CV1800B: New generation dedicated to 4M/3M IP camera SOC

Product Overview

CV1800B is a high-performance, low-power-consumption chip designed for the consumer market of surveillance IP cameras, smart homes, and other related products. It integrates H.264/H.265 video compression encoders and ISP, and supports various image enhancement and correction algorithms such as digital wide dynamic range, 3D noise reduction, defogging, and lens distortion correction to provide professional-level video image quality for customers.

Main characteristics

Processor core
– RISC-V C906@1.0 GHz.
– RISC-V C906@700 MHz.
– With Vector acceleration
– Integrated floating point unit (FPU)

Self-developed intelligent reference solution
– Humanoid detection, motion detection
– Warning area

Video codec performance
–H. 265 Main Profile
–H. 264 Baseline/Main/High profile
–H.264/H.265 encode：maximum resolution 2688*1520
– H.264/H.265 encode performance: 2688x1520@25fps+720x576@25fps
– JPEG maximum encode performance: 2688x1520@25fps
– Support various bit control modes including Constant Bit Rate (CBR)/Variable Bit Rate(VBR)/FIXQP
– Support regions of interest (ROI) encoding

Image and video processing
– Image video (90, 180, 270 degree rotation, mirror, flip)
– Video OSD overlay
– Scaling up/down from 1/32~32x
– 3A (AE / AWB / AF) algorithm
– Fixed pattern noise reduction and Defect Pixel Correction
– Lens shading correction, lens distortion correction and purple fringing correction
– Direction adaptive demosaic
– Gamma correction, dynamic contrast enhancement, color calibration and enhancement
– Local adaptive defogging
– Bayer noise reduction, 3DNR, detail and edge enhancement
–Local Tone mapping
– Two axis digital image stabilization
– Provide ISP tuning tools running on PC

Audio codec performance
–Software audio codec protocol (G.711, G.726, ADPCM)
–Support audio 3A (AEC, ANR, AGC) function

Video interface
– input
- Supports one video input
- Support 8 / 10 / 12-bit RGB Bayer video input
- Support BT.656 video input
- Support MIPI interface
- Support high definition CMOS image sensors including SONY, OnSemi, and OmniVision
- Compatible with multiple sensor parallel / differential interface electrical characteristics
- Provide programmable sensor clock output
- Support width up to 2688, resolution up to 2688 x 1520

Audio interface
– Integrated audio codec, support 16bit voice input and output

Security
– Support safe startup and upgrade
– Various ciphers including Advanced Encryption Standard (AES), Data Encryption Standard (DES), and SM4, all by hardware
– Security hardware:SHA / TRNG / Secure eFuse

Peripheral interface
– Integrated POR
– Integrated 3-channel ADC
– 4 I2C, 3 SPI, 5 UART, 13 PWM
– 1 SDIO interfaces, support SDIO 3.0
– 1 USB 2.0 host / device interface
– Several GPIO interfaces
– Integrated Key scan, Wiegand
– Integrate MAC PHY; 10/100 Mbps Full duplex or half duplex mode

Memory interface
– Built-in DRAM
- Built-in DDR2 512Mbit (64MB)
– SPI Nor flash interface (1.8V / 3.0V)
- Support 1, 2 and 4-wire modes
- Maximum capacity: 256MB
– SPI NAND flash interface (1.8V / 3.0V)
- Use built-in ECC module
- Support 1KB / 2KB / 4KB page size
- Corresponding maximum capacity: 16G / 32G/ 64G

