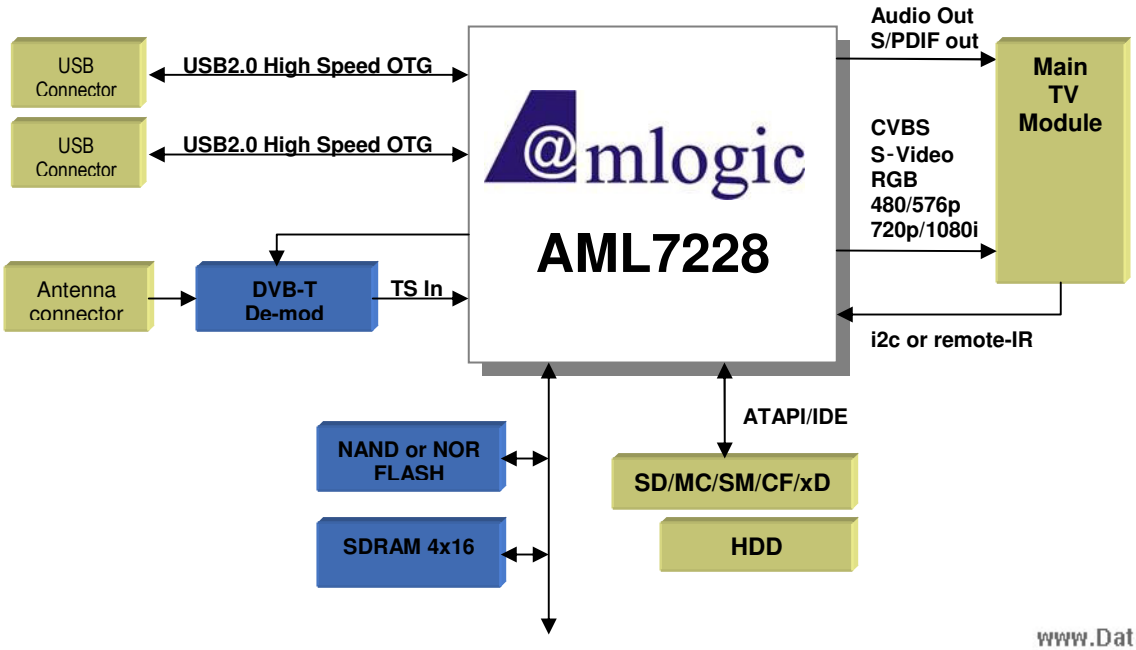
Product Brief AML7228

ADVANCED AUDIO/VIDEO PROCESSOR FOR LCD TV AND PLASMA TV

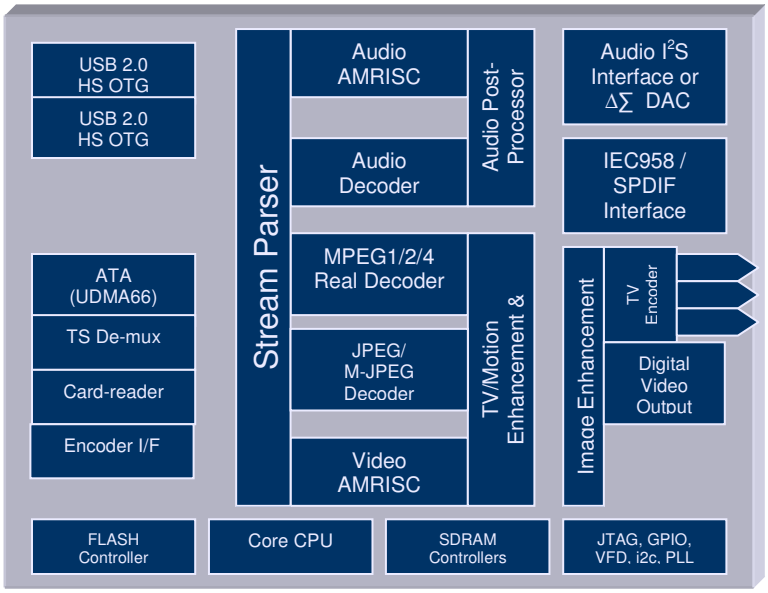
FEATURES

- **RealVideo Decoding**
  - RealVideo 8/9/10 Decoding
  - Supports *.rm and *.rmvb file formats
- **MPEG 1/2/4 Decoding**
  - MPEG-4 (DivX compatible)
  - MPEG-2 ML/MP conforming to ISO-13818
  - MPEG-1 ML/MP conforming to ISO-11172
  - Multiple language and multiple formats DivX sub-title support
  - Supports *.mpg, *.mpeg, *.dat, *.avi and *.mp4 file formats
- **JPEG/M-JPEG Decoding**
  - Super fast hardware decoding of JPEG picture
  - Unlimited pixel resolution (currently test with 16M pixel digital camera)
  - Supports thumbnail, scaling, rotation and transition effects
  - M-JPEG engine supports up to VGA @ 30fps movies
- **Other Images/Pictures Decoding**
  - Decodes BMP, PNG, GIF, TIFF and other picture formats
  - Supports zoom in and out, rotation and transition effects
- **Video Processing and Output**
  - Supports all SD/HD video formats: NTSC, PAL, 480p, 576p, 720p and 1080i
  - Triple high speed video DACs for analog video output
  - Programmable tint, brightness, zoom, 3:2/2:2 pull-down
  - On-Screen-Display (OSD) capable of supporting 4/16/256 colors or True-Color with sophisticated alpha-bending
  - Support Video-on-graphics mode for EPG display
  - Programmable tint, brightness and other TV enhancements
- **Audio Decoding**
  - Audio AMRISC™ processor w/ audio DSP extensions
  - Full MPEG audio layers I, II and III
  - Compliant with Dolby AC-3 5.1 channel decoding
  - Capable of decoding many audio formats including: MP3, WMA, WAV, Ogg Vorbis, AAC, RealAudio, APE, FLAC and ALAC.
- **Audio Post Processing and Audio Output**
  - Integrated a 2-channel delta-sigma audio DAC
  - IEC958 (S/PDIF) digital output
  - AC-3 5.1 to two channels down-mixing
  - Virtual surround sound to create 3-D spatial sound field from two audio channels
- **USB Interface**
  - Integrated dual OTG 2.0 High Speed controllers and PHYs
  - Integrated support for Mass-storage class (MS-Class), Picture Transfer Protocol (PTP), PictBridge protocol
  - Connecting to PCs or MACs as USB MS-Class devices
- **ATAPI Interface and Card Reader Interfaces**
  - Supports CF/MD, SM, MS, SD/SDHC and xD
  - Supports up to UDMA66 transfer speed on ATAPI/PATA
  - Supports reading/copying and play back of audio, picture and video multimedia files from storage devices
- **Transport Demux**
  - Supports standard SPI interface for connecting to external demodulator/FEC chip for ATSC, DVB-T or DMB-T over-the-air digital TV reception
  - AVOS with built-in support for all DTV table processing
- **Core CPU Sub-system**
  - 32-bit core CPU dedicated for user applications
  - Embedded debug interface using ICE/JTAG
  - Integrated general purpose timers, counters, DMA controllers
- **System, Peripherals and Misc. Interfaces**
  - Single 27 MHz crystal oscillator input
  - Encoder interface to Fujitsu Encoder devices
  - Supports SDRAM, NOR FLASH, and NAND FLASH
  - AMPOWER-II power management circuits and algorithm for portable devices
