



凌陽科技
SUNPLUS

Preliminary

SPCA504A
Data Sheet

Dual Mode PC Camera Processor

Scatch

Sunplus Camera Solution

SPCA504A

Data Sheet

Version 0.2.1

SUNPLUS TECHNOLOGY CO. reserves the right to change this documentation without prior notice. Information provided by SUNPLUS TECHNOLOGY CO. is believed to be accurate and reliable. However, SUNPLUS TECHNOLOGY CO. makes no warranty for any errors which may appear in this document. Contact SUNPLUS TECHNOLOGY CO. to obtain the latest version of device specifications before placing your order. No responsibility is assumed by SUNPLUS TECHNOLOGY CO. for any infringement of patent or other rights of third parties which may result from its use. In addition, SUNPLUS products are not authorized for use as critical components in life support devices/ systems or aviation devices/systems, where a malfunction or failure of the product ult in significant injury to the user, without the express written approval of Sunplus.

Table of Contents

1. GENERAL DESCRIPTION.....	3
2. FEATURE.....	3
3. PIN DESCRIPTION.....	4
3.1 PIN ASSIGNMENT FOR 160-PIN PACKAGE.....	4
3.2 PIN ASSIGNMENT FOR 128-PIN PACKAGE.....	10
4. FUNCTIONAL DESCRIPTION.....	15
4.1 BLOCK DIAGRAM.....	15
4.2. CAMERA OPERATION MODES.....	16
5. PACKAGE - 160 PINS.....	17
6. PACKAGE - 128 PINS.....	19
REVISION HISTORY.....	20



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

Pin	Signal	Pin	Signal
1	prstpin	80	fmgpio2
2	1	81	fmgpio3
3	2	82	fmgpio4
4	3	83	fmgpio5 / ma12
5	4	84	fmgpio6 / ma13
6	5	85	fmgpio7
7	6	86	fmgpio8
8	7	87	fmgpio9
9	8	88	fmgpio10
10	9	89	fmgpio11
11	10	90	fmgpio12
12	11	91	dvss2
13	12	92	dvdd2
14	13	93	md15
15	14	94	md14
16	15	95	md13
17	16	96	md12
18	17	97	md11
19	18	98	md10
20	19	99	md9
21	20	100	md8
22	21	101	md7
23	22	102	md6
24	23	103	md5
25	24	104	md4
26	25	105	md3
27	26	106	md2
28	27	107	md1
29	28	108	md0
30	29	109	ovss2
31	30	110	ovdd2
32	31	111	p35
33	32	112	p34
34	33	113	p31
35	34	114	p30
36	35	115	p17
37	36	116	p16
38	37	117	p15
39	38	118	p14
40	39	119	p13
41	40	120	
42	41	121	
43	42	122	
44	43	123	
45	44	124	
46	45	125	
47	46	126	
48	47	127	
49	48	128	
50	49	129	
51	50	130	
52	51	131	
53	52	132	
54	53	133	
55	54	134	
56	55	135	
57	56	136	
58	57	137	
59	58	138	
60	59	139	
61	60	140	
62	61	141	
63	62	142	
64	63	143	
65	64	144	
66	65	145	
67	66	146	
68	67	147	
69	68	148	
70	69	149	
71	70	150	
72	71	151	
73	72	152	
74	73	153	
75	74	154	
76	75	155	
77	76	156	
78	77	157	
79	78	158	
80	79	159	
81	80	160	