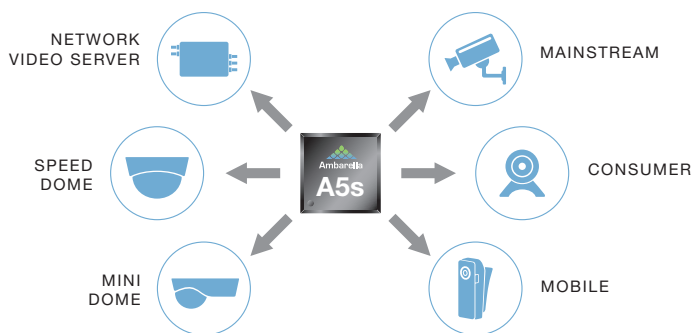# A5s – 1080p30 IP Camera SoC

Overview

The A5s IP Camera SoC integrates powerful image sensor processing, HD 1080p30 H.264 multi-stream encoding, and an ARM11 processor with rich I/O for IP Camera and Network Video Server (NVS) applications. Leveraging Ambarella's technology leadership in professional broadcasting, A5s offers excellent video quality, 3D noise reduction, digital WDR and four independent H.264/MJPEG streams.

The A5s SDK supports development of fully-featured IP Cameras and multi-channel NVS devices while offering developer differentiation such as analytics, digital PTZ, customizable AWB/AE/AF and a wide range of sensor choices.

A5s enables a wide range of video surveillance applications.

Key Features

Single Platform, Many Uses
◦ From entry-level SD to high-end multi-megapixel
◦ Wide range of sensors supported

Promotes Differentiation
◦ High-performance, software-programmable
◦ Proven Linux SDK and rich ARM-level APIs

Cost And Power Efficient
◦ Ultra-compact BOM with a single 16-bit DDR
◦ Less than 3 Watts for a complete camera design

Superior Image Quality
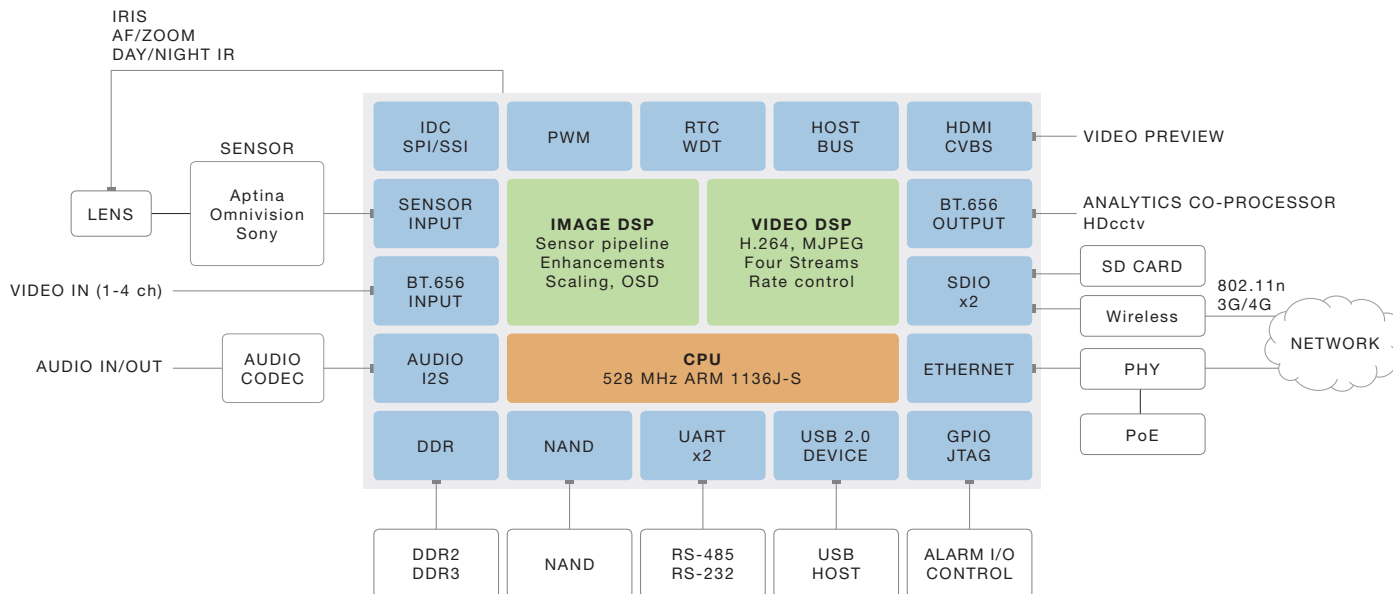◦ Advanced image sensor pipeline
◦ 3D noise reduction

