Hi3716M V400 Brief Data Sheet

Key Specifications

CPU

- High-performance ARM Cortex A9 processor
- Integrated multimedia acceleration engine NEON
- Dual-core service processing mechanism
- Built-in I-cache, D-cache, and L2 cache
- Hardware Java acceleration
- Floating-point coprocessor

3D GPU

- Integrated high-performance GPU
- OpenGL ES 2.0/1.1/1.0 and OpenVG 1.1
- EGL

Memory Interfaces

- DDR3/3L SDRAM interface
  - Maximum 2 GB memory capacity
  - 16-bit or 32-bit memory
- NAND flash interface
- eMMC

Video Decoding

- H.264 BP/MP/HP@L5.0; MVC
- MPEG1
- MPEG2 SP@ML and MP@HL
- MPEG4 SP@L0–3 and ASP@L0–5; GMC
- MPEG4 short header format (H.263 baseline)
- AVS baseline@L6.0 and AVS-P16
- VC-1 SP@ML, MP@HL, and AP@L0–3
- VP6/VP8
- Dual 1080p@30 fps decoding
- Low-delay decoding
- Simultaneous multi-channel decoding

Image Decoding

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

Video and Image Encoding

- H.264 BP/MP/HP@L4.2 video encoding, 720p@30 fps encoding
- JPEG hardware encoding
- Variable bit rate (VBR) and constant bit rate (CBR) modes for video encoding

Audio/Video Encoding and Decoding

- Dedicated audio DSP
- G.711(u/a) audio decoding
- MPEG L1/L2
- DRA decoding
- Dolby Digital and Dolby Digital Plus
- Dolby True HD and Dolby Digital Plus transcoding
- DTS and DTS HD core decoding
- DTS and Dolby Digital transparent transmission
- AAC-LC and HE AAC V1/V2 decoding
- APE, FLAC, Ogg, AMR-NB, and AMR-WB decoding
- Down mixing and resampling
- 2-channel audio mixing and echo cancellation
- Intelligent volume control
- SRS and Dolby MS11 sound effects
- Pounding bass processing
- G.711(u/a), AMR-NB, AMR-WB, and AAC-LC encoding

TS Demultiplexing/PVR

- One embedded DVB-C QAM demodulator, compliant with J.83 A/B/C
- A maximum of four TS inputs and one IF input
- A maximum of two TS outputs
- QAM loopback output
- A maximum of 96 hardware PID channels
- Full-service PVR
- Recording of scrambled and non-scrambled streams

Security Processing

- Advanced secure CA
- DRM
- OTP
- AES, DES, and 3DES data encryption and decryption
- Hardware hash algorithm
- Content protection for USB devices
- Downloadable CA

Graphics and Display Processing

- Enhanced full-hardware TDE
- Four-layer OSD
- Four video layers
- Mosaic and multi-region display
- Mirroring
- 16-bit or 32-bit color depth
- 3D video processing and display
- Full-hardware anti-aliasing and anti-flicker
- Image enhancement and denoising
- Deinterlacing
- Low-delay display

Audio/Video Interfaces

- PAL, NTSC, and SECAM standard output, and forcible standard conversion
- Aspect ratio of 4:3 or 16:9, aspect ratio conversion, and free scaling
- 1080p50(60)/1080i/720p/576p/576i/480p/480i outputs
- SD and HD signal reception
- HD and SD outputs originated from the same source or two different sources
- xvYCC(IEC 61966-2-4) standard for color gamut
- HDMI 1.4 with HDCP1.2
- Analog video interfaces
  - One CVBS interface
  - One YPrPb interface

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  - Four embedded video DACs (VDACs)
  - Configurable output interfaces
  - Rovi
  - VBI
- Audio Interfaces
  - Audio-left and audio-right channels: RCA, low-impedance, and unbalanced output interfaces
  - SPDIF interface
  - One embedded audio DAC (ADAC)

