COACH™ 5
Digital Camera Processor

ZR36430/ZR36431
Product Brief

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Overview

Zoran's COACH 5 is the fifth Camera On A CHip (COACH) digital camera processor. COACH 5 is firmware compatible with previous COACH processors, thus instantly providing a mature camera development platform. COACH 5 is offered in two versions: COACH 5e (ZR36430), supporting up to 2.3 Megapixel sensors, and COACH 5p, (ZR36431) supporting up to 4 Megapixel sensors. For the camera developer, both versions have identical features and interface sets. The two versions provide cost effectiveness across the entry level and mid-range digital camera market segments.

The COACH 5 includes all required hardware and firmware to support: two- and three-field interlaced sensors, progressive sensors, CMOS sensors, View-LCD display, TV output, Flash Memory of all types, USB, RS232, and stereo/speech audio recording/playback.

The COACH 5 digital camera processor offers value and performance due to its flexible and programmable architecture that supports a wide range of camera designs. COACH 5 eliminates the need for an external microcontroller. Internal A/D converters and additional general-purpose IO pins were added. User Interface software can be implemented within the COACH 5. Rom/Nor-type devices are no longer needed and the COACH 5 program can be stored on the same resident Nand-type flash memory used for image storage. Three-field CCD support, lens shading compensation (Patent Pending) and a smooth digital zoom allow significant cost savings for sensor and optics.

COACH 5 emphasizes image quality with true 10-bit enhanced sensor processing.

The COACH 5 comes with a complete development package that includes a "manufacture-ready" CamMini reference design, a comprehensive set of software development tools, and WHQL approved PC drivers.
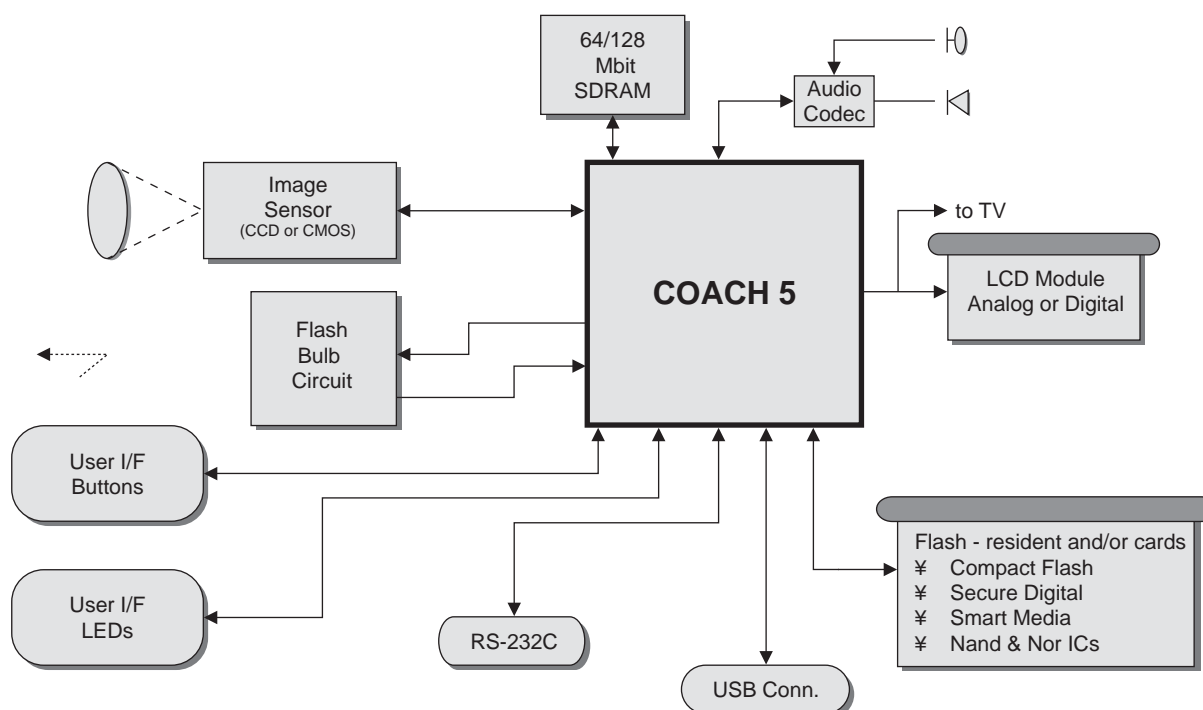

Figure 1. Camera System Block Diagram

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Features

• Direct glueless interface to industry standard interlaced (two- & three-field) and progressive CCD and CMOS sensors
• Supports image resolutions up to 2.3 Megapixels for COACH 5e and up to 4 Megapixels for COACH 5p
• Enhanced CCD signal processing with
  - 10-bit processing for high dynamic range
  - Color interpolation and conversion
  - Image scalers
  - Automatic White Balance (AWB)
  - Automatic Exposure (AE)
  - Edge enhancement
  - Programmable Lens Shading (Patent Pending) compensation
  - Performance enhancement when using Zoran's CMOS sensor

• Smooth Digital zoom – complete emulation of optical zoom (view and capture)
• Support for flash-strobe, light-control, red-eye reduction & flash-charge control
• Direct interface to resident flash memory and/or removable flash memory cards: CompactFlash (CF); SmartMedia (SSFDC); SD, MMC, and others
• Support 64Mbit & 128Mbit SDRAM (16-bit width) frame buffer
• Internal A/D for monitoring battery status & flash bulb charge, and for sensing camera buttons
• USB interface, including on-chip USB line drivers

• Real-time JPEG compression with advanced bit rate control ensures superior visual quality for the required number of stored images
• Capture of a sequence of still images
• Movie (AVI, with compressed audio) capture and playback to the Flash card, at a rate of up to 25 frames per second
• Video Capture Mode - capture CIF at 30 frames per second or VGA at 15 frames per second real-time video (MJPEG compressed) to a PC via USB
• Audio CODEC support, allows for audio annotation, dictaphone and AVI capture
• User interface implemented within the COACH eliminates the need for an additional microcontroller
• Analog and digital LCD support
• On-chip NTSC/PAL encoder provides direct analog output to a TV monitor
• DCF compliant, DPOF support, EXIF 2.1 image and audio file format
• Font-based (3-bit colors) and graphics based OSD (On Screen Display) engines for displaying user-interface messages, menus and icons on the LCD/TV. Menu of 64k colors.
• Programmable DSP engine ensures seamless upgrades through downloadable firmware
• Programmability for image processing algorithms
• Advanced power management
• 208-pin uBGA package
• Mass Storage Bulk in only mode - Only Plug and Play drivers required; does not require drivers for WinME, 2000, or XP

Evaluation and Development Tools

Data Book - complete specifications and description of the COACH
COACHWare - high level API for host software implementation of the user-interface. This comes wih API specifications.
FontMapMaker - for font map and icon creation
CamMini 5- manufacturing ready reference design - complete 1.3 Megapixel camera system (hardware & firmware)
PC connectivity - WHQL approved USB driver kits for image transfer and video capture

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