Dual Mode PC Camera Processor



Sunplus Camera Solution

SPCA504A

Data Sheet

Version 0.2.1

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1. General description

The SPCA504A is a digital camera processor chip that provides a complete solution for dual mode camera applications. This chip integrates image sensor interface, digital video input interface, color image processor, storage media controller, JPEG image compression engine, USB interface, and a built-in micro-controller. The SPCA504A supports both CCD and CMOS image sensors up to 1.1M and 2.0M pixels respectively. It is designed to fulfill all the requirements for the dual mode camera applications. The SPCA504A camera processor chip includes not only the latest technology, but also the full services and support of Sunplus.

2. Feature

The main functions of the SPCA504A includes:

- DSC mode : capture one frame each time
- Video clip mode : capture a video with frame rate 15~30 frames/sec
- PC-camera mode : 30 frames/sec for CIF size, 20 frames/sec for VGA size

The SPCA504A chip has many image-processing functions that include:

- High quality color interpolation
- Two-dimensional edge enhancement
- Bad pixels concealment
- AE/AWB parameter windows cover full range of the sensor

The SPCA504A supports image CCD/CMOS sensors up to 1.1M/2.1M pixels. Some of them are listed below.

CCD

- VGA : Sharp LZ24BP, Sony ICX098AK, Panasonic MN3777
- XGA : Sony ICX204AK
- SXGA : Panasonic MN3778 (progressive)

CMOS

- VGA: HP HDCS2020, PHOTOBIT PB320, OMMNIVISION OV7620, HYUNDAI HV7131B, SHARP LZ34B10, PIXART PAS202, TASC TAS5130A, BIOMORPHIC BI8602, IC MEDIA ICM205DL, MOTOROLA SCM20014, National Semiconductor LM9627, Century Semiconductor CS2102
- SVGA: HYUNDAI HV7141B
- XGA : PIXELCAM PCS2112
- SXGA: Motorola MCM20027

The DRAM interface supports 16M bits and 64M bits SDRAM modules through a 16-bit data bus.

Audio functions that the SPCA504A supports include audio class, audio capture, audio record and playback.

- It supports bi-directional AC-link for audio record and playback.
- It supports MP3 decoder interface for MP3 decoding and playback.
- It supports microphone interface for audio record.
- It supports an IMA-ADPCM compatible ADPCM compression engine for audio compression.

In addition to the external SDRAM module, the SPCA504A supports many storage media. That include:

- NAND-gate flash memory (smart media card)
- NOR-type flash memory
- ATAPI interface (ATAPI CDRW, compact flash memory)
- SPI serial flash memory, both mode0 and mode 3 supported (MultiMediaCard)
- Next Flash serial flash memory
- SD Card

The SPCA504A supports JPEG image compression at YUV422 and YUV 420 chroma format. It can also compress BW (black-and-white) images. The output data format is compliant with JFIF bitstream format. An automatic scale-down function is included to fit in the display size under playback mode.

The USB interface supports following pipes to PC. They are:

- Video ISO-IN pipe : for video data transmission to the PC
- Audio ISO-IN pipe : for Audio data transmission to the PC
- BULK-IN pipe : for uploading image from the camera to the PC
- BULK-OUT pipe : for download image data, audio data, firmware, and MP3 data to the camera.
- INTERRUPT-IN pipe: For reporting status and events of the camera to the PC

The SPCA504A has a built-in 8032 micro-controller with 6K bytes of internal SRAM.

- It supports *ISP* (in-system-programming with 4K bytes of shadow space).
- It has built-in 64K bytes of mask ROM.
- It supports *LOW-POWER* mode and *IDLE* mode.

The SPCA504A has a built-in PLL to supply on-chip clock sources.
The SPCA504A is packaged in either 128-pin QFP or 160-pin LQFP.
The SPCA504A needs 3.3/2.5 dual power supply.

3. Pin description

3.1 Pin assignment for 160-pin package

