OAX4000
ASIC product brief
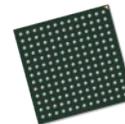
High-Performance ASIC Image Signal Processor Reduces Automotive Camera Design Complexity

OMNIVISION's OAX4000 companion image signal processor (ISP) offers design flexibility for next-generation automotive single- and multicamera architectures, enabling OEMs to future-proof their designs for added functionality as market demands change. Traditionally, electronic control modules required two ISPs, however, only one is needed when using the new OAX4000, reducing design complexity and space, and improving overall reliability. In combination with OMNIVISION's comprehensive sensor portfolio, the OAX4000 provides the ultimate automotive solution.

The OAX4000 is capable of processing up to four camera modules with 140 dB HDR and it offers the leading LED flicker mitigation (LFM) performance in the industry. Additionally, the OAX4000 offers more than 30% power savings over the previous generation ISP.

Ideal for multiple automotive applications including surround-view systems, e-mirror, and autonomous driving cameras, the OAX4000 is a high-performance application-specific integrated circuit (ASIC) capable of processing data streams from up to four cameras at 3MP, or one camera at 8MP. It supports multiple color filter array (CFA) patterns, including Bayer, RCCB, RGB-IR and RYYCy, and provides the option to output stream for both machine vision and human viewing pipelines independently. Additionally, the imaging pipeline has been upgraded to provide superior image quality. This includes the next-generation tone-mapping algorithm.

The OAX4000 complies with ASIL B advanced safety standards.

Find out more at www.ovt.com.

OAX4000

Applications

- Automotive
  - Automotive driver assistance system (ADAS)
  - Surround view system (SVS)
  - Driver monitoring system (DMS)
  - Interior monitor system (IMS)
  - Forward View Camera (FVC)
  - Camera monitor system (CMS)
  - E-Mirror
  - Rear view camera (RVC)

Technical Specifications

- **power supply:**
  - core: 0.8V -5%~ +10%
  - I/O: 1.8V ±10%
- **input interface:** MIPI RX
  (2x 4-lane or 4x 2-lane, 2.5 Gbps/lane)
- **input clock:** 8~32 MHz
- **output interface:** MIPI TX
  (2x 4-lane or 4x 2-lane, 2.5 Gbps/lane)
- **package dimensions:**
  7 mm x 7 mm (0.5 mm pitch)

Product Features

- embedded 32-bit RISC CPU
- up to four 3MP sensor (1920x1536 @ 30 fps) SVS application or a single 8MP sensor (3840x2160 @ 30 fps) ADAS application (HV+MV)
- supports mix sensors application with different format/resolution/frame rate
- multi-camera synchronization
- MIPI DPHY CSI-2 v3.0 specification compliant
  - up to 16 virtual channels
  - two CSI-2 input port and two CSI-2 output port, support 1/2/4 data lanes per port, up to 2.5 Gbps/lane
  - programmable data types
- support up to 4 captures HDR combination input
- on-chip DCDC from 1.8V to 0.8V
- supports multi-CFA pattern: RGGB, RYYCy, RCCB, RGBIR
- cybersecurity for sensor/ISP and ISP/host interface hacking prevention
- dedicated safety features to fulfill ASILB hardware metrics
- external frame sychronization capability
- SCCB slave interface lock feature for register access protect
- local and global tone mapping support
- automatic white balance (AWB), automatic exposure control (AEC) / automatic gain control (AGC), 50/60 Hz auto flicker detection and elimination
- embedded line information, including frame counter, temperature, and register data, for each image to enable critical automotive safety applications
- up to 17 GPIOs
- embedded temperature sensor
- 128 bytes common OTP and 2K bytes security OTP
- JTAG boundary scan
- serial camera control bus (SCCB) master/slave interface for sensor and ASIC configuration
- up to four-wire SPI flash interface to retrieve stored firmware and data from external SPI flash memory

Functional Block Diagram

OMNIVISION™