Digital Entertainment

VLSI Technology

VES6200

MPEG-2 Decoder Controller

Preliminary

OVERVIEW

The VES6200 integrates an MPEG-2 video decoder, an MPEG-2/AC-3 audio decoder, a 108 MHz ARM7 RISC processor, a high-performance graphics engine, a DMA controller and an NTSC/PAL/SECAM video encoder. In addition, the VES6200 supports an external CPU and a port for external audio/video capture.

When used with the companion VES2750, the two devices deliver a high-performance, low cost digital video design solution easily adaptable to all major world broadcasting standards and delivery modes.

The MPEG-2 video decoder decodes MP/ML and MP/SL data in PES and program stream format. The MPEG decoder can optionally decode video clips inserted by the CPU.

The audio block decodes MPEG-1/2 and Dolby™ AC3 audio. The audio can be routed to external audio DACs and to the IEC958 port. The chip supports PCM audio which may be mixed with decoded audio.

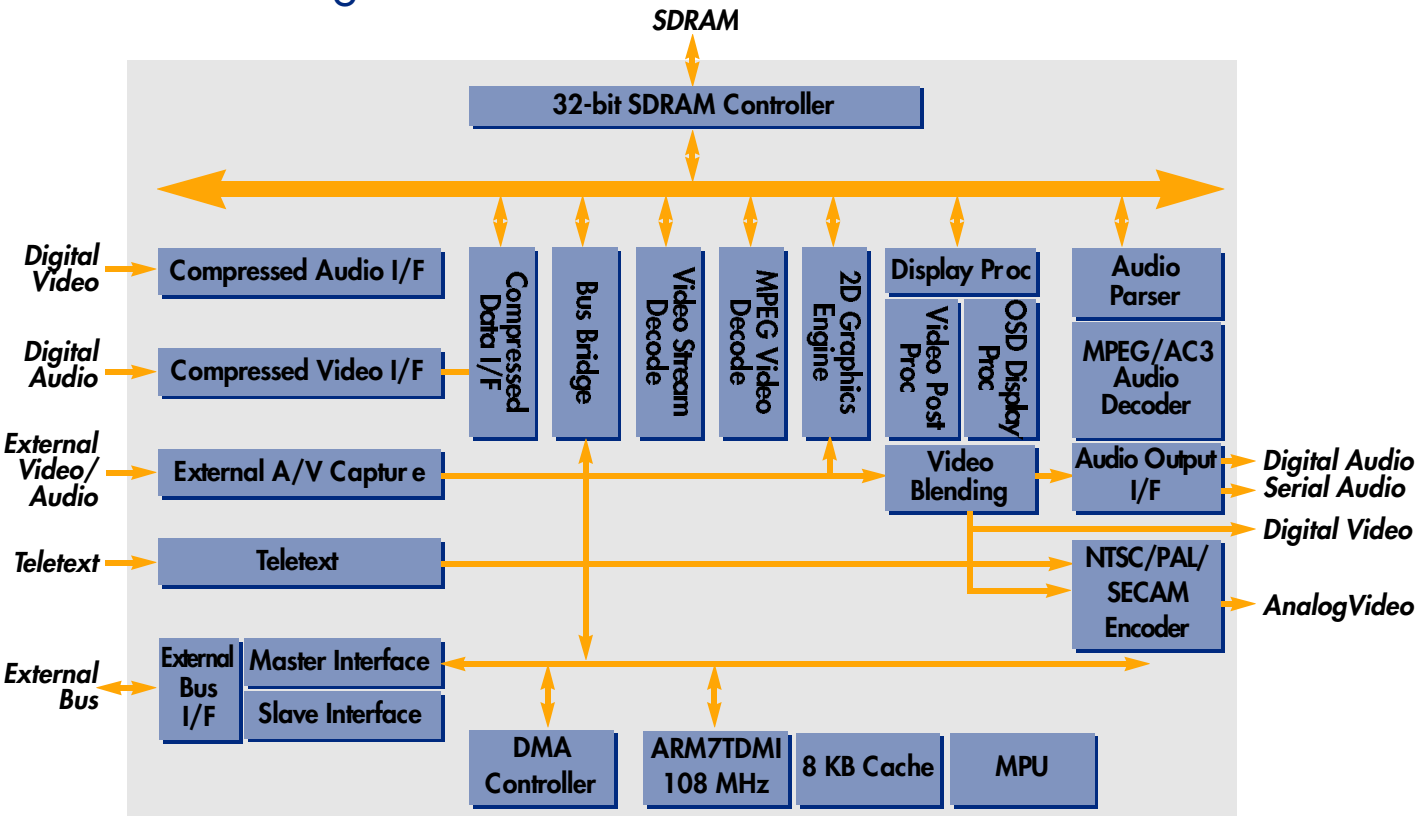
The embedded ARM7 CPU runs at 108 MHz, includes an 8 KB cache, memory protection unit (MPU), and supports the 16-bit ARM "Thumb" compact instruction mode.

The VES6200 includes a unified SDRAM controller. It can operate in 2 MB of SDRAM and can be expanded to 32 MB. The external bus interface unit can access devices such as Flash memory, ROM, SRAM, and other peripherals. In the slave mode, this same interface is reconfigured as a host interface for an external CPU. The VES6200 includes a 4-channel scatter-gather DMA controller for high-speed access to the VES2750 and other high-speed external peripherals. Five external interrupts are available.

One of the key differentiators of the VES6200 is its powerful graphics and video processing capability. This function is implemented in four modules: graphics accelerator, external video capture, plane compositor, and an anti-flicker filter.

