

DVD Recorder
System-on-a-Chip + RF Amplifier

DVD

Digital Camera

Digital TV

Imaging

IP Core

Product Brief

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Activa 220 / 230 + Activa 250 Benefits Overview

Zoran's Activa 220 is a DVD Recorder System-on-a-Chip Multimedia Processor that integrates a high performance, all-digital read/write front end (write strategy, DSP, and servo controller) and high quality back end (DVD playback, DVB demultiplexing and decode, and MPEG encode). Activa 220 has direct interfaces to multiple Optical Pickup Units (OPUs) via the Activa 250 RF amplifier chip.

The Activa 220+250 chipset is designed to deliver a broad portfolio of cost-effective products, from entry level Optical Disc Drive (ODD)-only systems to combo systems (e.g., ODD+Hard Disc Drive (HDD), ODD+VCR, and ODD+TV). All Zoran Activa 220/250-based recording solutions are 100% application and middleware software compatible with previous generation products, providing a turnkey solution that reduces product development cycles.

Zoran's Activa 220+250 based DVD recorders provide:

- Support for DVD recording formats (DVD+R/+RW, DVD-R/-RW)
- Intuitive, easy to use On Screen Display (OSD) for multiple devices (ODD, HDD, flash card, etc.)
- Convergence solutions for DVDR+DTT and Networking
- Customizable HW/SW platform for next generation application development
- 100% compliance to DVD-video, -VR, and +VR verifiers
- Native RGB input recording

The Activa 220+250 chipset is specifically designed to support standalone DVD recorders with support for value-added applications including:

- Multiple file format support, including MPEG-4 and DivX
- HDD/PVR functionality
- HDMI Digital Output w/HDCP, HD-JPEG
- USB Connectivity to digital cameras, printers and storage devices
- Flash Card Connectivity
- EPG services including Gemstar and tvtv
- YesDVD authoring

The Activa 220+250 solution is tuned for multiple Optical Pickup Units (OPUs) and media types allowing OEMs to develop differentiating features in the application software.

The Activa 220+250 chipset is the ideal IC solution for DVD Recorders, Digital Entertainment Media Centers and combo DVDR systems (DVDR+HDD, DVDR+DTT, DVDR+VCR, DVDR+TV, DVDR A/V Receiver).

The Activa 230 adds to the Activa 220 features dual Digital Video Broadcast Terrestrial and Satellite (DVB-T/S) support for a high performance European solution.

The Activa 220 and 230 are footprint and software compatible.

Features

General

- System-on-a-Chip solution for DVD recorder/player
- Digital Front End (DSP, Servo, Write Strategy)
- Back End (MPEG Encoder, DVD Decoder, DVB Demultiplexer and Decoder)
- Unified Memory Architecture
- Powerful 162 MHz 32-bit RISC CPU enables next generation applications
- Intuitive DVDR application and user interface
- Enables time-shift and "Watch and Record" applications

Recording

- Real time, 100% compliant DVD-Video, DVD-VR, and DVD+VR authoring
- Rich DVD-Video menus with Thumbnails
- Supports DVD-R/-RW/-RAM/+R/+RW, CD-R/-RW formats
- Certified Dolby Digital Consumer Encoder
- VCPS, CPRM content protection
- 124-10 Mbps VBR/CBR (2-/4-/6-/8-hr record modes) bitrates
- DV25 Decode, Real-time Transcode to MPEG
- 256Mb to 512Mb SDRAM configurations

Digital Video Decoder

- DVD-Video, DVD-Audio, CVD, SVCD, VCD, CDDA Decoding
- DivX 3.11/4.x/5.x/6.x(Ultra), XviD full-D1 (with QPEL and GMC)
- MPEG-4 Advanced Simple Profile Level 5 (720x480 @ 30fps)
- Glueless HDMI i/f to ZR36721 (HD Xtreme)
- JPEG Xtreme enables image display at true HD resolution w/ZR36721

