Ambarella
AI envisioned

PRODUCT BRIEF

H22

Video SoC for Consumer Applications

Key Features

Flexible, Low-Power Platform
- Quad-core Arm® Cortex®-A53 CPU up to 1 GHz
- Dual OS Support: ThreadX, Linux
- 14 nm low-power CMOS process

High Resolution and Frame Rate Image Processing
- 4KP60 video encoding (HEVC / AVC)
- High dynamic range (HDR) multi-exposure capture up to 4KP30
- Simultaneous second stream
- 3D electronic image stabilization (EIS) with 6-axis correction (translational, pitch, yaw, and roll) and shutter correction
- Dual processing pipeline for drone optical flow, 360° cameras, and other multi-sensor applications

Wireless Connectivity and Video Streaming Options
- USB host for 4G module connectivity
- DMA UART for Bluetooth (BT) module connection
- Dual encode for on the fly mobile resolution streaming

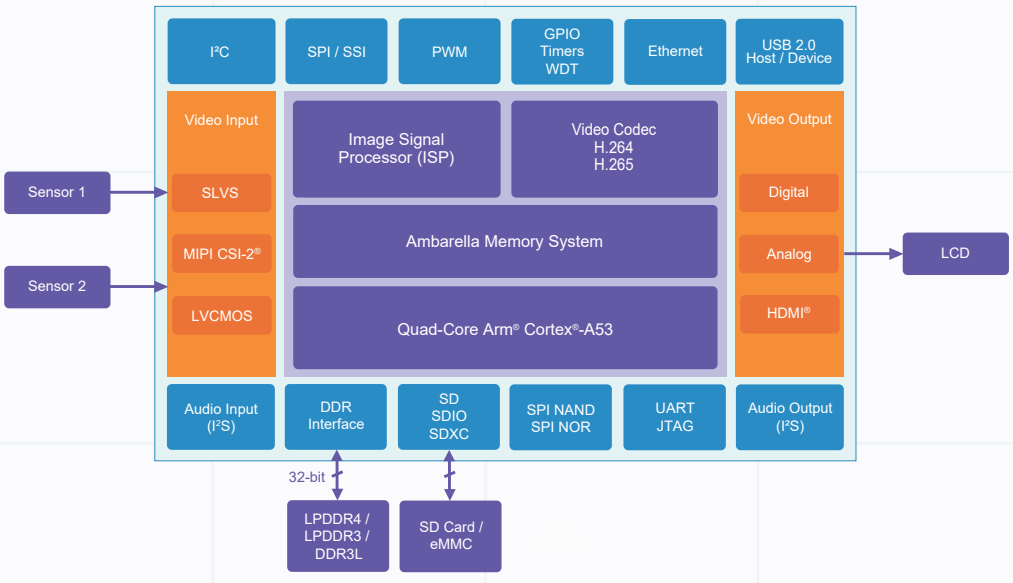
Overview

The Ambarella H22 system on chip (SoC) for consumer applications is an SoC that integrates an advanced image signal processor (ISP), H.265 (HEVC) and H.264 (AVC) encoders, and a powerful quad-core Arm® Cortex®-A53 CPU for advanced analytics, computer vision, flight control, WiFi streaming, and other user applications.

Targeting the next generation of connected drones, sports, and 360° (VR) cameras, H22 delivers up to 4K video recording at 60fps or equivalent performance while streaming a second, live, mobile-resolution video over a WiFi network for preview or sharing.

Equipped with dedicated hardware, H22 supports 3D electronic image stabilization (EIS) up to 4KP30, and multi-exposure high dynamic range (HDR) capture up to 4KP30.

A unique architecture and 14 nm process technology minimizes H22 power consumption while maximizing performance.



H22 Block Diagram

General Specifications

Processor Cores
- Quad-core Arm® Cortex®-A53 up to 1 GHz
- 32 KB / 32KB I/D and 256 KB L2 cache
- AES / 3DES / SHA-1 / MD5 cryptography engine
- Ambarella image and video DSPs

Sensor and Video I/O
- 2 MIPI CSI-2® sensor inputs, 4 lanes each
- 8-lane MIPI mode
- 10-lane SLVS / HiSPi™ 2.0 with PHY out
- PAL / NTSC composite SD video out
- RGB Bayer interface to popular sensors

CMOS Sensor Processing
- High dynamic range (HDR) multi-exposure capture up to 4KP30
- Lens shading and fixed pattern noise correction
- Dynamic range (WDR and HDR) engine

Image Processing
- 3D motion-compensated noise reduction (MCTF)
- Adjustable AE / AWB / AF
- Lens distortion correction (LDC) for wide angle lenses
- Defect pixel correction
- Geometric and chroma lens distortion correction (LDC)
- Backlight compensation
- Electronic image stabilization (EIS) and tilt correction up to 4KP30
- Crop, mirror, flip, 90° / 270° rotation

Video Encoding
- H.265 / HEVC MP level 5.1 encoding up to 4KP60
- H.264 MP / HP level 5.1 encoding up to 4KP60
- Simultaneous streams
- Multiple constant bit rate (CBR) and variable bit rate (VBR) control modules

Memory Interfaces
- LPDDR4 or LPDDR3 / DDR3 / DDR3L up to 1 GHz, 32-bit data bus
- Three SD controllers including SDXC™ / UHS-1 support
- Boot from SPI NOR, SPI EEPROM, NAND flash, USB, eMMC, or SLC with ECC

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

Physical
- 14 nm low-power CMOS
- Operating temperature: -20°C to +85°C
- FC LFBGA package (369 balls, 14x14 mm, 0.65 mm pitch) or FC LFBGA package (369 balls, 11x11, 0.5 mm pitch)

H22 Camera Development Platform

The H22 camera development platform contains the necessary tools, software, hardware, and documentation to develop a small form factor camera.

Evaluation Kit (EVK)
- H22 main board with connectors for sensor / lens board and peripherals
- Sensor board: OmniVision, Sony, and others
- Data sheet, BOM, schematics, and layout
- Reference application with C source code available with additional licensing

Software Development Kit (SDK)
- ThreadX / Linux 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 more

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