H6

# Best Picture Quality

## 4K STB Solution

## Overview

The H6 is a high performance SoC targeted at the OTT, DVB and IPTV markets. It supports 4K@60fps-10bit ultra-HD video decoding and low-latency H.264 4K encoding. There is also supports for HDR10 and HLG HDR，integrated Smartcolor 3.0 display system which is developed independently by Allwinner Technology. Dolby and DTS audio processing can also be done on this processor. The H6 will set the industry benchmark in terms of streaming compatibility, video smoothness and picture quality. It will also be compatible with various kinds of peripheral devices, and provides customers with flexible and mature solution.

## Highlights

- **64-bit quad core ARM Cortex A53 CPU**
- **High-performance multi-core ARM Mali-T720 GPU**
- **High-quality H.265/VP9 4K@60fps-10bit video decoder**
- **Low-latency H.264 4K@30fps video encoder**
- **HDR10 and HLG video processing**
- **Smartcolor3.0 Display Processing Engine**
- **FDE (Full Disk Encryption) ,Mainstream DRM**
- **Various kinds of interface: USB3.0,PCIe,HDMI2.0a,Ethernet**

## Features

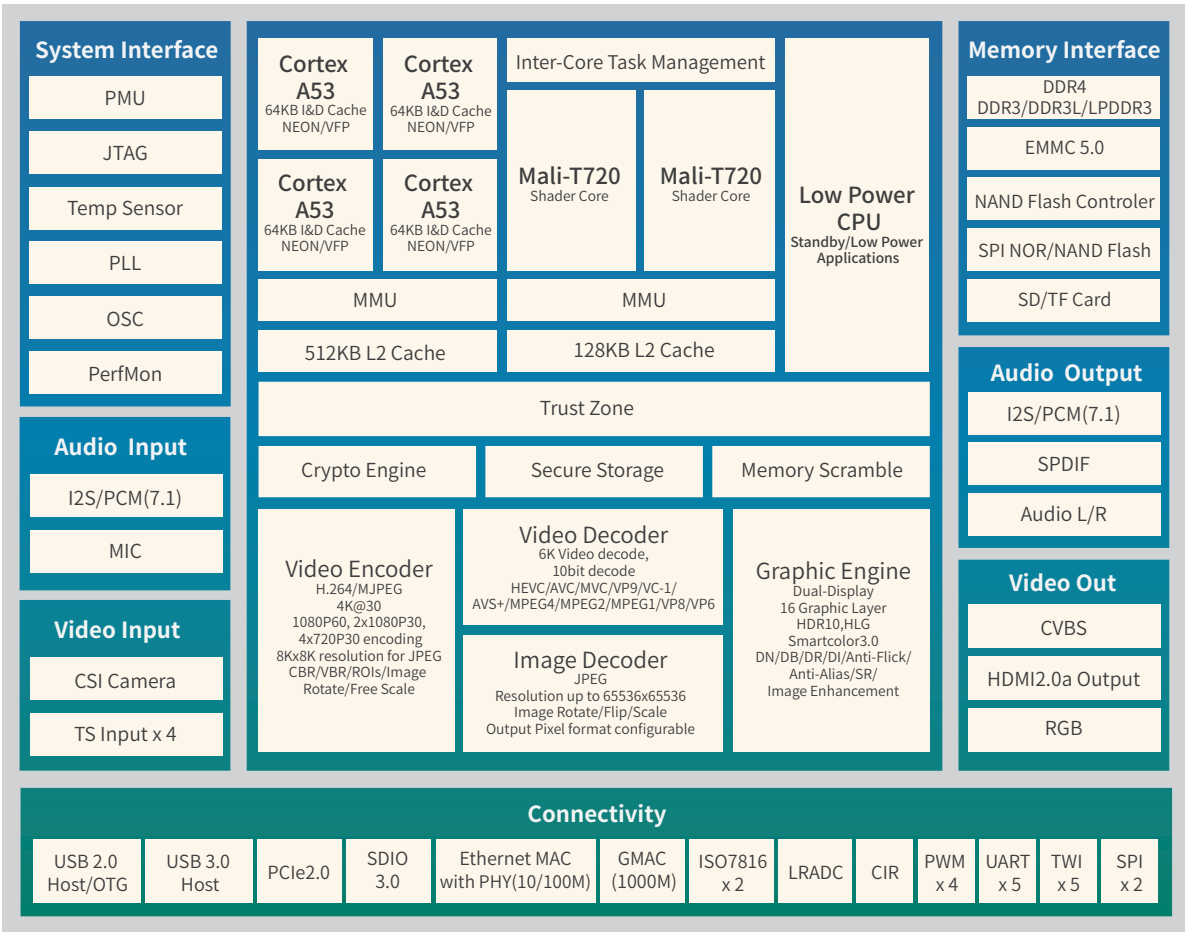
| | |
|---|---|
| High-Performance 64 bit CPU | • Quad-core 64-bit ARM Cortex A53<br>• Integrated multimedia acceleration engine - NEON<br>• Hardware Java acceleration<br>• Integrated hardware floating-point coprocessor |
| 3D GPU | • High-performance multi-core GPU Mali T720<br>• OpenGL ES3.1/3.0/2.0/1.1<br>• OpenCL 1.1/RenderScript<br>• Microsoft DirectX 11 FL9_3<br>• ASTC(Adaptive Scalable Texture Compression)<br>• Floating point operation greater than 70 GFLOPS |