Analog Video

- NTSC/PAL/SECAM/480P/576P analog video encoder with five 12-bit/108Mhz video DACs
- Horizontal Resolutions: 720, 704, 544, 480, 360, 352
- 3-field de-interlacing, de-blocking and de-ringing filters
- Simultaneous interlaced/progressive video output with independent OSD control
- Embedded NTSC/PAL Video Decoder with Time Base Correction (TBC) and 3D Y/C Separation
- Input video noise filtering (horizontal, vertical, temporal)
- Closed Captioning/Teletext/EPG VBI Bitslicing/Decoding and Insertion
- Input analog video: RGB, CVBS, or Y/C
- Picture-in-Picture for external source preview

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Driving the Digital Lifestyle

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Features Description (continued)

Audio

- Dolby Digital Consumer Encoder, MPEG Audio Encoding with Programmable Audio DSP
- Input Digital Audio: 2ch, 16-bit, 32/44.1/48kHz
- Output via I2S interface: 5.1+2ch, 24-bit, up to 192kHz
- Output Analog Audio: stereo class D outputs

Graphics

- High quality 16bpp OSD
- 4bpp alpha transparency

Interfaces

- 2 x Transport Stream Inputs for DVB-T/DVB-S (Activa 230 only)
- Smart Card and CIM Support (Activa 230 only)
- ATA33 w/UDMA for 8x dubbing from HDD to optical drive
- Embedded USB 2.0 FS link + phy
- Embedded 1394 link
- Glue-less interface to flash cards (MS, SD, CF, SM, MMC)
- Generic host bus interface
- UART, GPIO Interfaces
- EJTAG Support

Other

- 32-bit DDR 333 SDRAM
- PBGA-456 Green (also Pb-free) Package
- 4 W Power Consumption (<1 W Standby Mode)
- Part number: ZR35220HGCG (Activa 220)
ZR35230HGCG (Activa 230)

Activa 250 RF Amplifier Features

- Performance
 - DVD+R/-R - Up to 8x writing speed
 - DVD+RW/-RW - Up to 4x writing speed
 - CD-R/RW - Up to 24x writing speed
- Single and dual layer media support
- Broad DVD writable OPU support
- Glueless interface to Activa 220/230
- Complete analog front end for servo, RF channels and write strategy processing
- Laser power control for read and write
- Reference voltage generation
- 9 general purpose ADC inputs, and 7 PDM DAC outputs
- LVDS and single ended EFM OPU interface
- 16 GPIO pins
- LQFP-208 Green (also Pb-free) Package
- Part number: ZR35250ELCG

MPEG Video Encoder

The MPEG Video encoder supports real-time encoding into MPEG-2 formats. With programmable spatial and temporal preprocessing filters, the user can shape the incoming video to optimize the MPEG encoding. The horizontal decimator allows for a wide range of horizontal encoding resolutions: 352, 360, 480, 544, 704, and 720. Programmable horizontal resolution, along with the bitrate, provides great flexibility in optimizing the encoded video quality versus storage time. The encoder supports recording of 2/4/6/8 hours on a single layer DVD+/-R disc.

Automatic scene change detection and variable/constant bit rate processing consistently deliver optimal video quality over a variety of input video quality and content during encoding

The Activa 220 enables the watch and record class of applications, allowing the user to view one program while recording another. Zoran has enabled PVR (timeshifting and pausing live TV) on HDD and rewritable optical media. In addition, Activa 230 also enables watch/record of DVB-T/DVB-S programs.



Features Description (continued)

Programmable Audio DSP

The programmable audio DSP encodes or decodes in real-time Dolby Digital Consumer Encoder (DDCE), MPEG1-L2, MP3, and WMA formats.

DV25 A/V Decoder

The DV25 decoder decompresses the 1394/DV camcorder input. The decoded data can be real-time transcoded to MPEG-2 and be previewed on the PIP. Activa 220 provides convenient, direct control of 1394/DV camcorders using the DVD recorder remote control. This feature facilitates an integrated environment for simple editing and archiving of home movies.

Analog Video Decoder with 3D Y/C, TBC

The embedded analog video decoder supports decoding of NTSC, PAL, and SECAM TV signals. Inputs of RGB, S-Video, and composite video signals are supported. For best quality recording, native recording from RGB inputs is supported. For composite signal input, a high quality, programmable 3D Y/C separation circuit partitions the luma and chroma signals. To compensate for video artifacts from unstable sources such as a VCR, a time-base correction circuit resynchronizes the video signal prior to the MPEG encoding process.

