ALLWINNER®

S3

High level of Integration Camera Solution

The Most Competitive Processor for 1080P Camera Product

Overview

The S3 processor represents Allwinner's latest achievement in video encoding processors, which integrates a single ARM Cortex™-A7 CPU that operates at speed up to 1.2GHz with supporting numerous peripherals. S3 processor also includes one built-in DDR3, and external memory interfaces to SPI NAND/Nor flash and SD/MMC，to reduce total system cost and enhance overall functionality ,the S3 has a broad range of hardware peripherals such as UART, SPI, USB HS/FS OTG ,TWI, EMAC etc.

H.264 encoder by 1080p@60fps enables the S3 to capture superior shots in motion with the fine details. To enrich camera feature and enhance image quality, S3 equips an 8M HawkViewTM ISP with advanced features like spatial de-noise, chrominance de-noise, zone-based AE/AF/AWB statistics, black level correction, lens shading correction, color correction and anti-flick detection statistics. Audio subsystem includes audio codec with dedicated hardware, and supports I2S/PCM interface for connecting to an external audio codec.

Highlights

Robust Video Engine, H.264 1080p@60fps or 2-CH encoding

Allwinner S3 comes with a high-performance and low bit-rate video engine that is capable of single-channel H.264 1080p@60fps encoding, or dual-channel 1080p@30fps encoding, or front & rear 1080p@30fps encoding.An advanced ISP is integrated to provide higher image quality.

High level of integration

Allwinner S3 integrates 1Gbit DDR3 which means the hardware and PCB design will be more easier，it also contain a wide range of connectivity and interfaces, including MIPI & parallel CSI controllers, RGB/LVDS LCD controller, audio codec, EMAC + PHY, etc.
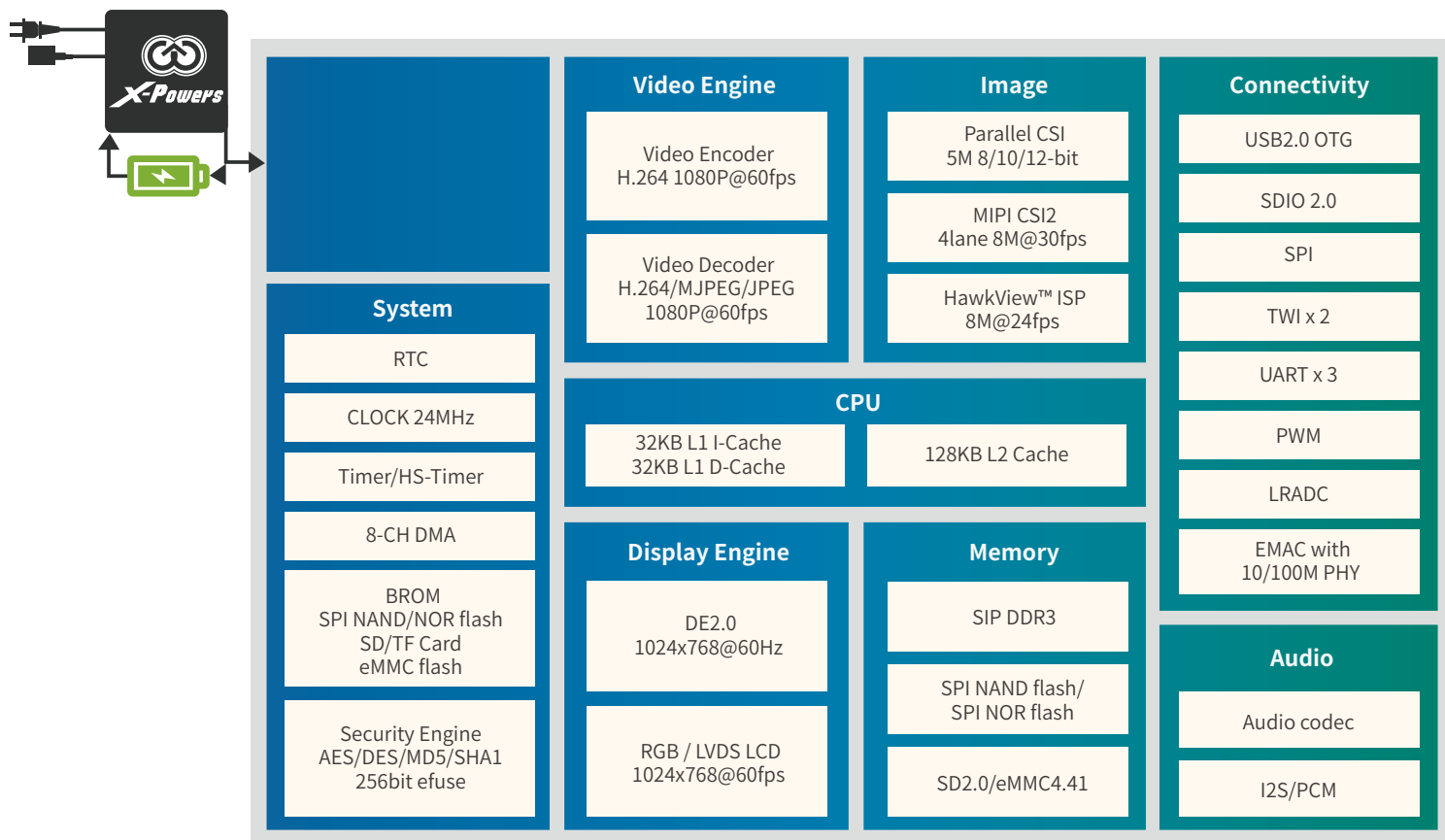
Low Power Consumption

