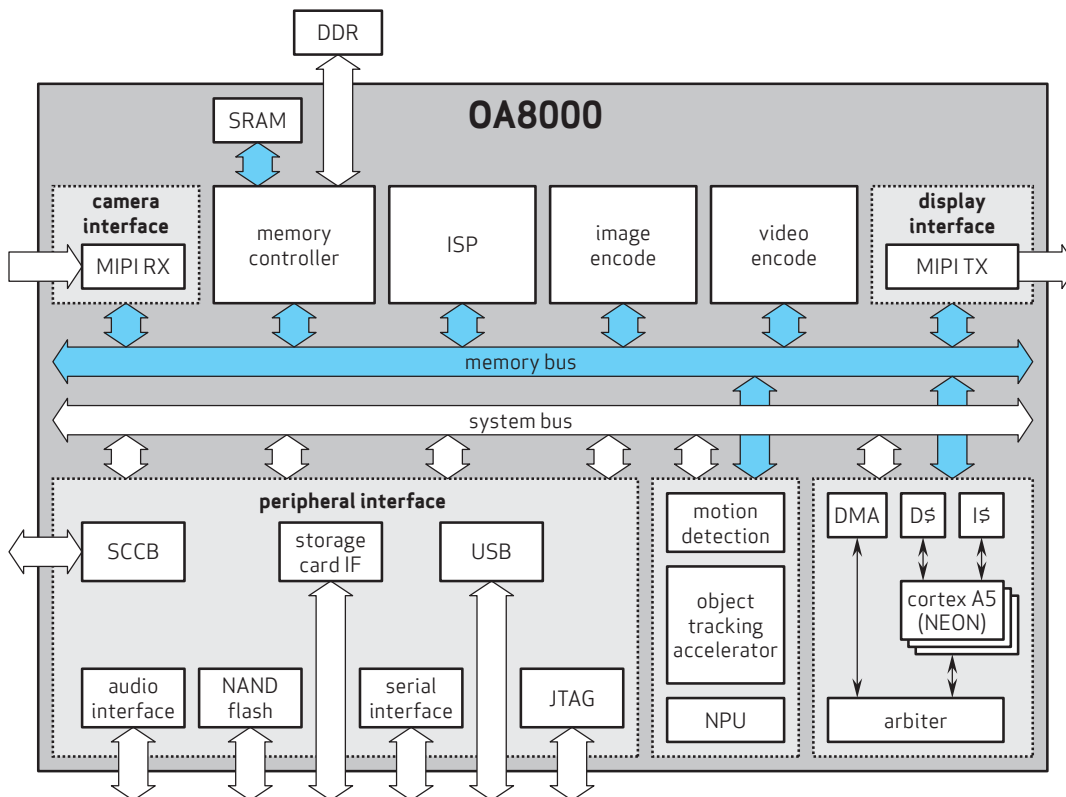
Product Features and Specifications

■ video encoder:
- high-profile advanced video encoder
- JPEG encoder for still pictures

■ neural network accelerator
- 1K MAC NPU
- SIMD pixel processor

■ special features:
- extremely low power consumption
- fast bootup
- secure boot
- smart video analytics for longer battery life
- dewarping and rotation
- built in audio CODEC for audio record/ playback and echo/noise cancellation

■ camera interfaces:
- MIPI one 4-lanes, or two 2-lane receiver
- supports up to 5MP image sensor
- SCCB master to access image sensor

■ image signal processor:
- RGB-Ir processing
- HDR processing
- dual-sensor 10-bit RAW to YUV processing
- adjustable AEC/AGC, AWB and autofocus
- color correction/adjustment, gamma correction and contrast adjustment
- 16x16 zone lens shading correction and online color shading correction
- lens distortion and perspective correction
- defective pixel correction
- mirror, flip and rotation
- supports up to 4X digital zoom
- 3D/2D de-noise filter

■ video engine:
- supports dual-video-stream recording with one 4MP at 24 fps (2688x1520) stream and one 1080p at 24 fps (1920x1080) stream
- rate control to support various and constant bit rates

■ video processing:
- cropping and scaling
- dewarping and rotation

■ video analytics:
- built-in advanced motion-detection engine
- built-in object tracking accelerator

■ still picture:
- supports still picture capture of up to 4 megapixels at 30 fps or 5 megapixels at 24 fps
- supports still picture compression

■ storage interfaces:
- one storage I/O peripheral interface, that can be used for an external Wi-Fi module
- one storage card interface
- NAND flash interface for 8-bit and 16-bit, with up to 8-bit BCH ECC
- supports serial interface NAND devices, with or without ECC engine

■ USB:
- USB2.0 HS/FS device controller

■ audio CODEC and audio engine:
- built-in 16-bit sigma delta ADC and 16-bit mono DAC, with full-duplex audio, AGC and echo/noise cancellation
- embedded audio engine for audio recording and playback
- full-duplex audio serial interface (up to 2 channels)
- supports various audio formats

■ security engine:
- supports AES/DES/3DES encryption and decryption
- supports secure boot

■ display interface:
- supports MIPI two-lane transmitter
- supports on-screen-display (OSD) and scaling

■ embedded quad-core ARM® Cortex® A5 CPU with NEON® and NPU:
- 32KB I-cache, 32KB D-cache for each core

■ DDR-SDRAM controller:
- LPDDR2/LPDDR3/DDR3/DDR3L 16-bits wide

■ miscellaneous:
- UART, timers, watchdog timer, general-purpose I/O, JTAG

■ power supply:
- core: 0.9V
- analog: 1.8V/3.3V
- DDR I/O: 1.2V (LPDDR2/LPDDR3) / 1.35V (DDR3L) / 1.5V (DDR3)
- I/O: 1.8V/3.3V
- PLL: 1.8V

■ temperature range:
- commercial grade operational temperature: -30°C to +85°C

Functional Block Diagram

OmniVision®