

Digital Camera Processor

DVD

Digital TV

Imaging

IP Cores

Mobile

ZR36450/2/5
Product BriefZoran Corporation
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www.zoran.com**Description**

The COACH 7 is an integrated, application-specific signal processing IC, managing still and video signals in digital cameras. Optimized for entry-level to high-end camera ranges from COACH 7 provides a

complete, cost effective, and low power solution for digital camera manufacturers.

Features

COACH 7 is available in several options

- COACH 7e (part number ZR36450) - Entry line, 12-bit color
- COACH 7p (part number ZR36452) - Performance line, 16-bit color and embedded TG
- COACH 7MCM (part number ZR36455) - TBD

**All chips are firmware compatible and share a majority of the system configuration allowing easy migration and support up to 16M pixel sensors*

Feature List

- 32-bit MIPS CPU for easy development and porting of SW applications
- Up to 16Mega Pixel image resolution
- MPEG capture and playback of VGA 30 frames/sec including audio. Supports most formats including ASF, DivX, AVI and MOV
- Audio
 - Embedded audio D/A and A/D; CD quality, 44.1KHz, 80DB quality
 - Embedded microphone and speaker amplifiers - glue-less interface to microphone, speaker
 - Programmable compression: ADPCM; MPEG1 Ly 2 and others
- Click-to-Click performance of less than 250msec for 4MP resolution
- Sensor support
 - Direct glueless interface to all standard CCD and CMOS sensors (including multi-field)
 - New "VGA Movie" mode of Panasonic, Sony and Sharp CCD sensors
 - External TG and 16-bit CCD analog front end (CDS-AEF)
 - Embedded TG to support CCD sensors from Matsushita, Sony and Sharp
- On-chip advanced 16-bit CCD signal processing features:
 - Anti Lens Shading filter (Patent pending)
 - White Balance Correction
 - Programmable Gamma LUT
 - Bayer Grid Color Filter Array (CFA) reconstruction
 - Automatic real time peak-noise and defective pixels correction (Patent pending)
 - CCD noise suppression - CFA grid noise, Black noise and Color aliasing suppression
 - Color matching, advanced color space conversion and Luminance Correction
 - Automatic Focusing (AF), Automatic White Balance (AWB) and Automatic Exposure (AE).
 - Additional Zoran patent-pending technology is employed
- Image enhancement and manipulation for enhanced viewing and printing.
- High quality 16x to 1/16x scaler with smooth zero-overhead up to 16x zoom in all modes
- Real time L/R, U/D image flip
- On-chip support for flashcontrol, including red-eye reduction.
- Direct interface to resident flash memory (NAND or NOR type) and/or removable memory cards (CompactFlash - CF), SmartMedia (SSFDC), Secure Digital (SD), MultimediaCard (MMC), xD, Memory Stick, Memory Stick Pro (MS-Pro) and DRAM storage.
- Supports single 16-bit data width DDR-DRAM of, 64Mbit, 128Mbit, 256Mbit and 512Mbit.
- High speed JPEG compression/decompression of 27M pixel/sec
- ZI2C, Serial Port (SP), SCP for RS-232 and on-chip EJTAG port for debugging probe
- On-chip 2.0 High-Speed USB OTG interface, including USB line driver.
- Micro controller functionality integration
 - On-chip 7-inputs successive approximation 12-bits ADC with 100k samples/sec.
 - Embedded Real time clock (RTC)
 - Over 40 GPIO and special DAC (PWM) pins. Some GPIO signals are multiplexed with unused pins.
 - On-chip general pattern generator for motor control support with 16 PWM outputs.
- 32 color-on screen display (OSD) with 4 transparency levels and 2 display highlight rectangles
- Direct output to TV monitor (CVBS format), no need for NTSC/PAL encoder or video DAC.
- Digital video output to interface for all standard digital LCDs including on-chip programmable controller with quantization noise reduction filter
- SW download from USB/UART, NAND/NOR and all card types.
- Special PWRC block to cost-effective camera power supply design with direct connection to 1.6V-3.6V battery supply, on-chip control for power sequence and low battery indication

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- Firmware highlights
 - Embedded host control (HCE) software architecture allows the creation of DSC applications with minimal effort. backward compatibility Traditional COACH software API
 - Open firmware architecture allows easy customer modification to base software modules
 - Advanced bit rate control guarantees tJPEG compression size
 - All standard camera operation modes including live preview, still image capturing, capturing of AVI and MPEG video clips, playback of images and video clips, thumbnails preview mode, menu and others
 - Fully customizable, high performance DCF 2.0, EXIF 2.2 and DPOF 1.1 support
 - Image Editing
 - Image playback allows up to 16x digital zoom, accelerated playback and image rotation
 - Advanced GUI support including
 - YUV 4:2:2 and 5-bit OSD color spaces with resizable, multi-color fonts
 - Shapes and images drawing including circles, rectangles, bitmaps, jpegs and other
 - Virtual mode, for automatic fitting of the customer graphics to actual display size, thus significantly decreasing the effort of GUI developer
 - Picture-in-Picture support for creating multiple image layers in image playback and live preview. For example allows panoramic support mode implementation
 - Audio support includes multiple audio recording formats support including MPEG-1 layer 2, ADPCM, uLaw and others. Optional audio annotation of pictures, playback and recording of sound in AVI clips, Sound effects, including shutter effects and Dictaphone feature
 - Variety of protocols for USB interface supported include PC Video Capture, WIA, Twain, Twain 2, Bulk-Only Mass Storage, PTP, Pictbridge
- Extensive set of PC tools and drivers
- 3.3V I/O power supply
- 2.5V DDR I/O supply
- 1.8V Core power supply
- 1.6V-3.6V battery supply
- 272 and 324-pin 17x17 BGA package (TBD)



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