Booting modes
– Support booting from SPI NOR Flash
– Support booting from SPI NAND flash
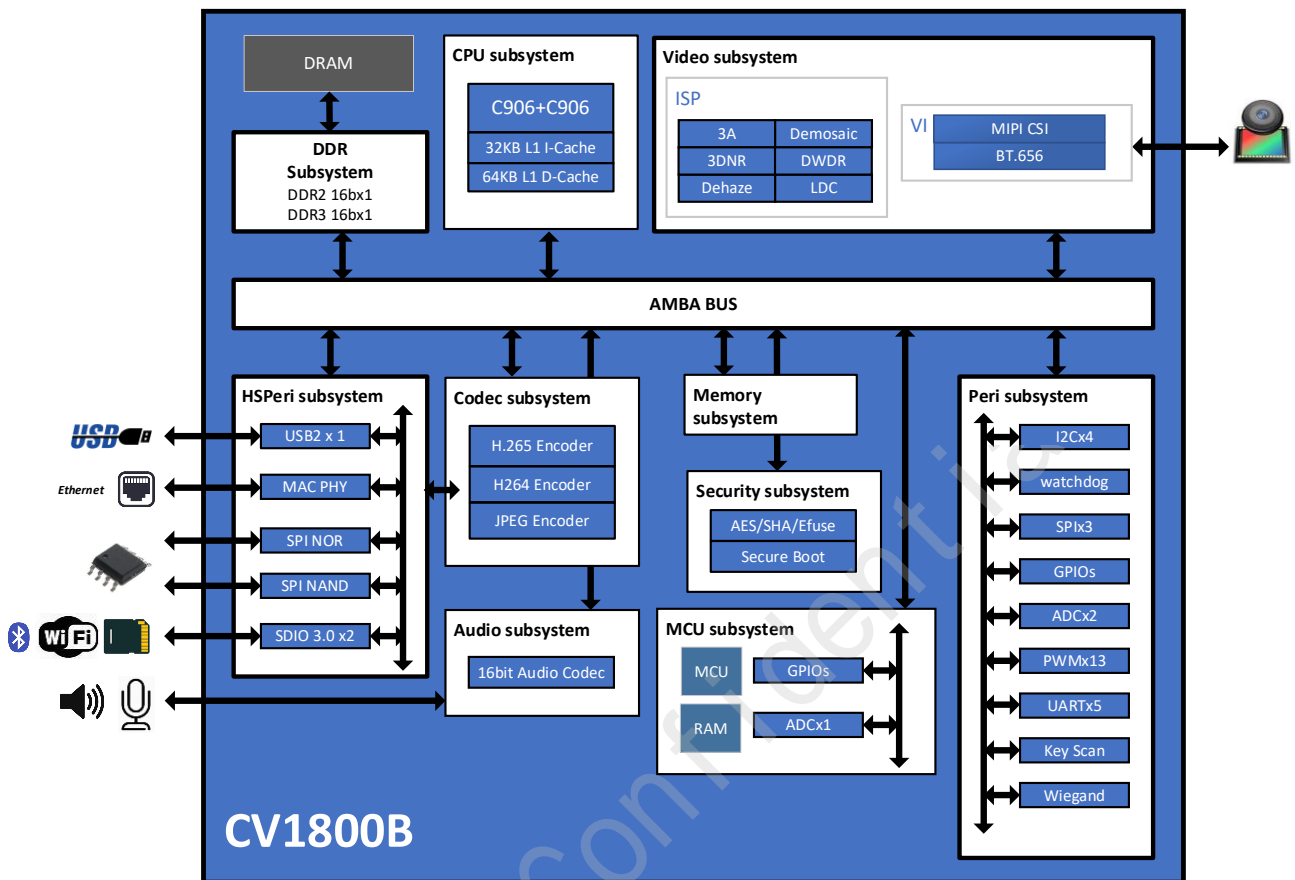– Support fast boot

System image upgrade modes
– Support system image upgrade through SD card
– Support system image upgrade through USB device
– Support system image upgrade through Ethernet

Physical specifications
– Support multi-level power saving mode
– Operation voltage
- Core voltage is 0.9V
- IO voltage is 1.8V/3.0V
– Package
- Use QFN package
- Package size:7mm x 7mm
- Pitch:0.35mm

Function Module Diagram

CV1800B Function Module Diagram

- DRAM
- DDR Subsystem
  - DDR2 16bx1
  - DDR3 16bx1
- CPU subsystem
  - C906+C906
  - 32KB L1 I-Cache
  - 64KB L1 D-Cache
- Video subsystem
  - ISP
    - 3A
    - Demosaic
    - 3DNR
    - DWDR
    - Dehaze
    - LDC
  - VI
    - MIPI CSI
    - BT.656
- AMBA BUS
- HSPeri subsystem
  - USB2 x 1
  - MAC PHY
  - SPI NOR
  - SPI NAND
  - SDIO 3.0 x2
- Codec subsystem
  - H.265 Encoder
  - H264 Encoder
  - JPEG Encoder
- Audio subsystem
  - 16bit Audio Codec
- Memory subsystem
- Security subsystem
  - AES/SHA/Efuse
  - Secure Boot
- MCU subsystem
  - MCU
  - RAM
  - GPIOs
  - ADCx1
- Peri subsystem
  - I2Cx4
  - watchdog
  - SPIx3
  - GPIOs
  - ADCx2
  - PWMx13
  - UARTx5
  - Key Scan
  - Wiegand

External interfaces: USB, Ethernet, SPI, Bluetooth, WiFi, SD, Speaker/Microphone, Camera

IP camera solution for consumer application