# A7L-A Advanced HD Automotive Camera SoC

## Overview

The A7L-A SoC family enables single channel Super HD (3MP) at 30fps, Full 1080p HD at up to 60 fps and dual channel Full 1080p30 HD supporting video recording through the front windshield as well as through the rear window or inside the vehicle. The A7L-A's combination of Wide Dynamic Range (WDR), smart auto exposure, and full-resolution over-sampling provide excellent image quality allowing the capture of license plates and other details, even in low light conditions.

The SoC includes a high speed 700MHz ARM CPU to support advanced analytics algorithms including Lane Departure Warning System.

A7L-A enables WiFi connectivity for reviewing the captured video clips on iOS and Android devices. The SDK leverages Ambarella's multi-stream encoding capability which supports the recording of full HD video while simultaneously recording and streaming a second stream to the smartphone.

The A7L-A SoC is ideal for next generation automotive camera designs.

## Key Features

**Unparalleled Performance**

∘ Full HD @ 60fps or Super HD 3M @ 30fps

∘ Two channel Full HD @ 30fps

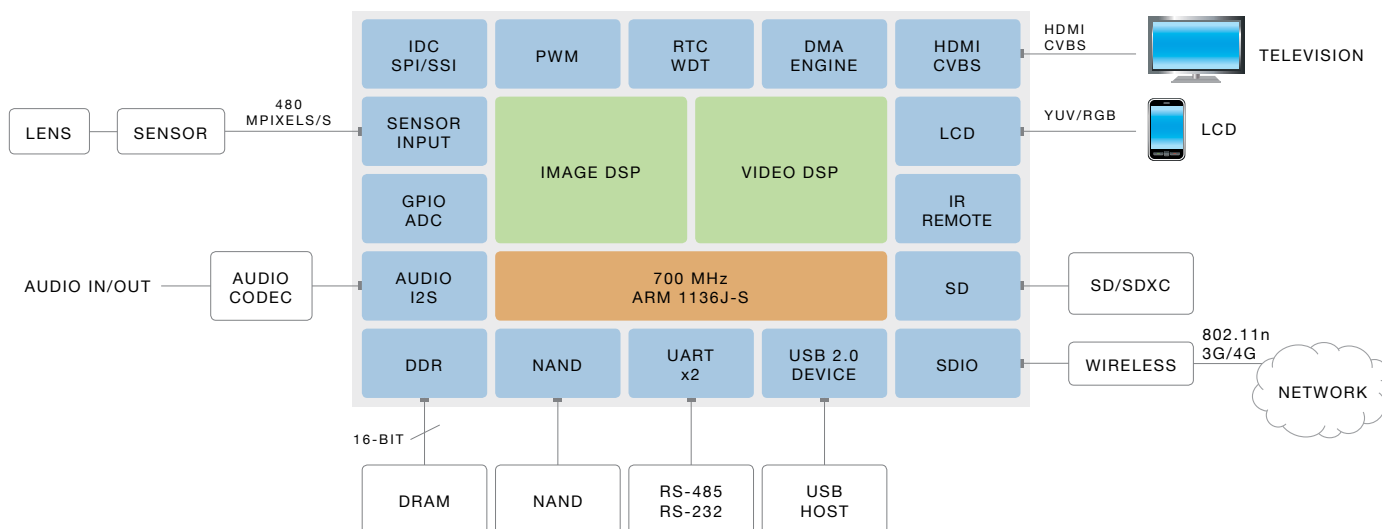∘ Super Wide Angle configuration

**Superior Image Quality**

∘ Advanced night vision for low light conditions

∘ Full resolution over-sampling

∘ Wide Dynamic Range (WDR)

∘ High Dynamic Range (HDR)

∘ Automotive Smart Auto Exposure

**Advanced Features**

∘ Lane Departure Warning System (LDWS)

∘ Integrated DRAM option for simplified system design

∘ WiFi support for smartphone connectivity

## Block Diagram

# A7L-A Advanced HD Automotive Camera SoC

## General Specifications

### Image Sensor Interface
◦ 480 MPixels/s sensor data input
◦ LVDS, sub-LVDS, SLVS/MLVS
◦ LVCMOS, Parallel, MIPI

### High Performance Automotive Video Engine
◦ Super HD 3MP @ 30fps or Full 1080p HD @ 60fps
◦ Simultaneous encode of two high resolution 1080p30 streams for front and rear cameras
◦ Super Wide Angle encoding up to 2560x720p total resolution
◦ Advanced Night Vision with super resolution over-sampling, 3D noise filters and dynamic tone mapping
◦ Real time geometric distortion (warp) filter
◦ Advanced automotive dynamic range engine with local exposure, highlight and tone adjustment
◦ Automotive smart auto exposure (AE) with scene detection, object detection and dynamic AE
◦ Continuous looping, motion detection and event-based / emergency video

### Powerful CPU for Advanced Driver Assistance
◦ Up to 700 MHz ARM1136J-S
◦ Includes Lane Departure Warning System (LDWS) function

### File Formats
◦ Audio: AAC (Two-channel LC, HEAAC, HEAAC v2), ADPCM / LPCM / PCM
◦ Video File: MP4. MOV, AVI, TS
◦ Photo File: JPG

### Advanced Video and Display Processing
◦ BP/MP/HP H.264 Level 5.0 and MJPEG encode
◦ Crop, mirror, flip, scale functions and LCD rotation
◦ Alpha-blending OSD; text, overlays
◦ Multiple video output ports

### Low Power and Low Cost DDR Interface
◦ 16-bit DDR3, DDR3L, DDR2, LPDDR2 up to 400 MHz
◦ Integrated DRAM option for simplified system design

### Peripheral Support
◦ Two SDIO for SD Card and 3G/4G/WiFi networking
◦ USB 2.0 device
◦ BT.656/1120 YUV 108MHz video in/out
◦ Popular LCD panel controllers (RGB mode)
◦ HDMI 1.4 with CEC support
◦ SSI/SPI, IDC, I2S, PWM, GPIO, UART, NAND, JTAG
◦ Real-time clock and watchdog timer

### Physical
◦ 32nm LP CMOS technology
◦ Operating temperature: 0℃ to +70℃
◦ 328-pin FBGA package, 14mm x 14mm

## A7L-A Advanced HD Automotive Camera Development Platform

The A7L-A Advanced HD Automotive Camera Development Platform contains the necessary tools, software, hardware and documentation to develop a state-of-the-art single or dual-channel Full HD automotive camera product.
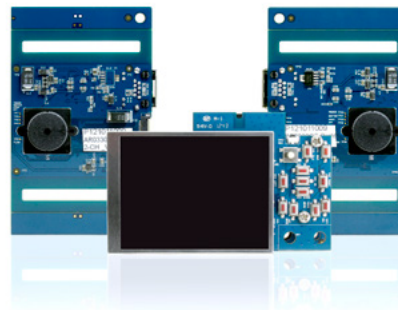
### Hardware Platform
◦ Main board with A7L-A and sensor board with C/CS mount lens
◦ Sensor: Aptina, OmniVision, Panasonic, Sony — many choices

### Software Development Kit (SDK)
◦ eSol ultron OS and development tools
◦ Full support of dual OS simultaneous operation (Linux+ultron)
◦ Demonstration automotive camera application with full source code
◦ Extensive and fully documented middleware API library suite

### Documentation
◦ Programmer's guide, application notes, API documents
◦ SoC data sheet, BOM, schematics and layout files

## Contact

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