# HD Zapper STB Solution

# Key Specifications

## CPU

- High-performance ARM Cortex A9 processor
- Built-in I-cache, D-cache, and L2 cache
- Hardware Java acceleration
- Floating-point coprocessor

## Memory Interface

- DDR2/DDR3 interface
  - Maximum memory of 512 MB
  - 16-bit memory width
- SPI flash
- NAND flash

## Video Decoding

- H264 MP, HP@ L 4.1
- MPEG1
- MPEG2 MP@HL
- MPEG4 SP@ L0-3 and ASP@L0-5
- AVS baseline@ L 6.0
- VC-1 AP
- VP6/VP8
- Real-time decoding capability of 1080p (30 fps)
- Video post-processing such as denoising and deblocking

## Picture Decoding

- JPEG decoding , a maximum of 64 megapixels
- PNG decoding, a maximum of 64 megapixels

## Audio/Video Encoding

- H.264/MPEG-4 video encoding, a maximum of 800x600@25 fps
- JPEG encoding
- VBR and CBR for video encoding
- 1-channel voice encoding
- Echo cancellation

## Audio Decoding

- MPEG L1/L2 decoding
- Dolby digital decoding, Dolby digital plus decoding, and Dolby digital plus transcoding
- Dolby digital transparent transmission
- DTS/DTSHD core decoding
- DTS transparent transmission
- DRA decoding
- Down mixing
- Resampling
- 2-channel sound mixing
- Intelligent volume control

## TS Demultiplexing/PVR

- 3-channel TS inputs including 1-channel IF input
- A maximum of 96 PID filters
- CSA2/ CSA3/AES/DES descrambling
- PVR
- Recording of scrambled and non-scrambled streams

## QAM Demodulator

- One built-in QAM demodulator supporting ITU J83-A/B/C standards
- 1-channel QAM loopback output

## Security Processing

- Advanced security features
- OTP and chip ID
- AES, DES, and 3DES data encryption
- Content protection for USB devices
- DDR SDRAM data protection

## Graphics Processing

- Enhanced full-hardware 2D graphics acceleration engine
- Full-hardware anti-aliasing and anti-flicker

## Display Processing

- Two-layer OSD
- 16-bit or 32-bit color depth
- Two background layers and three video layers
- 1920-pixel width for each layer
- Image enhancement

## Audio/Video Interface

- PAL.,/NTSC/ SECAM analog outputs
- Aspect ratio of 4:3 or 16:9, aspect ratio conversion, scaling
- 1080p 50 (60)/1080i/720p/576p/576i/480p/480i outputs
- Simultaneous output of high-definition and standard-definition signals from the same source or different sources
- xvYCC (IEC 61966-2-4) standard
- HDMI 1.4 with HDCP 1.2
- Analog video interface
  - One CVBS interface
  - One YPrPb interface
  - One S-Video interface
  - Six built-in video DACs
  - Configurable output interfaces
  - Rovi
  - VBI
- Audio interface
  - Stereo channels (RCA output interface)
  - SPDIF
  - One built-in audio DAC

## Peripheral Interfaces

- Two USB 2.0 host ports, integrated with the PHY
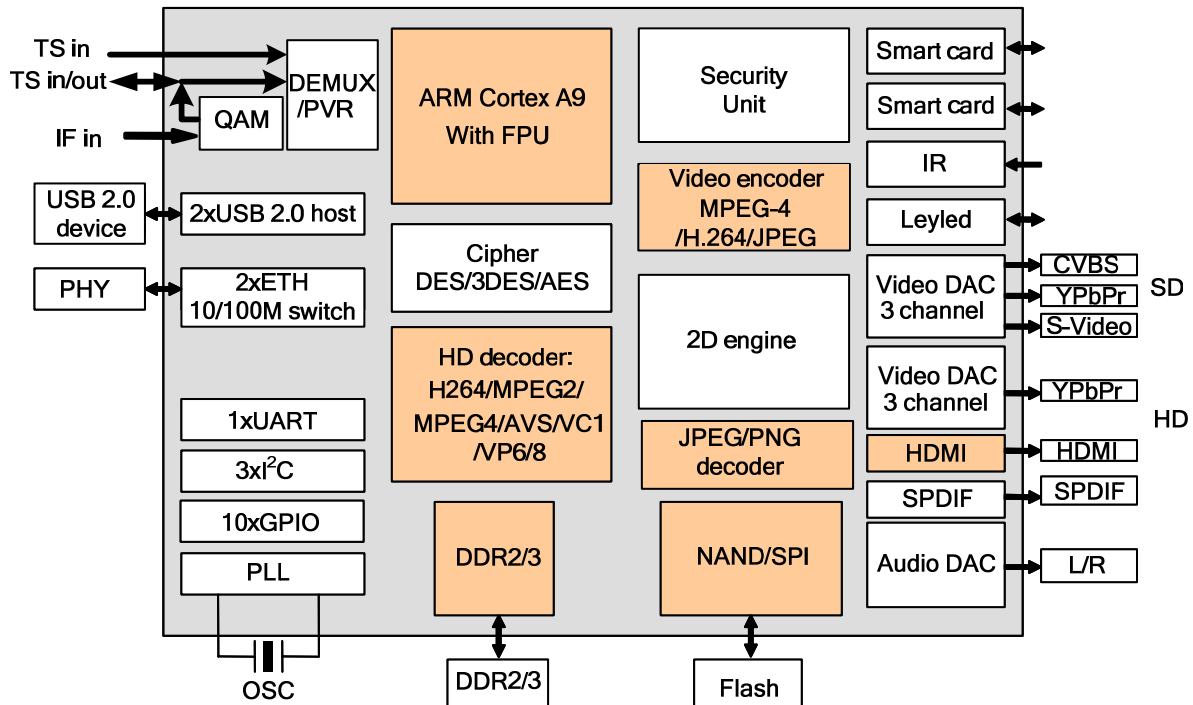- Two 10/100 M adaptive Ethernet ports, providing layer-2 or

