



S3LM IP Camera SoC

Overview

The Ambarella S3LM IP Camera SoC integrates an advanced image sensor pipeline (ISP), H.265 and H.264 encoders capable of up to 3Mp30 video, and a 720-MHz ARM® Cortex™-A9 system CPU for implementing custom applications. The low-power S3LM is suitable for home security and service provider cloud IP camera designs, offering imaging features functions such as IR night vision and 180 degree lens correction.

The flexible S3LM SDK provides a Linux-based framework and development environment that includes image-tuning tools and a rich set of APIs, enabling a range of product customization and differentiation options.



The S3LM chip is suitable for home security IP Cameras with 720p30, 1080p30 and 3Mp30 class performance

Key Features

Flexible Low-Power Platform

- ARM® Cortex™-A9 CPU
- Linux SDK for standards-based development
- 28-nm low-power CMOS process

Advanced Image Processing

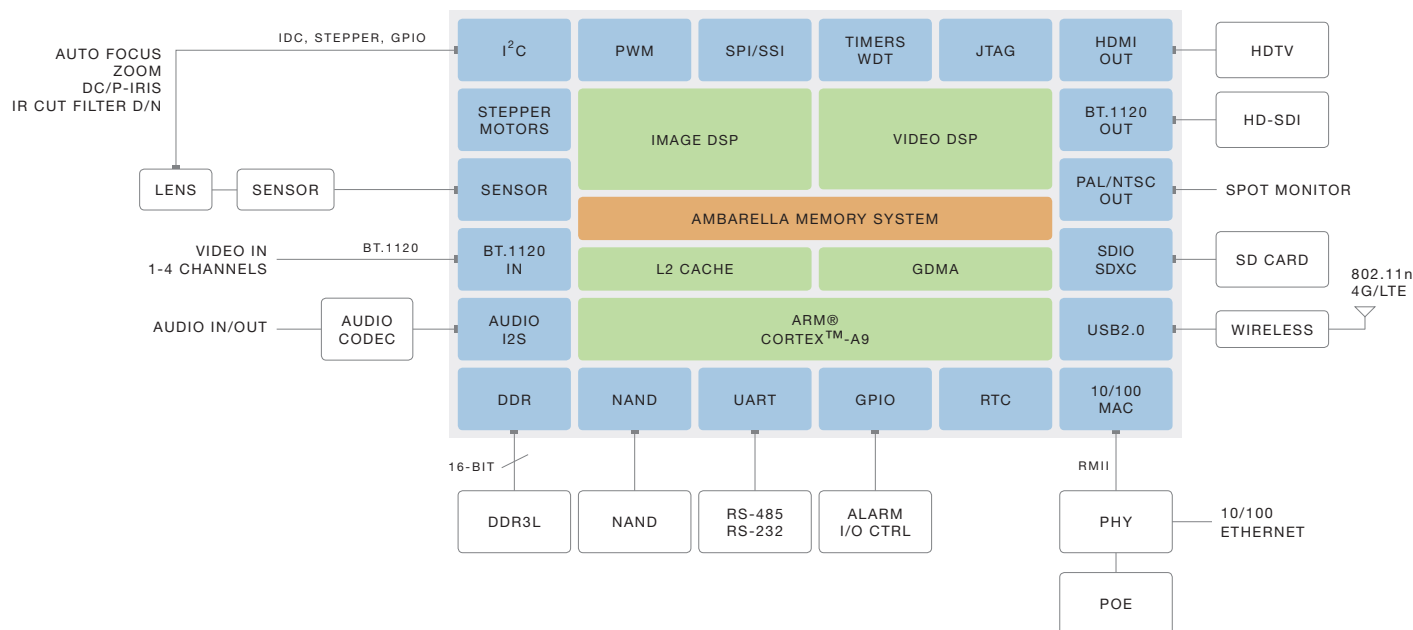
- Up to 5 Mpixel resolution
- Multi-exposure line-interleaved HDR
- Hardware dewarp for 180° panorama
- IR night vision

High-Efficiency Video Encoding

- H.265 and H.264 video compression
- Up to 3M@30fps + VGA video
- Flexible multi-streaming

Block Diagram

The diagram below illustrates an IP Camera design based on the Ambarella S3LM device.



General Specifications

Processor Cores

- ARM® Cortex™-A9 up to 720 MHz
- 32 KB / 32 KB I/D and 128 KB L2 Cache
- NEON™ and FPU acceleration
- AES / 3DES / SHA-1 / MD5 Cryptography Engine
- Ambarella Image and Video DSPs

Sensor and Video I/O

- Seamless RGB Bayer interface to popular sensors
 - 10 lanes of SLVS / HiSPi™ / MIPI interface
- BT.601 / 656 / 1120 video in and BT.656 / 1120 out
- PAL / NTSC composite SD video out

Front End Sensor Processing

- 5 MPixels maximum resolution
- 240 MHz maximum pixel rate
- Lens shading, fixed pattern noise correction
- Multi-exposure HDR (line-interleaved sensors)
- WDR local exposure

Image Processing

- 3D motion compensated noise reduction (MCTF)
- Adjustable AE / AWB / AF
- 180° fisheye lens distortion correction
- High quality polyphase scalers
- Digital PTZ and Virtual Cameras
- OSD engine; overlays, privacy mask
- Crop, mirror, flip, 90° / 270° rotation
- DC-iris and P-iris
- Defect pixel correction
- Geometric and chroma lens distortion correction
- Gamma compensation and color enhancement
- Backlight compensation

Intelligent Video Analytics

- Advanced 3rd party analytics options
- Intelligent motion detection
- Audio detection
- People/pet detection

Video Encoding

- 5 MPixels maximum resolution
- 3M@30fps + 480p30 maximum encoding performance
- Up to 4 simultaneous stream encodes
- SmartAVC low bitrate streaming
- Flexible GOP configuration with I, P and B frames
- Temporal Scalable Video Codec with 4 Layers (SVCT)
- Dynamic region of interest (ROI) with 32 free-form regions
- Multiple CBR and VBR rate control modes

Memory Interfaces

- DDR3 / DDR3L up to 660 MHz, 16-bit data bus
- One SD controller with SDXC SD™ Card
- NAND flash, SLC with ECC
- Boot from SPI-NOR, SPI-EEPROM, NAND flash, USB or eMMC

Peripheral Interfaces

- 10 / 100 Ethernet with RMII / MII
- One USB 2.0 port with Device / Host w/PHY
- Multiple I2S, SSI / SPI, I²C, and UART
- Multiple GPIO, PWM, Steppers, and ADC channels
- Watchdog Timer, multiple general purpose timers, JTAG and IR

Physical

- 28-nm low-power CMOS
- Operating temperature -20°C to +85°C
- LFBGA package with 256 balls, 11x11 mm, 0.65 mm pitch

S3LM IP Camera Development Platform

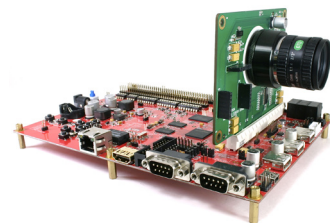
The S3LM IP Camera Development Platform contains the necessary tools, software, hardware and documentation to develop an IP Camera while supporting development of customized features.

Evaluation Kit (EVK)

- S3LM main board with connectors for sensor/lens board and peripherals
- Sensor board: Aptina (ON Semiconductor), Omnivision, Panasonic, Sony, and others
- Datasheet, BOM, schematics, and layout
- IP Camera reference application with C source code

Software Development Kit (SDK)

- Linux 3.10.X kernel with patches, drivers, tools, and application source code
- Royalty-free libraries for ISP, 3A, dewarp, and codecs
- Image tuning and manufacturing calibration tools
- Detailed documentation with programmer's guide, application notes



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