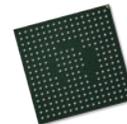




OA8000

ASIC product brief



OA8000 Artificial Intelligence Video Processor

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.

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- OA8000-B35G (lead-free)
235-pin BGA

Applications

- battery-powered smart home monitoring camera applications, with CNN acceleration

Technical Specifications

- power supply:**
 - core: 0.9V
 - analog: 1.8V
 - 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
- power requirements:**
 - active: 210 mW, measured at 1080p @ 30 fps
- package dimensions:** 11 mm x 11 mm

Product Features

- general features**
 - highly integrated, extreme low power and fast boot up AI video processor with neural network (CNN) accelerator
- camera interfaces**
 - MIPI receiver: one 4-lanes, two 2-lanes
 - supports up to 5MP image sensor
 - SCCB master to access image sensor
- image signal processor**
 - RGB-Ir processing
 - HDR processing
 - dual-sensor 12-bit RAW to YUV processing
 - adjustable AEC/AGC, AWB, and auto focus
 - 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 and flip
 - supports up to 4x digital zoom
 - 3D/2D de-noise filter
- video engine**
 - supports single-stream video recording with a maximum resolution of up to 5 megapixels
 - supports dual-video-stream recording with one 4 megapixels stream and one 2 megapixels stream
 - rate control to support variable and constant bit rates
- video processing**
 - cropping and scaling
 - de-warping and rotation
- neural network accelerator**
 - 1K MAC NPU
 - pixel processor (SIMD) for pixel processing in CNN inference layer, and control of neural processing unit
- USB device**
 - USB 2.0 HS/FS device controller
- video analytics**
 - built-in advanced motion-detection engine
 - built-in object tracking accelerator
- display interface**
 - supports MIPI two-lane transmitter
 - supports on-screen-display (OSD) and scaling functions
- still picture**
 - supports still picture capture up to 5 megapixels
 - supports still picture compression
- storage interfaces**
 - one storage I/O peripheral interface, that can be used for an external WiFi module
 - one storage card peripheral interface
 - NAND flash parallel interface for 8-bit and 16-bit, with up to 8-bit BCH ECC
 - NAND flash serial interface, with or without ECC engine
- security engine**
 - supports AES/DES/3DES encryption/decryption
 - supports secure boot
- 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 support left/right 16-bit data mode
 - supports various audio formats
- embedded microcontrollers**
 - quad core ARM® Cortex® A5, each with NEON® and FPU, 32KB I-cache, 32KB D-cache
- DDR-SDRAM controller**
 - LPDDR2/LPDDR3/DDR3/DDR3L 16-bits wide
- miscellaneous**
 - UART, timers, watchdog timer, general-purpose I/O, JTAG

Functional Block Diagram

