



Low Cost DVB-C Interactive/PVR STB Solution

Chipset Features

CPU

- High-performance ARM926EJ-FS processor
- Java hardware acceleration
- Floating-point coprocessor

Memory Interfaces

- 16-bit DDR1 and DDR2 interfaces
- SPI flash interface
- Up to 256 MB memory capacity
- Up to 64 MB flash capacity

QAM Demodulator

- 16-/32-/64-/128-/256-QAM demodulation
- DVB-C, ITU J83-A, and ITU J83-C standard compliance
- Integrated 10-bit intermediate-frequency ADC, supporting all direct intermediate-frequency QAM solutions
- Adaptive digital down sampling and anti-aliasing filtering, symbol rate ranging from 0.87 Mbaud to 9 Mbaud
- Adaptive digital carrier recovery, up to ± 800 kHz frequency offset
- Adaptive digital timing recovery, up to 500 ppm symbol rate deviation
- Forwarding error correction decoding
- Single- or dual-AGC
- Automatic spectrum inversion recognition and correction
- Blind scanning of symbols and demodulation mode
- 1-channel QAM loopback output

Transport Processing

- DVB-CSA descrambler
- Serial input interface (up to 13.5 Mbyte/s bit rate) and parallel input interface (up to 96 Mbit/s bit rate)
- 3-channel DEMUXs for recording encrypted streams and transparent streams
- 32 PID filters for each DEMUX
- Up to 48 filters for each DEMUX
- 16-byte filters, supporting AND, OR, XOR, and NOT operations

Fast Startup Engine

- Picture displaying within 1s and transparent stream displaying within 3s after startup

- Configurable duration of playing pictures and transparent streams

Audio Decoding

- MPEG-1 and MPEG-2 layer-I/layer-II decoding
- MP3 decoding
- 2-channel PCM audio mixing
- Embedded 24-bit audio DAC
- High-performance hardware resampling
- SPDIF digital output and direct output of AC3 streams
- 1-channel I²S output

Video Decoding

- Full-hardware decoding of MPEG-2 MP@ML and MPEG-1
- Video bit rate of each channel ranging from 2 Mbit/s to 15 Mbit/s
- Aspect ratio of 4:3 or 16:9, free size scaling

Picture Decoding

- Up to 64-megapixel JPEG decoding

Graphics Processing

- 2D graphics acceleration, anti-alias, anti-flicker, and image stabilizer
- Input bitmaps in RGB or YUV format
- Format conversion of output bitmaps between RGB and YUV
- 8-, 16-, or 32-bit OSD
- Alpha and colorkey operations
- Anti-flicker filter for OSD

Video Output

- Four-layer plane including one background layer, one video layer, and two OSD layers supporting the layer still function
- Alpha blending of the background layer, video layer, and OSD layers, 256-level transparency
- Free size video scaling
- OSD pictures in 8-, 16-, or 32-bit RGB or YCbCr format
- Norm conversion of OSD pictures between PAL and NTSC

TV Encoder

- YPbPr, RGB, CVBS, and S-video output modes



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- 4-channel video DACs, simultaneous output of 1-channel CVBS and 1-channel component (YPbPr/RGB/S-Video)
- VBI encoding, including teletext, closed caption, CGMS, WSS, and VPS

Peripheral Interfaces

- Two integrated USB 2.0 host ports, up to eight USB ports on board-level expansion
- Two 10/100 Mbit/s adaptive Ethernet ports, supporting layer-2 switching and VLAN
- One UART interface, one IR interface, one LED interface, two smart card interfaces, and four I²C interfaces

PVR

- Recording of scrambled and descrambled TSs
- Embedded DES/3DES/AES cipher, supporting protection on hard disk contents (optional)