The video encoder supports NTSC, PAL, and SECAM standards. Two-times over-sampling of the output signals assures the highest quality composite output signal. Five 10-bit resolution output DACs have also been integrated. The encoder includes close-caption and teletext insertion and Macrovision™ copy protection.

Block Diagram



Preliminary

FEATURES

MPEG-2 Video Decode

- Fully compliant to MPEG-1 (ISO 11172-2) and MPEG-2 (ISO/IEC 13818-2) MP/ML and MP/SL video standards
- Video resolution up to CCIR601/656 – 720x480 for 30 Hz systems, 720x576 for 25 Hz systems
- Handles compressed data rate of 20+ Mbps (100+ Mbps peak)
- High-level commands and trick modes supported
- Error detection and concealment
- Pull-down frame rate conversion for 24 Hz encoded movies

Audio Decode

- MPEG-1 and MPEG-2 audio (ISO/IEC 13818-3) two-channel stereo, layer 1, and layer 2
- Dolby AC-3 decoding: 2-channel down-mix Class A decode with optional ProLogic™ encoding
- Supports 16, 22.05, 24, 32, 44.1, 48 kHz sample rates
- Detects and conceals errors
- Serial output format
- I²S format (optional), Digital audio output (IEC958)
- Support for PCM audio via host or external audio-capture port
- Audio mixing: MPEG/AC3 audio with PCM audio
- Independent gain control on PCM and decoded audio
- Automatic and manual synchronization modes

ARM Subsystem

- 108 MHz 32-bit pipelined ARM7TDMI RISC CPU
- 8 KB 4-way software configurable unified cache
- Special 16-bit instruction-set mode for higher code density (Thumb)
- Integrated multiplier
- Embedded in-circuit emulation for source-level debug via JTAG
- Memory protection unit (8 regions)
- Write buffer (4 level)

Memory/Bus Interfaces

- Configurable pipelined 32-bit SDRAM controller with support for 2 MB - 32 MB memory
- External bus interface supports 8 devices with 16 MB of memory space each
- 5 external interrupts
- 4 channel scatter-gather DMA controller
- In slave-mode, the external bus interface can be used with an external processor
- Watchdog timer

Graphics Subsystem

- Powerful 32-bit BitBLT engine that supports copies, blends, color fills, scaling, chroma-key, and color space conversion for accelerating font rendering
- Video capture of 4:2:2 video with scaling and color conversion
- Support for five planes: still, video, OSD background, OSD, and hardware cursor
- 1/2/4/8-bits/pixel, RGB16, and true-color 4:2:2 OSD Bitmap
- CLUT entry in 8:8:8:8 format
- Support for RLE compression on 2/4/8-bits/pixel bitmap
- 8-bit alpha blending per region
- 8-bit alpha blending per color
- Anti-flicker support
- Arbitrary scaling of video and still with horizontal and vertical filtering
- Flexible blending modes for the five planes with alpha blending
- Supports picture-in-picture of decoded video and captured video

Video Encoder

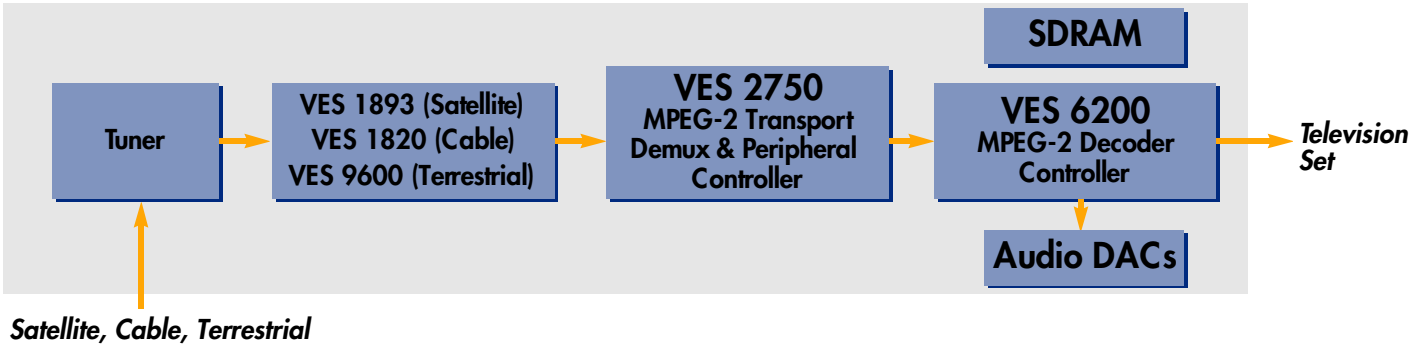
- Digital video encoding
- Supports PAL, NTSC, or SECAM
- Internal digital subcarrier synthesizer
- Five10-bit resolution DACs
- Macrovision 7.01 anticopy protection
- Close-caption and Teletext insertion support
- Simultaneous S-Video/Composite and RGB outputs
- 2x oversampling of DAC output signal
- Complete on-chip video timing generator

Technology

- 0.20µm process technology
- 256 pin BGA package

ViSTA '99 Evaluation Kit

- Horizon II board
- ViSTA API
- pSOS port
- JumpStart & JEENI developer tools



For update information, please visit our website at http://www.vlsi.com
or call the Worldwide Headquarters at +1-408-434-3100
or the European Headquarters at +49/89/627 06-0

VLSI Technology, Inc.
1109 McKay Drive
San Jose, CA 95131
USA