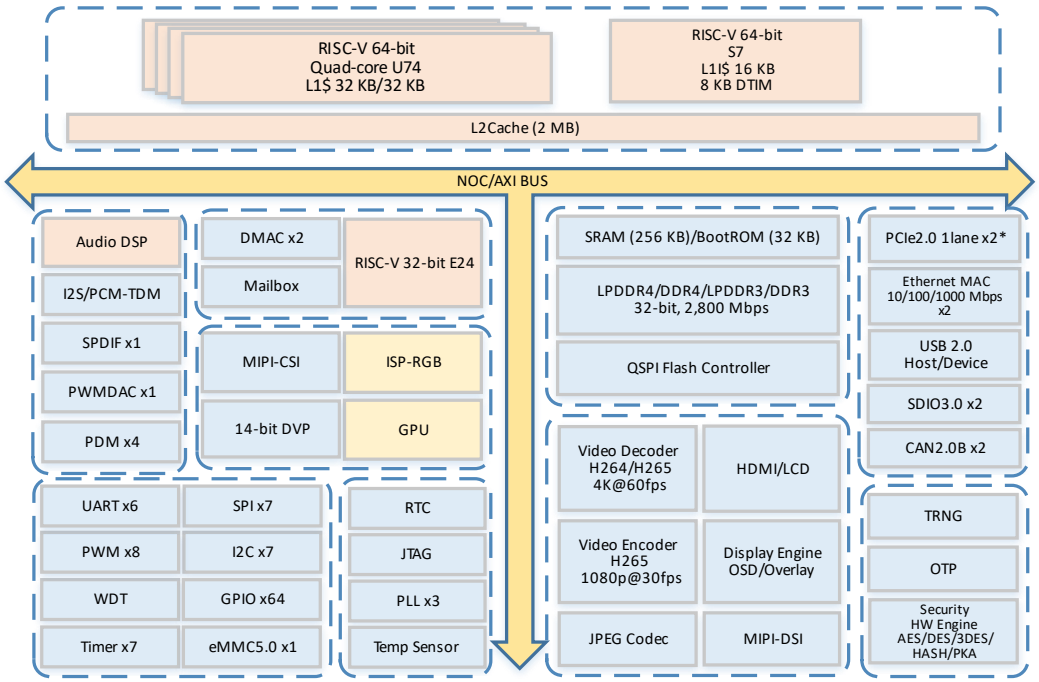
JH7110 SOC PLATFORM

BLOCK DIAGRAM



*: One of the PCIe2.0 lanes can be reused by USB3.0.

Equipped with RISC-V quad-core U74, JH7110 shares 2 MB of L2 cache and supports Linux OS. The StarFive ISP is compatible with mainstream camera sensors. The built-in image/video processing subsystem supports H265/H264/JPEG/ codec and 4K@30fps display. With high-performance, OpenCL/OpenGL ES/Vulkan support, JH7110 can further enhance intelligence and efficiency. Thanks to its capabilities to process all kinds of complex image/video tasks and intelligent visual calculations, JH7110 can qualify various real-time visual processing scenarios on the edge end.

COMMERCIAL

- Personal single board computer (SBC)
- Home NAS
- Router (Soft routing)

SMART HOME

- Sweeping robot
- Intelligent visual home appliances (refrigerator, microwave oven, etc.)

INDUSTRIAL

- Industrial robot
- Unmanned store
- Logistics robot
- Intelligent unmanned aerial vehicle (UAV), AV, ADAS

PUBLIC SECURITY

- Video surveillance
- Traffic management

HIGHLIGHT

- RISC-V U74 quad-core with 2 MB L2 cache and S7 monitor core
- Support Linux OS since minimum Linux kernel version 5.10
- CPU work frequency up to 1.5GHz
- GPU IMG BXE-4-32
- 32-bit LPDDR4/DDR4, up to 2,800 Mbps
- Video decoder supports up to 4K@60fps and multi-stream for H264/H265
- Video encoder supports up to 1080p@30fps and multi-stream for H265
- Provide JPEG encoder/decoder
- Support up to 1080p@30fps full-functional ISP
- Support video input: 1x DVP and 1x MIPI-CSI with 4D2C up to 4K@30fps
- Support video output: MIPI display output with 4D1C up to 1080p@30fps
- Support 1x HDMI2.0 port display up to 4K@30fps
- Support LCD or MIPI-DSI output up to 1080p@30fps
- Support 2x PCIe2.0, x1 lane, USB3.0 Host/Device
- Support 2x Ethernet MAC 1000 Mbps, 2x CAN2.0B
- Support TRNG and OTP, DMA, QSPI, and other peripherals
- Audio DSP supports floating-point instructions
- Dedicated audio processing and sub-system

FEATURE

CPU SYSTEM

- 64-bit high-performance RISC-V CPU (U74) quad-core
  - –Support RV64GC RISC-V ISA
  - –L1-cache: I$32 KB/D$32 KB
  - –Cache coherence for quad-core
- RV64IMAC S7 monitor core
  - –16 KB L1 I-Cache with ECC
  - –8 KB DTIM with ECC
  - –8 region physical memory protection
- 32-bit RISC-V CPU core (E24) for real time control
  - –Support RV32IMFC RISC-V ISA
  - –16 KB I-cache only
- L2-cache up to 2 MB cache size
- Dual DMA controllers support up to 16+4 channels
- Support Linux/VxWorks/RTOS