| | |
|---|---|
| Memory Control Interfaces | • DDR4/DDR3/DDR3L interface<br>• EMMC Flash interface, supports EMMC5.0<br>• NAND Flash interface<br>  • SLC/MLC/TLC flash memory<br>  • Maximum 80-bit error-correcting code (ECC)<br>• SPI NOR Flash |
| Video Decoding (Allwinner Phoenix 3.0 VE Engine) | • H265/HEVC Main/Main10 profile@Level5.1 High-tier ;4K@60fps, up to 6Kx4K@30fps<br>• H264/AVC BP/MP/HP@level5.1, MVC, 4K@30fps<br>• VP9, Profile 0/2, 4K@60fps<br>• VP6/VP8, 1080P@60fps<br>• MPEG1/MPEG2 SP@ML, MP@HL, 1080P@60fps<br>• MPEG4 SP@level 0~3, ASP@level 0~5, GMC, short header format, 1080P@60fps<br>• AVS+/AVS JIZHUN profile@level 6.0, 1080P@60fps<br>• VC-1 SP@ML, MP@HL, AP@level 0~3, 1080P@60fps<br>• Supports Frame Buffer Compression (FBC)<br>• Output pixel format configurable,YUV420/YV12/NV12/… |
| Image Decoding (Allwinner Phoenix 3.0 VE Engine) | • Real-time image decoding- Maximum resolution up to 65536 x 65536<br>• Integrated JPEG hardware decoder<br>• Configurable output pixel format- YUV420/YV12/NV12/… |
| Video and Image Encoding (Allwinner Phoenix 3.0 VE Engine) | • H264 BP/MP/HP@level 4.2 video encoding, up to 4K@30fps<br>• MJPEG video encoding, up to 4K@30fps<br>• JPEG image encoding- maximum resolution up to 8Kx8K<br>• Supports 1x1080P@60fps/2x1080P@30fps/4x720P@30fps simultaneous encoding<br>• Supports constant bit rate(CBR) or variable bit rate(VBR) mode<br>• Low-latency encoding<br>• Encoding of multiple region of interest(ROIs)<br>• Picture/Video Rotate<br>• Picture free scale up/down, scale ratio from 1/4 to 8 |
| Audio Encoding/ Decoding | • MPEG-1, MPEG-2 (L1/L2/L3) , MP3, AAC-LC, HE AAC V1/V2, APE, FLAC, OGG, AMR-NB, AMR-WB, G.711(u/a) decoding<br>• G.711(u/a), AMR-NB, AMR-WB, AAC-LC encoding<br>• Karaoke sound effects, supports automatic gain control, voice enhancement and echo/ reverberation.<br>• 3~5m far field sound acquisition, supports speech enhancement, acoustic echo cancellation and direction of speaker estimation.<br>• Virtual surround sound<br>• Dolby Digital/Dolby Digital Plus decoding (option)<br>• Dolby DMA2.0 audio effect (option)<br>• DTS-HD decoding (option)<br>• Dolby Digital/DTS transparent transmission |
| TS Demultiplexing/ PVR | • 4 TS inputs<br>• Each TS supports 32 PID<br>• DVB-CSA/AES/DES descrambling<br>• PVR, recording of scrambled and non-scrambled streams |
| Security Processing | • Full Disk Encryption(FDE), supports AES-ECB/CBC<br>• 4K bits Efuse (OTP) |