VBI Bitslicing and Decoding

The Activa 220 offers a programmable circuit for hardware Vertical Blanking Interval (VBI) bitslicing. Hardware VBI and VPS/PDC bitslicing is important for extracting closed captioning, electronic program guide (EPG), Teletext, widescreen signaling, and other VBI standards efficiently, without burdening the CPU.

Digital Video Broadcasting

The Activa 230 supports two transport stream inputs in DVB-T/DVB-S format. Free-to-Air broadcasts are natively supported in the Activa 230, while PayTV broadcasts are supported by attaching an external Smart Card or Common Interface Module. Many simultaneous scenarios are supported, including watching one program while recording the other, or watch a DVD while recording a digital broadcast in the background.

DVD Playback Processor

The Activa 220 leverages the robust design of the Zoran Vaddis line of chips, providing full support for DVD-Video playback, DVD-Video and DVD+/-VR authoring, and copy protection. The DVD processor performs DVD demultiplexing and parsing, MPEG-1/2/4/DivX video decoding, subpicture decoding, highlight processing, and audio/video synchronization.

Integrated support for Content Protection for Prerecorded Media (CPPM) and Content Protection for Recordable Media (CPRM). The graphics processor and OSD units provide great flexibility in creating sophisticated EPG and user interfaces, which are easier to use than competing solutions.

A unique capability of the Activa 220 is the ability to deliver high quality, intelligible, 1x-2x variable audio playback while in fast forward mode, allowing the consumer to view a movie faster than real-time.

DVD Recorder Processor

The Activa 220 is the core component of a digital recorder system. With 256Mb-512Mb of DDR SDRAM support and integrated RISC CPU, real-time authoring of DVD-Video and DVD+/-VR is simplified. The larger memory also allows for various watch and record options, like best quality variable bitrate (VBR) encoding simultaneous with DVD disc playback, and HDD playback with DVDR disc record. The flexible Activa 220 architecture supports DVD-R/-RW/-RAM/+R/+RW and CD-R/-RW formats.

Video Content Protection System (VCPS) and Content Protection for Recordable Media (CPRM) modules are provided. Additional proprietary security is provided for protecting content stored HDD and delivered via a network.

The high-performance ATAPI w/UDMA interface allows up to two drives (HDD and optical), allowing multiple product SKUs by changing the drives and software.

DivX Decoding

Activa 220 has hardware accelerators for optimal DivX decode performance and compatibility and can play streams up to 10Mbps at up to 720x480/30fps. With support for Quarter PEL (QPEL) and Global Motion Compensation (GMC), Activa 220 provides full compatibility with high resolution streams. Activa 220 is Home Theater Level Certified with DivX.

HDMI Output I/F

High Definition Multimedia Interface is an emerging display standard to allow direct digital high definition connections between the DVD recorder and the display. When used with the Zoran's companion HDXtreme IC (ZR36721), Activa 220 based products deliver a stunning high definition video quality from standard definition content. In addition, JPEGXtreme allows the viewing of JPEG images in native HD (2MP) resolution.

MaestroLink Networked Multimedia

The Activa 220's powerful bitstream processing capabilities make it ideal for a digital recorder-centric A/V client or server, I.E. Zbox, enabled by Zoran's MaestroLink technology. Video-on-demand and home networking are also supported.

DVD Authoring

Activa 220's authoring software enables easy real-time archiving of home movies from DV tape onto DVD disc or HDD. Formatting to DVD-R/-RW/-RAM/+R/+RW is supported. All logical formats for DVD recording (DVD+VR, DVD-VR, and DVD-Video) are supported.

Interfaces

Activa 220 concurrently outputs progressive and interlaced video, with OSD optionally displayed allowing simultaneous viewing of progressive video to TV while dubbing to VCR.

Application Programming Interface

The Activa 220 is accessed via a simple but powerful application programming interface allowing quick time to market. Parameter driven commands such as start encode and stop encode enable OEMs to develop a rich feature set for digital recorder products.

