Hi3516 Full-HD IP Camera SoC

Key Specifications

Processor
- ARM Cortex A9
  - Up to 800 MHz
  - 32 KB L1 I-cache, 32 KB L1 D-cache
  - 256 KB L2 cache

Video Encoding
- H.264 baseline profile
- H.264 main profile
- H.264 high profile
- MPEG4 SP
- MJPEG/JPEG baseline

Video Encoding Performance
- 16-megapixel maximum resolution for H.264 encoding
- Real-time H.264&JPEG encoding of multiple types of streams:
  - 1080p@30 fps+D1@30 fps+CIF@30 fps+QVGA@30 fps+1080p JPEG snapshot 1 fps
  - 720p@60 fps+D1@30 fps+CIF@30 fps+QVGA@30 fps+720p JPEG snapshot 1 fps
- JPEG snapshot of 3-megapixel@15 fps to 16-megapixel @2 fps
- MPEG4 SP encoding, a maximum of 960H resolution
- CBR, VBR, and ABR, ranging from 16 kbit/s to 40 Mbit/s
- Encoding frame rate, ranging from 1/16 frame/s to 60 frame/s
- ROI
- Color-to-gray

Intelligent Video Analysis
- Integrated intelligent analysis acceleration engine, supporting motion detection, boundary guard, face detection, and video diagnosis

Video and Graphic Processing
- De-interlace pre-processing, image enhancement, edge enhancement, and 3D denoise
- Anti-flicker processing for output videos and graphics
- 1/16x to 8x video scaling
- 1/24x to 42x image scaling
- OSD overlay pre-processing for eight areas during encoding
- Hardware graphics overlay post-processing for the videos at two layers (video layer and graphics layer 1)

ISP
- Adjustable 3A function
- WDR, highlight compensation, backlight compensation, gamma correction, and color enhancement
- Defect pixel correction, denoise, and digital image stabilizer
- ISP APIs for adjusting the ISP effect
- PC sensor and ISP tuning tools

Audio Codec
- Voice codec in compliance with multiple protocols by using software
- G.711, ADPCM, and G.726 encoding
- Echo cancellation

Security Engine
- AES, DES, and 3DES encryption and decryption algorithms by using hardware
- Digital watermark

Video Interfaces
- Input
  - 8-/10-/12-/14-/16-bit RGB Bayer input, a maximum of 150 MHz clock frequency
  - BT.601
  - BT.656
  - BT.1120, supporting the embedded synchronization and external synchronization modes
  - Compatibility with mainstream CMOSs provided by SONY, Aptina, OV, and Altasens
  - Compatibility with HD CCDs provided by Sharp and Panasonic
  - Compatibility with the 960H CCD sensor
  - Video inputs of 16-megapixel@2 fps, 5-megapixel@5 fps, 3-megapixel@15 fps, 1080p@30 fps or 720p@60 fps
  - Two input interfaces. Only one has the ISP function, and dual-sensor inputs are supported.
- Output
  - 1-channel CVBS output and one BT.656 output interface
  - One BT.1120 VO interface for connecting to the external HDMI or SDI interface, 1080p@30 fps

Audio Interfaces
- I2Sx2
- Integrated audio codecx1, 8- or 16-bit voice inputs and outputs
- Connection to the external audio codec, 8- or 16-bit voice inputs and outputs

Peripheral Interfaces
- UARTx4
- IRx1, I2Cx1, SPIx1 (master/slave mode), GPIOs, and PWMx6
- PCIe 1.1x1, EP and RC
- SDIO 2.0x2, maximum capacity of 32 GB
- USB 2.0 Hostx2, hub
- GMACx1, supporting RGMII and MII modes, 10 Mbit/s or 100 Mbit/s full-duplex or half-duplex mode, and 1000 Mbit/s full-duplex mode

External Memory Interfaces
- DDR2 or DDR3 SDRAM
  - 32-/16-bit DDR2/DDR3@500 MHz
  - Maximum capacity of 1 GB
- SPI/NOR flash
  - 1-, 2-, or 4-bit SPI/NOR flash
- NAND flash
  - 8 bits
  - SLC, MLC, and 1-, 4-, 8-, or 24-bit ECC
  - Components with 8 GB capacity or larger
- NOR flash or NAND flash boot mode

SDK
- SDK based on Linux 2.6.35
- High-performance H.264 PC decoding library

Physical Specifications
- Power consumption
  - Typical power of 1200 mW
  - Multiple-level power-saving mode
- Operating voltage
  - 1.0 V core voltage
  - 3.3 V I/O voltage, 2.5 V PCIE voltage, and 5 V tolerance voltage
  - 1.5 V or 1.8 V DDR2/DDR3 SDRAM voltage
- Ambient temperature
  - 20°C (–4°F) to +70°C (+158°F)
- Package
  - 416-pin FC-CSP
- 0.65 mm ball pitch and 15 mm x 15 mm body size

Functional Block Diagram
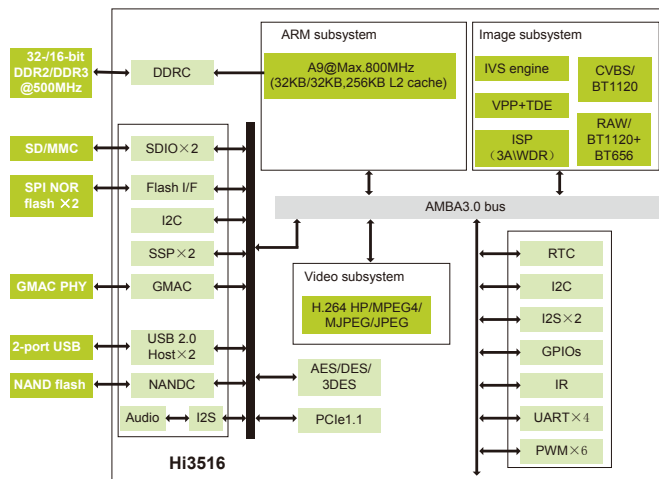
As the surveillance mode switched from the analog CCTV to DVR, networking, high definition, and intelligence gradually became essential features required in the development trend. The requirements on the high-performance (HP) IP camera are also defined. The Hi3516 is a professional high-end SoC based on the HP IP camera application. With the high performance of encoding H.264 streams (1080p@30 fps), high quality of ISP and encoded videos, and high-performance intelligent acceleration engine, the Hi3516 meets various requirements on function, performance, and picture quality of the IP camera. At the same time, the cost is reduced significantly.

Hi3516 IPC Solution with a Single Sensor
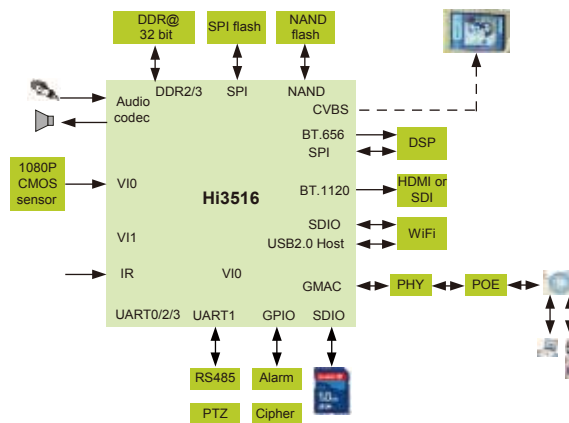
Hi3516 IPC Solution with Dual Sensors