Hailo-15H AI Vision Processor

Unprecedented AI performance in a camera power envelope



Overview

The Hailo-15H AI vision processor is a system-on-chips (SoC) designed for smart cameras, integrating Hailo's patented, field-proven AI inference technology with state-of-the-art computer vision engine to deliver exceptional image quality and sophisticated video analytics.
The unprecedented AI capacity can be used for both AI-powered image enhancement and processing of multiple complex deep learning AI and GenAI applications at full scale and at superior efficiency.

Highlights & Key Features

Unparalleled AI Video Analytics

- 20 TOPS (Tera Operation Per Second) running on a powerful Neural Network (NN) core enabling processing of multiple advanced deep learning models in parallel
- High FPS deep learning model processing for faster and highly accurate detection of more objects per frame
- Best AI performance at a standard camera power consumption & cost envelope

Superior Image Quality

- AI-powered vision processing for video enhancement: Real-time low-light enhancement with advanced denoising, exposure boosting, and color/detail preservation in extreme low-light conditions along with digital zoom, image stabilization, and distortion correction
- Premium 4K30 image quality: Delivered by a cutting-edge ISP pipeline and advanced vision subsystem with High Dynamic Range (HDR) and noise reduction, ensuring clear video across challenging lighting conditions
- Industry-leading DSP-based vision processing and high-quality video encoding

Flexible & Secure System

- Industrial grade SoC with a variety of hardware interfaces for image sensors, data, and memory
- Secure boot and secure debug with hardware accelerated crypto library, TrustZone, TRNG, and Firewall

Comprehensive Software Suite

- A combination of out-of-the-box pipelines with easy-to-use, open software enabling camera vendors to develop their own pipelines
- Comprehensive libraries, drivers, image & video processing algorithms with a complete Yocto based Linux distribution
- Field proven and trusted by thousands of developers

System Usage

The Hailo-15H AI vision processors offer a versatile solution for a variety of smart cameras, accommodating diverse requirements , pipelines and feature sets.

General Specifications

Application Processor sub-system

- Quad-core ARM™ A53 up to 1.3 GHz 12 kDMIPs

Vision sub-system

- ISP: up to 12MP resolution, 600 Mpixel/s pixel rate
- YUV and Bayer RGB (RAW)
- High Dynamic Range (HDR)
- Multi-stage denoising (2DNR, 3DNR, Chroma NR)
- Video Encoding (HEVC & AVC) H.265/H.264 , multiple stream
- Electronic / digital image stabilization, lens shading & distortion correction, digital zoom, flip & rotate
- Hybrid processing of AI-ISP with traditional ISP for superior visual fidelity

High-performance NN core sub-system

- 20 TOPS
- Hailo's patented structure defined dataflow architecture
- Full software control for continuous capability upgrades

DSP vision processing sub-system

- Vector DSP, 256 MACs@ 700 MHz supports up to 350 GOPs

Memory Interfaces

- LPDDR4/4X 32bit @4266 MT/s
- QSPI
- SDIO 3.0/eMMc5.1 (up to HS200)

Sensor Interfaces

- Video In: dual MIPI CSI, DVP 24 bit
- Video Out: MIPI DSI

Peripheral Interfaces

- PCIe Gen 3.0 x 4 lanes (Endpoint or RC)
- Ethernet 10/100/1000 Mbit/s (RMII / RGMII)
- USB3.1 Gen2 / USB2.0 Host
- I2C (x4), I2S (x2 in, x2 out), SPI (x4)

Security

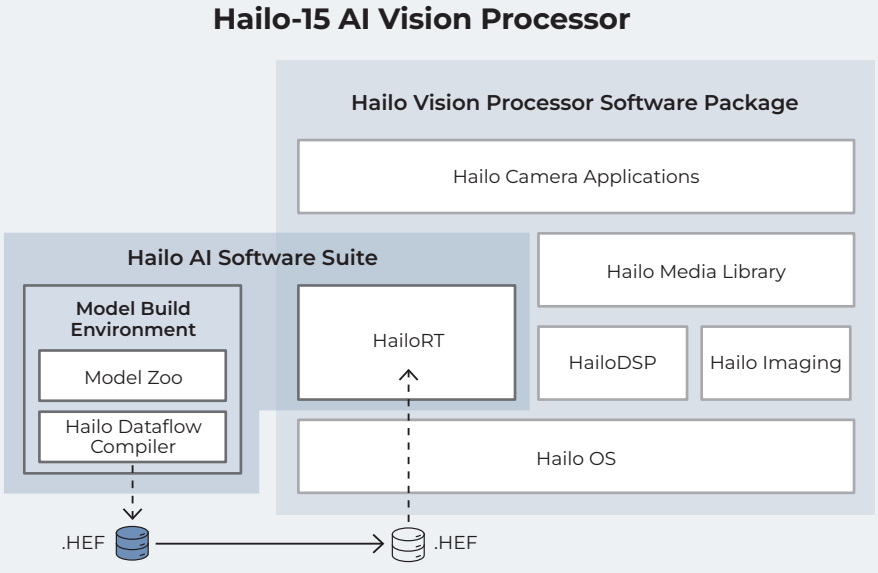
- Secure boot
- Secure debug
- Hardware accelerated crypto library
- TrustZone, TRNG, Firewall

Physical

- Packaging: FCCSP 15x15 mm
- Operating temperature -40°C to 85°C

Comprehensive Software Package

The vision processor software package includes a set of drivers, libraries and tools designed to develop smart cameras based on AI computer vision. It includes all the support for camera hardware interfaces and protocols, as well as specialized image- and video-processing algorithms and vision subsystem that are optimized for the requirements of camera-based applications. It is compliment by the AI Software Suite that enables the compilation, optimization, and deployment of NNs.



Part Numbers

Hailo-15H Industrial: HNC2HAI11SM

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