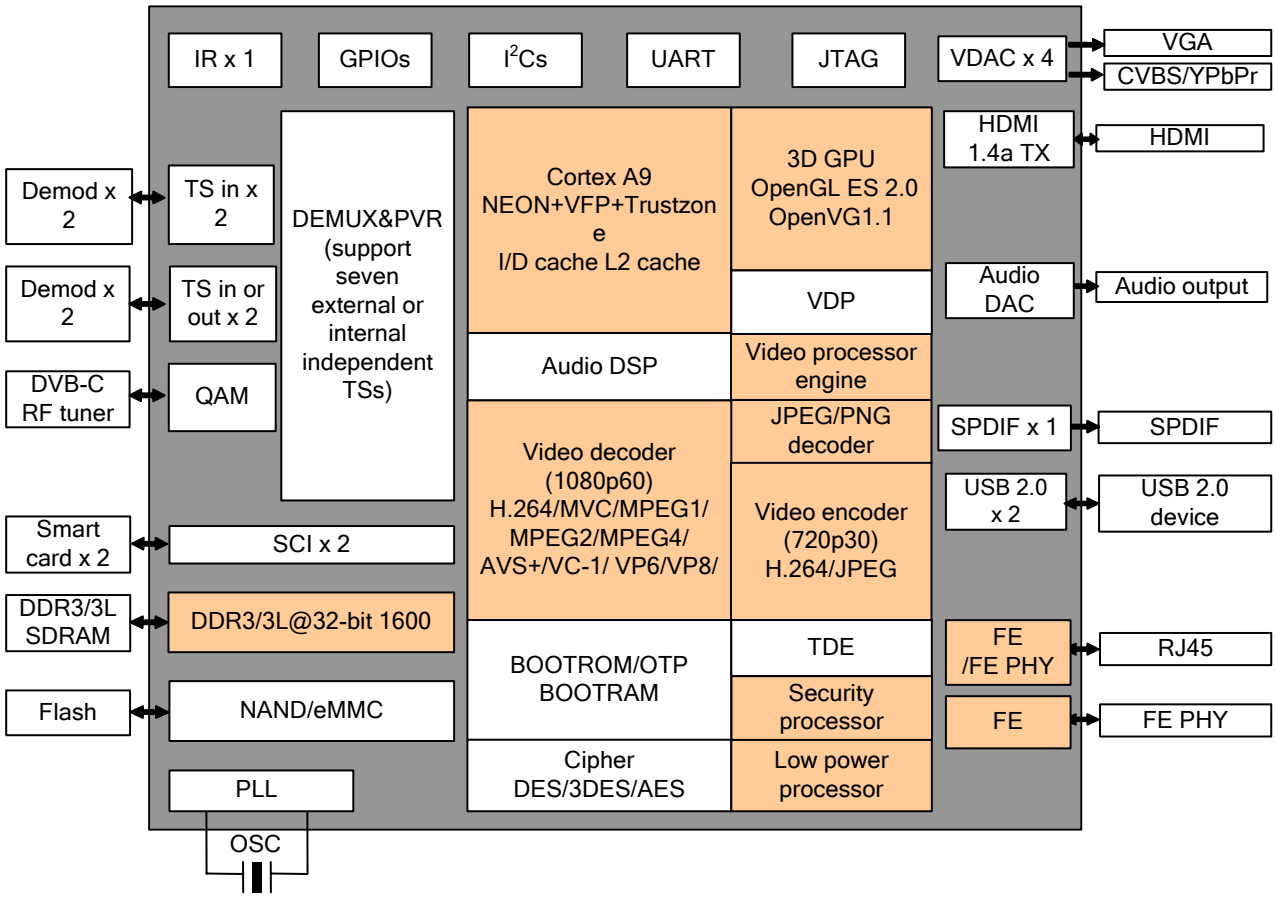
Peripheral Interfaces

- Two USB 2.0 host ports, integrated with the PHY
- Two 10 Mbit/s or 100 Mbit/s adaptive Ethernet ports
- One FE PHY
- One SDIO interface
- Two UART interfaces
- Two smart card interfaces (SCIs), supporting T0, T1, and T14 protocols
- One IR receiver interfaces
- One LED and keypad control interface
- Three I^2C interfaces
- Ten groups of GPIO interfaces
- Integrated POR module

Other Specifications

- Fast startup
- Passive standby and low-power consumption
- Integrated dedicated standby processor, supporting various low-power modes and less than 30 mW standby power consumption
- Low-power design using the technologies such as adaptive voltage scaling (AVS) and dynamic voltage frequency scaling (DVFS)
- 2.5 W typical working power consumption and less than 6 W typical STB working power consumption in playback mode
- Quad flat package (QFP) or plastic ball grid array (PBGA) package
- Two-layer PCB

Functional Block Diagram



With an integrated ARM Cortex A9 processor and embedded NEON, Hi3716M V400 provides high-speed processing capability that meets differentiated service requirements. It provides a smooth man-machine interface and rich game experience with a

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high-performance 2D/3D acceleration engine. To meet the growing requirements on multimedia playback, transcoding, and video communication, Hi3716M V400 supports H.264 encoding and HD video decoding in various formats, including MPEG2, H.264, AVS+, VC-1 AP, VP6, and VP8. It also enables flexible connection schemes with two embedded Ethernet ports and two USB ports. The chip design meets the requirements of mainstream advanced security applications.