Allwinner S3 runs is highly power efficient due to its leading fabrication process and optimized processor architecture design.

Features

CPU	• ARM® Cortex™-A7 @1.2GHz
Video Engine	• Supports 1080p@60fps or 2-channel 1080p@30fps H.264 video encoding, supports 8M JPEG encoding • Supports H.264 1080p@60fps decoding, MJPEG 1080@30fps decoding
ISP	• Integrated ISP up to 8M pixels • Supports two channel outputs for display and encoding respectively • Supports various input and output formats • Supports AE/AF/AWB • Supports saturation adjustment/ noise reduction/ defect pixel correction/distortion correction
Video Input/Output	• Supports 8/10/12-bit parallel CSI and 4-lane MIPI CSI2 • Supports BT1120 input • Supports up to 8M CMOS sensor • Supports RGB/i80/LVDS LCD up to 1024x768 resolution • Supports Allwinner's next-gen SmartColor display technology for better visual effects for images & videos
Memory	• SIP 16-bit DDR3, up to 1333Mbp
Audio Codec	• Integrated 92dB audio codec • Supports two ADC channels and two DAC channels • Supports 3 MIC-in, a stereo Line-in, a headphone output and a stereo line-out output
Security Engine	• Supports AES/DES
Connectivity	• 3 x SD card controllers • LRADC/SPI/TWI/UART/PWM • USB, EMAC+PHY
OS	• Supports Camdroid OS, an Android-lite operating system • Supports Linux OS
Package	• FBGA 234 balls, 11mm x 11mm size, 0.65 pitch

Block Diagram

X-Powers

Video Engine

Video Encoder
H.264 1080P@60fps

Video Decoder
H.264/MJPEG/JPEG
1080P@60fps

Image

Parallel CSI
5M 8/10/12-bit

MIPI CSI2
4lane 8M@30fps

HawkView™ ISP
8M@24fps

Connectivity

USB2.0 OTG

SDIO 2.0

SPI

TWI x 2

UART x 3

PWM

LRADC

EMAC with
10/100M PHY

System

RTC

CLOCK 24MHz

Timer/HS-Timer

8-CH DMA

BROM
SPI NAND/NOR flash
SD/TF Card
eMMC flash

Security Engine
AES/DES/MD5/SHA1
256bit efuse

CPU

32KB L1 I-Cache
32KB L1 D-Cache

128KB L2 Cache

Display Engine

DE2.0
1024x768@60Hz

RGB / LVDS LCD
1024x768@60fps

Memory

SIP DDR3

SPI NAND flash/
SPI NOR flash

SD2.0/eMMC4.41

Audio

Audio codec

I2S/PCM