A9 Ultra HD 4K Camera SoC

Overview

The Ambarella A9 SoC enables development of the next generation of mirrorless, sports, and digital still cameras (DSCs) with leading-edge video features and exceptional still image quality.

In addition to 4K Ultra HD video resolution at 30 frames per second, the A9 supports high frame-rate video for capturing fast-action sports with 1080p video at 120 frames per second or 720p video at 240 frames per second.

The A9 includes dual core ARM® Cortex™-A9 CPUs providing the performance required for advanced applications including wireless connectivity to smartphones for video streaming or image sharing.

The 32 nm Ambarella A9 Ultra HD 4K SoC Device.

Key Features

Ultra HD 4K H.264 Encoder
- High Profile with B-frames for high efficiency

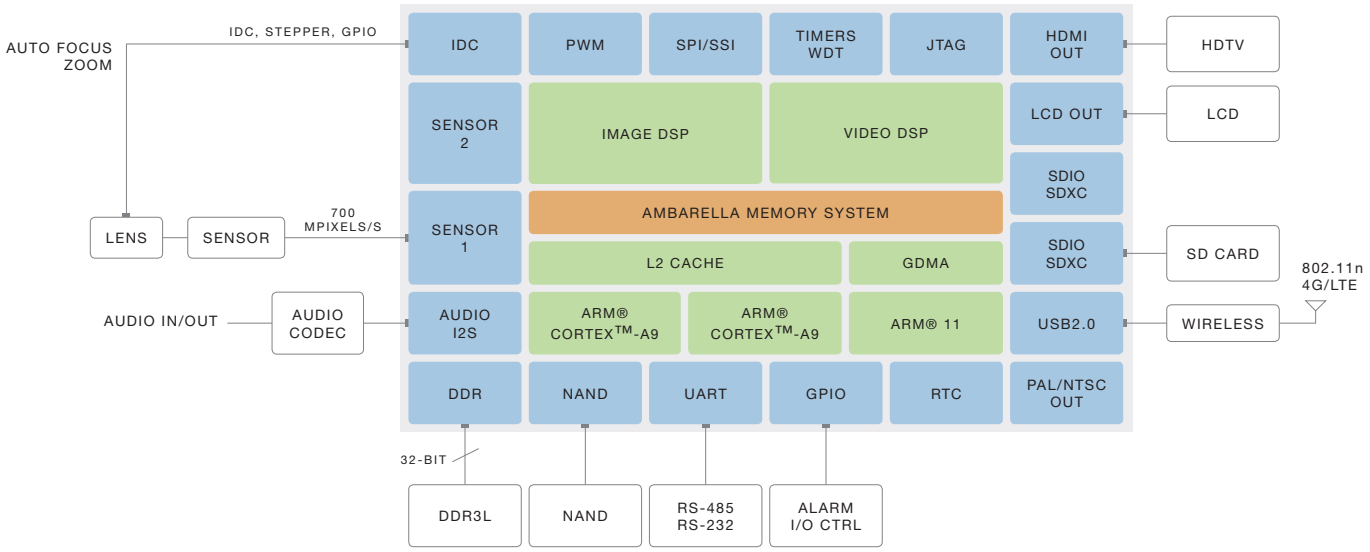
Super High Frame Rate Modes
- 1080p120 and 720p240 for action videography

Advanced Imaging
- 700Mpixels/s oversampling performance
- Multi-exposure HDR and WDR tone mapping
- Electronic image stabilization (EIS)
- Improved MCTF with advanced sharpening

Wi-Fi™ Connectivity
- Remote viewfinder, playback
- Upload pictures and video to social media

Block Diagram

Ambarella A9 Ultra HD 4K SoC System Diagram.



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General Specifications

Processor Cores
- Dual Core ARM® Cortex™-A9 @ up to 1 GHz
  - NEON™ and FPU acceleration
- Ambarella Image and Video DSPs
- Cryptography Engine

Sensor and Video I/O
- Dual sensor interfaces
  - 12-lane SLVDS/HiSPi™/subLVDS, 4-lane MIPI™, or 16-bit
  - 1-lane SLVDS/MIPI
- BT.601/656/1120 video in and BT.656/1120 out
- 24-bit RGB out, HDMI® 1.4a with PHY out
- PAL/NTSC composite SD video out

Front End Sensor Processing
- 32 MPixels maximum resolution
- 700 MHz maximum pixel rate
- Lens shading, fixed pattern noise correction
- Multi-exposure HDR
- WDR local exposure

Video Encoding
- H.264 codec BP/MP/HP Level 5.1 and MJPEG
- Ultra HD 4K encode performance
- 1080p120, 720p240 modes
- Low bitrate/high quality encoding
- On-the-fly change of multiple encoding parameters
- Flexible GOP configuration
- Multiple CBR and VBR rate control modes

Image Processing
- 3D motion compensated noise reduction (MCTF)
- Electronic Image stabilization (EIS)
- Adjustable AE/AWB/AF
- High quality polyphase scalers
- Crop, mirror, flip, 90° rotation

Memory Interfaces
- DDR3/DDR3L
- 32-bit data bus
- Dual SMIO with SDXC SD™ Card Support
- NAND flash, SLC with ECC
- Boot from NAND, SPI EEPROM, USB or eMMC

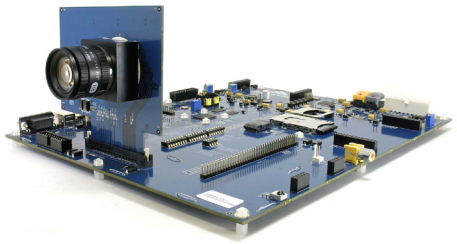
Peripheral Interfaces
- GMAC Ethernet with GMII / MII
- USB2.0 HS Device or Host w/PHY
- Multiple I2S, SSI/SPI, IDC, and UART
- Many GPIO ports, Multiple PWM, Steppers, IR, ADC
- Watchdog Timer, multiple general purpose timers, JTAG

Physical
- 32nm Low Power CMOS
- <1W for 1080p60 encode
- <2W for Ultra HD 4K encode
- Operating temperature 0°C to 70°C
- TFBGA package with 404 balls, 15x15 mm, 0.65 mm pitch

A9 Ultra HD 4K Camera Development Platform

The A9 Camera Development Platform contains the necessary tools, software, hardware and documentation to develop a state-of-the-art network-enabled Ultra HD camera design.

Hardware Platform
- Main board with A9 and sensor board with C/CS mount lens
- Sensor: Aptina, OmniVision, Samsung, Sony—many choices available



Software Development Kit (SDK)
- Royalty-free libraries for ISP, 3A, and codecs
- Demonstration DV/DSC 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 **www.ambarella.com/about/contact/inquiries.html**