| | |
|---|---|
| Security Processing | • Protection for JTAG and other debugging port<br>• HDCP 2.2/1.4 protection for HDMI outputs<br>• Trusted execution environment(TEE)<br>• Digital rights management(DRM)<br>• Mainstream advanced CA<br>• Secure boot<br>• Secure Storage<br>• Secure upgrade |
| Display Processing (Smartcolor 3.0 DE Engine) | • Supports HDR10 and HLG HDR processing<br>• HDR conversion between SDR<br>• Supports for dual display - same or different content<br>• Supports 16 layers, video and UI input layers to overlay<br>• Supports Potter-Duff Alpha Blending between layers<br>• Programmable zoom ratios for up/down scaling<br>• 3D video processing and display<br>• Color space conversion(CSC) with configurable coefficients<br>• De-Noise、De-Block、De-Ring<br>• High quality motion adaptive de-Interlace<br>• Sharpness and detail enhancement<br>• Adaptive saturation enhancement<br>• Contrast enhancement black/white level stretch<br>• Super-resolution<br>• Fresh tone protection<br>• Supports Frame Buffer Compression (FBC) |
| Audio/Video Interfaces | • Video Output<br>  • One HDMI 2.0a TX with HDCP 2.2 output<br>  • One CVBS interface , supports PAL/NTSC mode<br>  • RGB interface, maximum resolution up to1920x1080<br>• Video Input<br>  • CSI camera (DVP)<br>• Audio Interfaces<br>  • Analog audio input/output<br>  • Digital MIC interface<br>  • Two I2S digital audio interfaces, support 7.1 channel<br>  • S/PDIF audio interface |
| Peripheral Interfaces | • One USB3.0 host port<br>• One USB2.0 otg port ,one USB2.0 host port<br>• Supports PCIe 2.0 interface<br>• 10/100 Mbit/s Ethernet port, E-PHY integrated<br>• Giga Ethernet MAC<br>• One SDIO3.0,one eMMC5.0,one SD Card2.0<br>• Five UART interfaces<br>• Two ISO7816 Smart Card interfaces<br>• Five TWI interfaces<br>• Multiple general-purpose input/output (GPIO) interfaces<br>• IR receiver and keypad control interface |
| Package | • BGA451<br>• 15mm x 15mm<br>• Ball pitch/size：0.65mm/0.3mm |

| | |
|---|---|
| Others | • Ultra low-power design<br>• Various boot mode (USB boot、SDcard boot、Flash boot)<br>• Adaptive voltage scaling(AVS)<br>• Dynamic voltage and frequency scaling(DVFS) |

# Block Diagram




## ABOUT ALLWINNER

Allwinner Technology is a leading fabless design company dedicated to smart application processor SoCs and smart analog ICs. Its product line includes multi-core application processors for smart devices and smart power management ICs used by brands worldwide.

With its focus on cutting edge UHD video processing, high performance multi-core CPU/GPU integration, and ultra-low power consumption, Allwinner Technology is a mainstream solution provider for the global tablet, internet TV, smart home device, automotive in-dash device, smart power management, and mobile connected device markets. Allwinner Technology is headquartered in Zhuhai, China.

## CONTACT US

For more product info, please contact service@allwinnertech.com, or scan the QR code to follow us on Wechat.