MEMORY AND STORAGE

- BUS RAM up to 256 KB
- DDR controller support 1 channel of x32
  - –DDR4/3, LPDDR4/3 for 2133 Mbps
  - –2pcs of x16 or 1pcs of x32 devices
  - –DDR memory density up to 8 GB
- QSPI controller external flash memory
  - –Support XIP mode and Page mode
  - –Separate 1/2/4 data width
  - –Support SPI Nor Flash size up to 16 MB
  - –Support SPI Nand Flash size up to 2 GB

GPU SUBSYSTEM

- Support OpenCL 1.2
- Support OpenGL ES 3.2
- Support Vulkan 1.2

VIDEO PROCESSING

- Camera MIPI Interface
  - –MIPI CSI-2 RX DPHY
    - Up to 6 lanes of 1.5Gbps
    - Support 4D1C x1 MIPI sensors
    - Support 2D1C x2 MIPI sensors
  - –Separate 2x CSI-RX controller, each controller supports up to 4K-Pixel interfaces
- ISP (Image Signal Process)
  - –Support 1x MIPI CSI channel and 1x DVP input channel
  - –Support up to 1080p@30fps CMOS RGB image sensor
  - –ISP core support
    - Defective pixel correction
    - R/G/B LUT, AE/AWB/AF
    - Histogram analysis
    - Lens Shading/Color Shading
    - Sensor spatial crosstalk cancellation
    - Global tone mapping/Spatial noise reduction
    - Seamless digital scale down from 1/4x to 1x
- Video Encoder
  - –H.265/HEVC Encoder, 1080p@30fps
  - –Support I/P type slice
  - –High-performance CABAC encoding
  - –Support Region of Interest (ROI)
- Video Decoder
  - –4K@60fps or 1080p@30fps
  - –Compatible with the ITU-T Recommendation H.264
  - –Compatible with ISO/IEC 23008-2 HEVC
  - –Support Format 420, 8-bit/10-bit
  - –Support I/P type slice
  - –H.265/HEVC Main/Main10, L5.1
  - –H.264 High/High10, L5.2
- JPEG
  - –Up to 290 MPixel/Sec for YUV420, 210 MPixel/Sec for YUV422, 140 MPixel/Sec for YUV444
  - –Bit rate 480 Mbps (MJPG 8M @30fps 422 1:8)
  - –Compliant with Baseline/Extended sequential ISO/IEC 10918-1 JPEG
  - –Compliant with Motion JPEG
  - –Support from 16x16 pixels to 32 K x 32 K (32,768x32,768)

DISPLAY

- Display
  - –Support 1x HDMI 2.0 up to 4 K@60fps
  - –RGB656, RGB888 I/F, up to 1080p@30fps
  - –Support 8-layer picture-in-picture
  - –Support 1/64-64 times scaler (1/64 not covered)
  - –Support MIPI TX DPHY lane connected with panel module
- MIPI Display Interface
  - –MIPI TX DSI Controller for single display output
  - –MIPI TX DPHY supports 4D1C lanes
  - –Data rate support up to 2.5Gbps

CONNECTIVITY

- 2x PCIe2.0 controller with integrated PHY
  - –X1 PCI Express Core
  - –Support link rate of 5 GT/s per lane
- USB 2.0 host/device mode with high speed and full speed
- 2x Ethernet GMAC for 10/100/1000 Mbps with RMII/RGMII
- 2x SDIO 3.0/eMMC 5.0 host controllers
- 2x CAN2.0B data rates up to 1 Mbps

SECURITY

- Encryption: AES; DES/3DES; HASH; PKA
- Compliant with TRNG
- 256-bit random number generation
- 512 x 32-bit (2 KB) of OTP for key data on-die storage

AUDIO DSP

- Used for traditional audio/voice data algorithm processing
- 32-bit Audio DSP, support floating-point instructions
- 96 Kbytes DTCM, 96 Kbytes ITCM
- 16 Kbytes I-cache, 32 Kbytes D-cache
- Support internal DMA
- Support On-Chip Debug (OCD)
- 32 interrupts count

AUDIO INTERFACE

- 8 channel TX and RX I2S/PCM TDM
- 4 sets of I2S/PCM I/F and support DMA
- 2 sets of SPDIF, RX mode and TX mode
- 4-channel PDM input for digital MIC
- DAC output with PWM interface

PERIPHERALS

- 6 x UART
- 7 x I2C
- 7 x SPI
- 2 x SDIO
- 1 x DPI (Parallel RGB Display)
- 1 x PCM/I2S
- 7 x 32-bit timers
- 1 x temperature sensor
- 2 x INTC
- 8 x PWM outputs
- 1 x 32-bit WDT reset output
- 64 x GPIO
- 1 x DVP sensor input interface
- 3 x GPCLK outputs

PACKAGE

- