Overview

The Ambarella S3L IP camera SoC integrates an advanced image signal processor (ISP), H.265 and H.264 encoders capable of up to 5MP@30 video, and a 1-GHz Arm® Cortex®-A9 CPU for implementing custom applications. The low-power S3L is suitable for a wide range of IP camera designs, offering advanced imaging features, such as high dynamic range (HDR) processing, motion-compensated 3D noise reduction, and lens distortion correction (LDC).

The Ambarella S3L Flexible Linux Software Development Kit (SDK) provides a Linux-based framework and development environment that includes image tuning tools and a rich set of application programming interfaces (APIs), enabling a range of product customization and differentiation options in areas such as sensor and lens tuning, analytics, and network applications.
The S3L 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)
- S3L main board with connectors for sensor / lens board and peripherals
- Sensor board: Aptina, 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 and application notes

### Sensor and Video I/O
- Seamless RBG Bayer interface to popular sensors
  - 8-lane SLVS / HiSPI™ or 4-lane MIPI®
  - 16-bit parallel
  - BT.601 / 656 / 1120 video in and BT.656 / BT.1120 video out
- 24-bit RGB out, HDMI® 1.4a with PHY out
- PAL / NTSC composite SD video out

### Processor Cores
- Arm® Cortex®-A9 up to 1.0 GHz
- 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

### Image Processing
- 3D motion-compensated noise reduction (MCTF)
- Adjustable AE / AWB / AF
- 180° fisheye lens distortion correction (LDC)
- High-quality polyphase scalers
- Digital pan / tilt / zoom (PTZ) and virtual cameras
- OSD engine, overlays, and privacy mask
- Crop, mirror, and 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 third-party analytics options:
  - Face detection and tracking
  - Intelligent motion detection
  - Tampering / intrusion detection and people counting
  - License plate recognition
  - Object recognition and more

### Video Encoding
- H.265 (HEVC) MP L5.1, H.264 MP / HP L5.1 and MJPEG
- 6 MPixel maximum resolution
- 5M@30fps + 480p30 maximum encoding performance
- Up to 4 simultaneous stream encodes
- SmartAVC low bit-rate streaming
- Flexible GOP configuration with I, P, and B frames

### Memory Interfaces
- DDR3 / DDR3L up to 800 MHz, 32-bit or 16-bit data bus
- Two SD controllers with SDXC SD™ card
- NAND flash and SLC with ECC
- Boot from SPI NOR, SPI-EEPROM, NAND flash, USB, or eMMC

### Peripheral Interfaces
- 10 / 100 Ethernet with RMII / MII
- Two USB 2.0 ports with device and device / host with PHY
- Multiple I²S, SSI / SPI, I²C, and UART
- Many GPIO ports, PWM, steppers, IR, and ADC
- Watchdog timer, multiple general purpose timers, and JTAG

### Physical
- 28 nm low-power CMOS
- Operating temperature -20°C to +85°C
- LFBGA package with 353 balls, 14x14 mm, 0.65 mm pitch