  - Integrated i2c slave and master controllers, VFD controller, UART controller, remote control input circuitry, PWM output
  - 1.2 volt and 3.3 volt power supplies; 3.3V I/O support
  - 256 pins PQFP RoHS package

ADVANCED AUDIO/VIDEO PROCESSOR SOLUTION



OVERVIEW



AML7228 Block Diagram

AML7228 A/V processor integrates A/V decoders, USB/card-readers/hard-disk interface modules, CPU subsystem and power management circuits together. The device is especially designed for CRT/LCD/plasma DTV processing and external multi-media TV companion devices.

An embedded 32-bit Core CPU handles all system related application software. It executes AVOS, the base operating system for AML7228. AVOS drivers including USB drivers, SD hardware driver, and other hardware related programming interfaces. Applications include GUI, EPG viewer, and file system are also included. Developers can add additional applications for end-product customization.

RealVideo, MPEG1/2/4 and JPEG/M-JPEG streams are processed by dedicated video decoding hardware and the flexible Video AMRISC™ engine. The hardware and microcode combination is capable of decoding D1 size video sequence at full speed, and JPEG pictures with no limits. Pixel based de-interlacing is applied to the video sequence for high quality video output.

Contrast enhancement, hue adjustment, video scaling, video interpolation, pan-scan, letter-box, and zoom are supported by video post-processing module. The scalar supports both up-scaling and down-scaling of images and video. The integrated video encoder supports all video resolutions from traditional NTSC/PAL to 720p/1080i high definition video output thru the on-chip triple video DACs or digital video ports.

The integrated Audio AMRISC™ RISC processor performs advanced digital audio decoding and post-processing. The micro-coded engine provides support for all existing audio formats and it also has enough flexibility to accommodate new audio standards. Popular audio formats like LPCM, Dolby AC-3 5.1, MP-3, WMA, AAC, RealAudio and FLAC can be supported. In addition, SPDIF (IEC958) input and outputs are supported.

The AML7228 also integrated two USB 2.0 High Speed OTG controllers and PHYs for connecting to devices. AVOS can support USB Hub class, Mass-Storage (MS) class, Picture Transfer Protocol (PTP) and PictBridge protocol. The AVOS USB firmware also supports multiple file systems and includes flexible file transfer functions between USB devices.

AML7228 includes transport stream de-multiplexer hardware with both serial and parallel SPI interface. It interfaces to external DVB-T or DMB-T demodulator device to receive Free-To-Air digital TV contents. In addition to TS-Demux, a special encoder interface is added for PVR application.

The AML7228 supports several popular memory card formats and protocols. For example, Secure Digital (SD) and Sony Memory Stick (MS) are supported. AML7228 also integrates an ATA (UDMA66) hard disk controller for media file storage. On-board NAND FLASH is supported for PVR application.

AML7228 is 100% pin compatible with AML7218 processor.

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