Enhanced Video Processing
◦ Digital WDR
◦ AE/AWB/AF, digital PTZ, face tracking, more

State-Of-The-Art H.264 Compression Engine
◦ High compression ratio, also in high motion scenes
◦ Full HD 1080p30 + D1

Block Diagram

A5s – 1080p30 IP Camera SoC

General Specifications

Sensor and Video I/O
◦ 8-lane SLVDS, HiSPI™, MIPI CSI-2, and parallel
◦ Up to 14 Mpixel resolution and 240 MHz pixel rate
◦ BT.656/1120 108 MHz 1-4 ch video input/output
◦ HDMI 1.3 out

Front End Sensor Processing
◦ Lens correction
◦ Black level correction
◦ Defect pixel cluster correction
◦ CFA crosstalk noise filtering
◦ RGB Bayer demosaicing
◦ 3D color transformation with gamma

Image Processing
◦ 3D noise reduction filtering
◦ Digital WDR contrast enhancement
◦ AE/AWB/AF libraries supplied
◦ Day/Night and DC/Stepper iris control
◦ Flicker suppression
◦ Alpha-blending OSD; text, overlays, privacy mask
◦ Digital WDR contrast enhancement
◦ Crop, mirror, flip, scale, digital PTZ
◦ Saturation, brightness, contrast
◦ Motion and face detection

Low Power
◦ 650 mW power consumption for 1080p30 encode

Video Encoder
◦ H.264 BP/MP/HP Level 5.0
◦ MJPEG
◦ Up to 4 simultaneous streams
◦ Up to 14MP resolution
◦ Full HD 1920x1080@30fps + D1
◦ 3MP@20fps, 5MP@12fps, or 10MP@3fps
◦ CBR/VBR/ConstantQP rate control

CPU
◦ 528 MHz ARM1136J-S
◦ AES/DES/3DES cryptographic acceleration

Memory
◦ 1x 16-bit DDR2/DDR3/Mobile DDR/Mobile DDR2

Peripherals
◦ SDIOx2 for SD Card and 3G/WiFi
◦ Ethernet MII
◦ USB 2.0 Device
◦ I2S audio in/out
◦ NAND Flash, 16-bit Host i/f
◦ SSI/SPI, IDC, PWM, GPIO, RS-232C/485
◦ Real-time clock, watchdog timer, JTAG

Physical
◦ 15x15 mm, 404 pin TFBGA package
◦ Operating temperature: -20°C to +85°C

A5s IP Camera Development Platform

The A5s IP Camera Development Platform contains the necessary tools, software, hardware and documentation to develop a professional IP camera design.
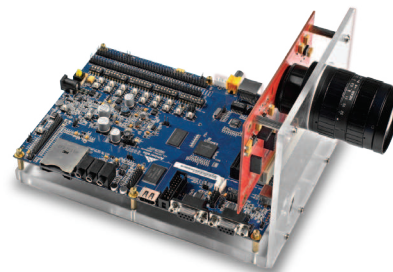
Evaluation Kit Hardware Platform (EVK)
◦ Main board with A5s SoC and sensor board with C/CS mount lens
◦ Sensor : Aptina, OmniVision, Samsung, Sony — many choices available

Software Development Kit (SDK)
◦ Royalty-free IP camera application with source
◦ Image tuning and manufacturing tools
◦ Linux 2.6.32 (or later) with drivers, kernel patches and toolchain

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

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