

Key Specifications

Main Processor Core

- ARM Cortex Quad-core A55, up to 1.5GHz

AI Processor

- Up to 2 TOPS

Display

- MIPI-DSI: 4-lane
- Resolution 1080P@60fps, 1280*480@60fps, 1920*360@60fps
- Support secure display

Dedicated Audio Processing Unit

- Integrated audio DSP

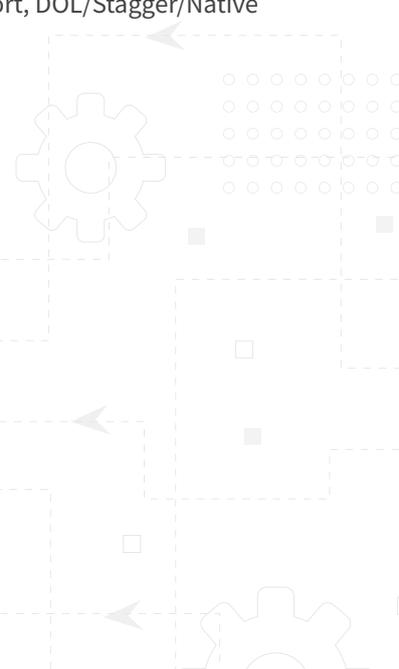
GPU

- ARM Mali G31
- OpenGL ES 3.0/3.1/3.2
- Support AFBC1.2

ISP

- Up to 8M single channel or 4M + 4M dual channel
 - Single channel with 4096*2160@30fps or 2688*1566@60fps or 1080P@120fps
 - Dual channel with 2K@30fps + 2K@30fps
- Scaling (from 4096*4096 to 64*64), Color Conversion
- Memory bandwidth compressor
- Adjustable 3A functions (AE, AWB, and AF)
- WDR (Wide Dynamic Range) and tone mapping
- Multi-exposure HDR (need sensor support, DOL/Stagger/Native Compond)
- De-mosaic
- Gamma Correction
- Image Effects
- Digital Zoom
- Rotate/Crop/Scale/Mirror/Flip
- Dedicated color space conversion
- Noise Reduction
 - CNR
 - 3DNR
 - Purple Fringing Correction
- Image Enhancement
 - Anti-fog
 - De-warp, fisheye correction

JA312 is a specialized SoC with advanced high definition camera function and integrated AI acceleration. It supports single 8M camera or dual 4M camera video recording, and all major AI inference usage scenarios. It supports multiple sensors (up to 2) inputs, encoding and transmitting. It integrates industry surveillance grade ISP and Video Codec, Quad Cortex A55 (up to 1.5GHz), Mali GPU. Empowered by 11nm process node, optimized for performance and power architecture design, JA312 provides industry leading image and AI processing capability.



Video Encoding

- HEVC/H.264/JPEG encoding
- 4K@30fps + 1080P@30fps + 720P@30fps
- 2K@30fps + 1080P@30fps + 720P@30fps
- Five bit-rate control modes (CBR, VBR, FixQp, AVBR, QpMap)
- Support Widevine (level 1)
- Encoding of up to eight ROIs
- Maximum resolution for JPEG encoding: 8192 x 8192
- Please noted that it is limited by the input data (e.g. data from ISP is up to 4K).
- Maximum JPEG encoding is up to 4K (3840 x 2160)@160fps

Video Decoding

- HEVC/H.264/MPEG4/VC-1/VP9/VP8/JPEG decoding
- 4096*2160@30fps, 3840*2160@30fps
- Maximum resolution for JPEG decoding: 8192 x 8192
- Maximum JPEG decoding is up to 4K (3840 x 2160)@30fps

Audio Encoding and Decoding

- AAC, G.711, G726 and other encoding formats
- AAC, G.711, G726, MP3 and other decoding formats

Voice Processing

- Voice Detection
- Speech Enhancement
 - AEC (Acoustic Echo Cancellation)
 - ALC (Automatic Level Control)
 - Noise Suppression
 - Beamforming

Video and Audio Interfaces

- Dual MIPI-CSI (2 Lanes + 4 Lanes), 2.1Gbps per lane
- One 4-lane MIPI-DSI, 2.1Gbps per lane
- Four SPI interfaces
- Five I2S interfaces
 - One for codec output (support 5.1 stereo)
 - One for 2~8 channel microphone input
 - Three reserved
- LVDS up to 1080P@60fps

Security Engine

- AES (ECB/CM/F8)
- SHA (SHA1/SHA-256)
- RSA
- SM2/3/4
- OTP and Random number generator
- TEE, based on OP-TEE, TrustZone
- Secure Boot

Memory Interfaces

- Support the following DDR memory
 - DDR3/DDR3L/LPDDR3
 - DDR4/LPDDR4
- Maximum capacity of 3GB
- eMMC 5.1 interface
- SPI NOR flash interface
 - Maximum capacity of 256MB
- SPI NAND flash interface
 - Maximum capacity of 1GB
- Micro SD
 - Maximum capacity of 256GB
- Booting from SPI NOR flash and SPI NAND flash
- Booting from eMMC

Peripheral Interfaces

- 6 UART interfaces, 4Mbps, 4 of them support data flow control
- 6 I2C ports
- 3 SD 3.0/SDIO 3.0 interfaces
- 2 USB 2.0 HS, FS and OTG mode, OTG supports dual role device, no support for SRP/HNP
- 1 Ethernet interface: RGMII&RMII/MII, 10/100/1000 MAC
- 8 PWM interfaces
- Rich GPIO ports
- JTAG interface
- TPIU interface
- 6 direct keys

OS

- Linux kernel v4.14
- Android upon request