- Time shift
- Trick mode in time-shift or playback mode

Advanced Security

- Advanced security features
- OTP and chip ID

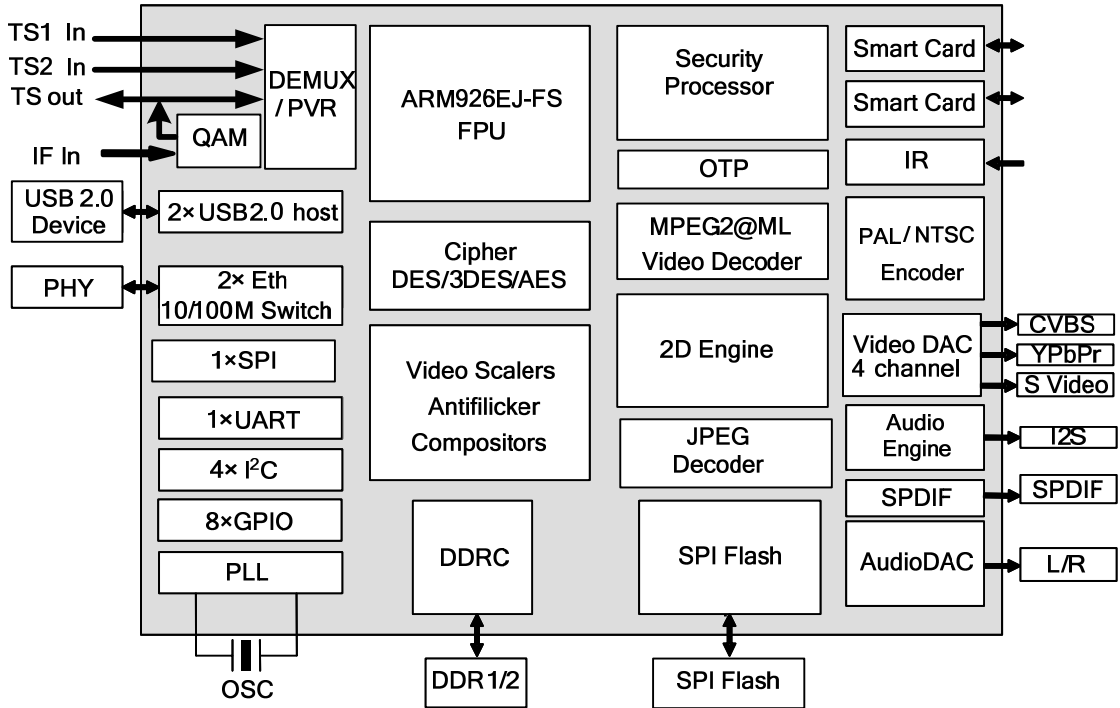
Electrical Specifications

- Less than 1.5 W for the chip operating power consumption and 100 mW for the standby power consumption
- Idle, sleep, doze, and normal power-saving modes
- 0.11 μm technology and 1.2 V, 1.8 V, 2.5 V, or 3.3 V power voltage
- 216-pin LQFP package

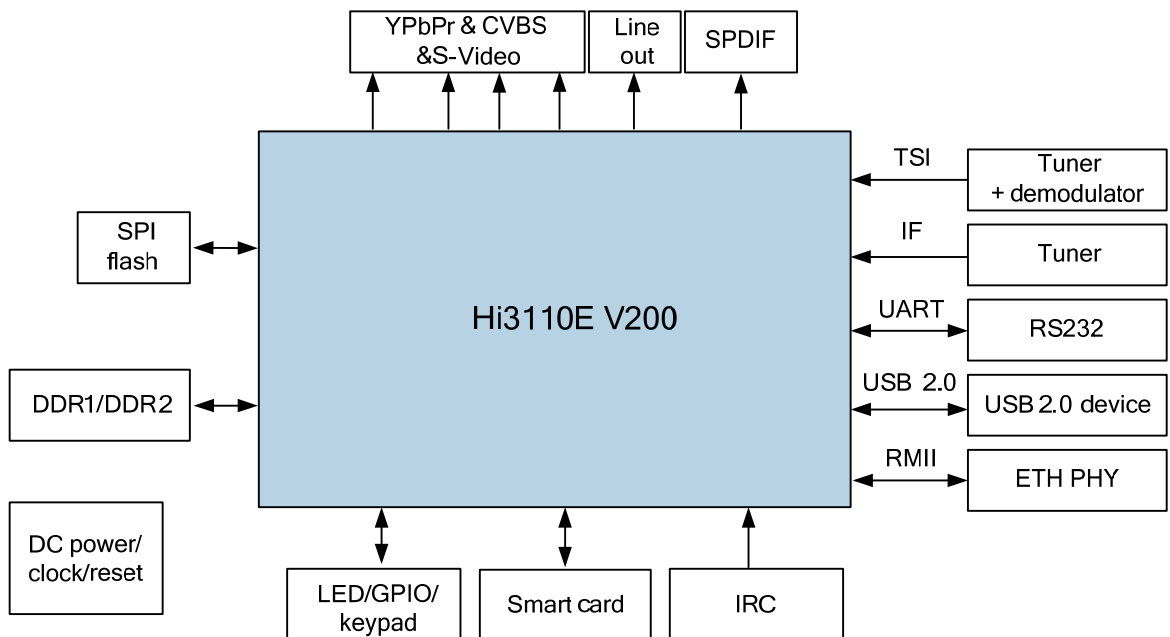


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Functional Block Diagram



Typical Application Block Diagram





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Solution Features

- Value-added services
 - Two integrated Ethernet ports, supporting layer-2 switching and cost-effective home gateway
 - Two integrated USB 2.0 host ports
 - An integrated ARM CPU and embedded floating-point coprocessor, supporting the value-added services including the flash animation and games
 - Full-hardware Java acceleration, ensuring rapid running of the Java-based middleware
 - Optimization based on the HTML middleware
 - Full-hardware audio/video decoding independent of the CPU and software
 - High-performance full-hardware TDE, improving the OSD refresh speed and game speed
 - Free TCP/IP protocols inherent in open Linux, supporting development and expansion of value-added services
- Home Gateway
 - Integrated two Ethernet ports, supporting layer-2 switching, VLAN, and DHCP
 - Home gateway, supporting data services for the PC
 - Data flow control, ensuring upstream service data of the STB
- PVR
 - Recording of encrypted and non-encrypted streams
 - Real-time recording, timing recording, and scheduled EPG recording
 - Simultaneous playing of programs at a frequency and recording of programs at another frequency
 - Protection on the contents recorded in hard disk
 - Fast forward, rewind, and pause in playback or time-shift mode
- Advertisements
 - Displaying of static pictures within 1s or transparent stream videos within 3s after startup
 - Four-layer plane and dual-OSD menus, supporting EPG advertisement, advertisement during program channel switching, and interactive advertisement
- Games
 - Console games and online games
 - Game background music and sound effect
 - High-performance floating-point coprocessor and enhanced 2D acceleration for improving the game performance
- Home Entertainment
 - Local and Cloud photo album
 - MP3 playing
 - Browse of JPEG photos, up to 64 megapixels, special effects of shutter, gradient, and scroll bar
 - Playing of MJPEG clips recorded by the mobile phone, digital camera, or PMP
- Green STB solution
 - Wakeup mode, and entire STB standby power consumption less than 0.8 W
 - Entire STB power consumption less than 7 W in normal working mode
 - Auto-hibernation and automatic standby when no operations in preset period
- DDR Memory Playback
 - Playback of broadcasting programs based on DDR without peripherals. The playback time depends on the available DDR space.
- Mosaic-like preview
 - Display multi-program in one window for users easy to search for favorite programs
 - Advertisements in the multi-picture window
- CA without cards