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layer-3 switching
- One UART interfaces
- Two smart card interfaces
- One IR receiver processor and two input interfaces
- One LED and keypad control interface
- Three I$^2$C interfaces
- 10 groups of GPIO interfaces

## Others

- Fast startup

- Downloading and running of boot programs through the serial port
- Standby controller inside and extra low power consumption standby support
- Typical standby power consumption less than 1 W
- Typical entire power consumption less than 7 W in operating mode
- QFP and PBGA package
- Routing on 2-layer PCB board

# HD Zapper STB Solution

## Functional Block Diagram



With the advanced ARM Cortex A9 processor, Hi3716M V300 provides high-speed processing capability, which meets the requirements of complex applications. As Hi3716M V300 has two built-in Ethernet ports and two USB ports, it supports flexible connection solutions. Hi3716M V300 also supports high-definition video decoding in various formats (including MPEG2, H.264, and AVS, VC-1 AP, VP6/VP8) to meet multi-media playing requirements.

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## Solution Features

### Open Architecture
- Open Linux operating system
- Open source communities

### Various AV Decoding Formats

### Communication
- Video phone solution
- VoIP solution

### Bandwidth Service
- Integrates with two 10/100 M adaptive Ethernet ports and supports 2-layer or 3-layer switching, VLAN, and DHCP, enabling the home STB and PC to be online at the same time

### PVR
- Connects to peripherals through USB ports for recording
- Provides the FAT32 or NTFS file system compatible with the PC
- Supports the recording of scrambled and non-scrambled streams
- Supports timing recording and scheduled recording of EPG programs
- Play and time-shift one program while recording another program at the same time

### Advertisement
- Display static pictures rapidly after startup
- Play local or network videos and transparent streams rapidly after startup
- Supports interactive advertisement services

### Game
- Local games and online games
- Game background music and sound effect
- High-efficient floating-point coprocessor to improve the game performance

### Home Entertainment
- Local and cloud photo albums
- MP3 playing with lyrics
- Browse of picture in various formats, full-hardware JPEG or PNG decoding
- Special display effects support
- MJPEG video play
- Multiple media formats support

### Environmental Protection
- Low power consumption
- Extra low power consumption standby suppportAuto-hibernation or standby support
- Various wakeup modes

### 3D Television
- Playing of side-by-side HD 3D videos

### Mosaic-Like Preview
- Supports multi-picture preview (local mosaic)
- Support advertisements in the mosaic windows
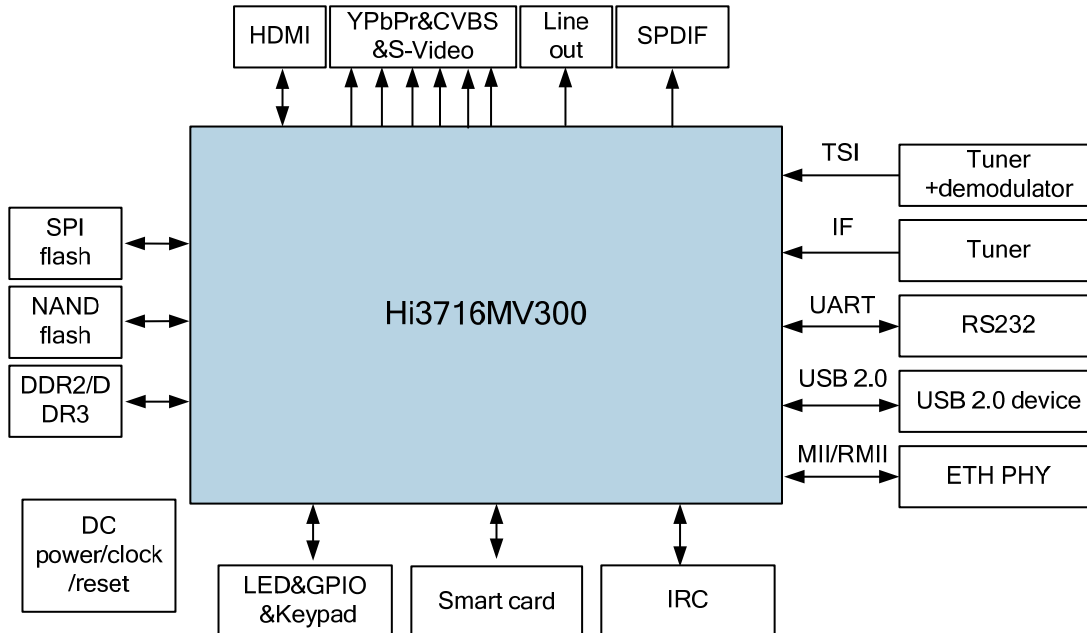
### Intelligent Volume Control
- Automatic volume equalization between different program channels

### Cost-Effective Design
- QFP and BGA package support; PCB design with two layers
- 1x16-bit DDR3 design, which reduces the BOM cost

# HD Zapper STB Solution

## Typical Application Block Diagram



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