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Solution Features

Open Architecture for Growing Services

- Android OS
- Open Linux OS
- Various open-source websites

3D Interface Design and Games

Video Transcoding and Mirroring

Various Audio/Video Decoding Formats

Communication Services

- One 720p30 fps video communication service
- One VoIP service

Bandwidth Data Service

- Two integrated 10/100 Mbit/s adaptive network ports, supporting layer 2 and layer 3 switching; VLAN and DHCP, allowing the home STB and PC to be online at the same time

Full-service PVR

- Recording by connecting to peripherals over the USB port
- FAT32 or NTFS file system compatible with the PC
- Recording of scrambled and non-scrambled streams
- Timed recording and scheduled EPG program recording
- Playing programs at a frequency and recording programs at another frequency at the same time; time-shifting of the current program

Advertising Service

- Rapid display of static pictures after startup
- Rapid playback of local videos and unscrambled network streams after startup
- Interactive advertising services such as EPG advertisement and advertisement during program channel switching

Game Service

- Standalone games and online games
- Game background music and sound effect
- High-efficient floating-point coprocessor for improving the game performance

Home Digital Entertainment

- Local album and online album
- MP3 playback and lyrics display
- Browsing of pictures in various formats and JPEG/PNG full-hardware decoding
- Special effects such as shutter, gradient, scroll bar, and flip
- Playback of MJPEG clips recorded by the mobile phone, digital camera, or PMP
- Playback of media files in multiple formats

Low Power Design

- Less than 0.5 W standby power consumption of the STB
- Less than 6 W typical working power consumption of the STB
- Auto-hibernation (automatic standby when no operation is performed in a preset period)
- Various wakeup modes

3D Television

- HD 3D video playback

Multi-picture Preview

- Dynamic multi-picture preview (local mosaic)
- Learning about the programs in a short period to search for favorite programs
- Advertisements in the multi-picture window

Intelligent Volume Control

- Automatic volume equalization between different program channels, implementing intelligent and user-friendly operations

Cost-Effective Design

- QFP or BGA package and 2-layer PCB design
- 1x or 2x 16-bit DDR3, reducing the BOM costs

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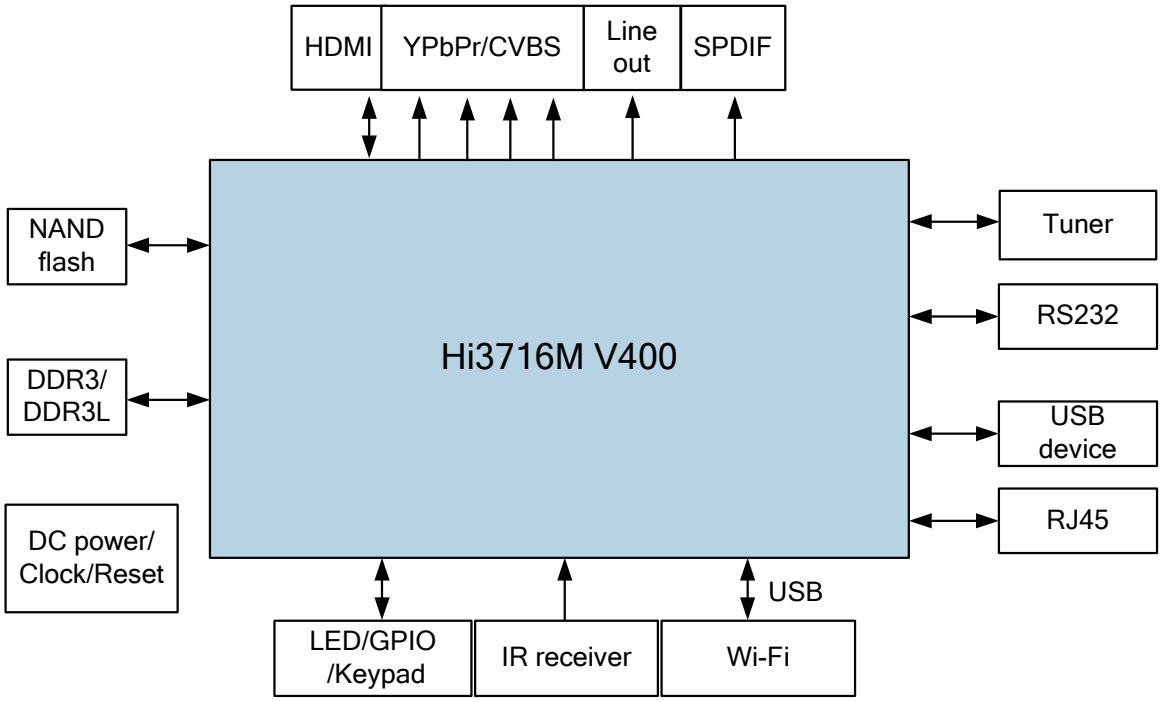
Typical Application Block Diagram



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