Activa® 220 / Activa® 230 + Activa® 250

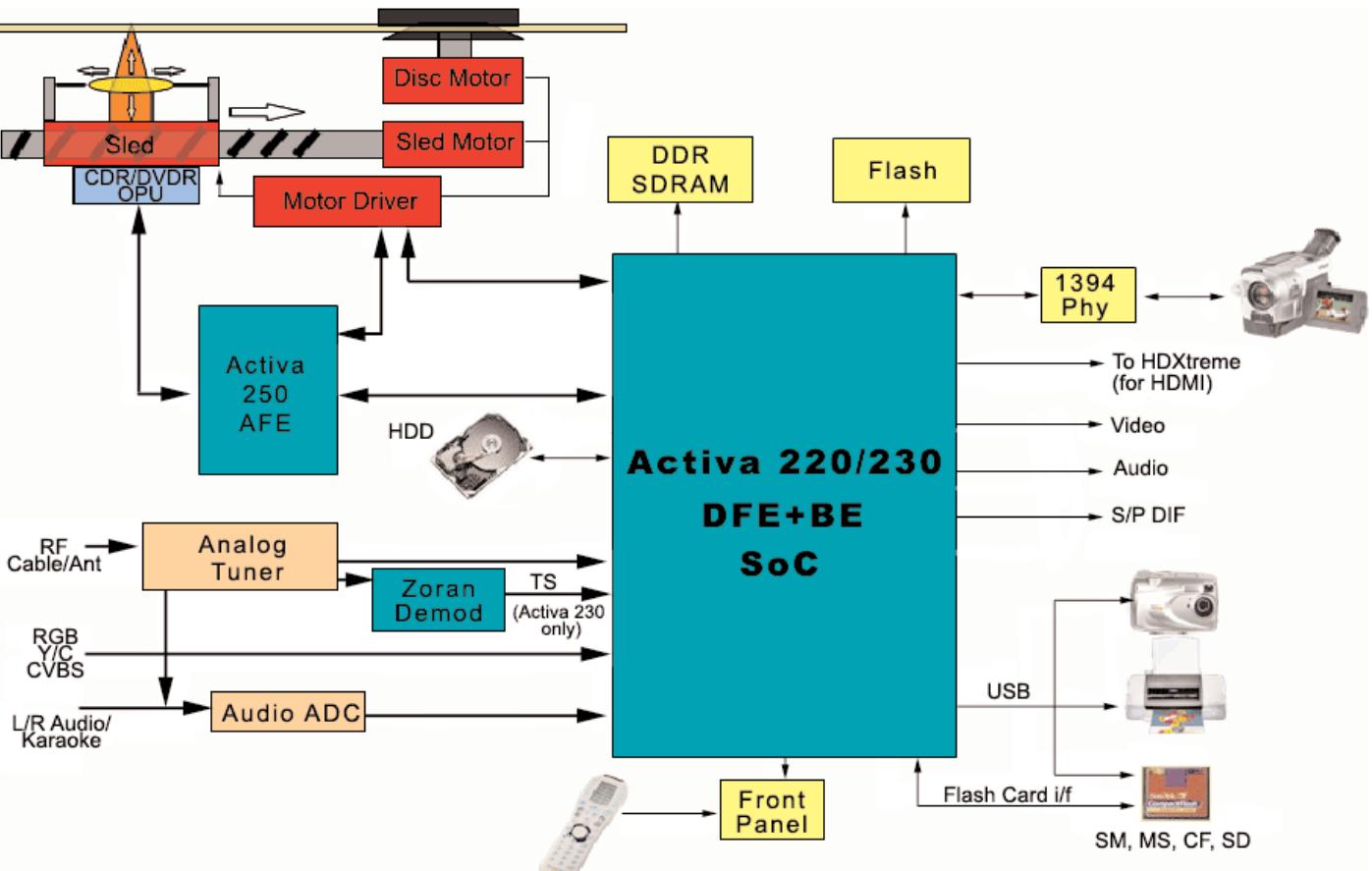
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Activa 220/230 + 250 DVD Recorder Reference Design



For more information, contact Zoran's Sunnyvale office or the office nearest you:

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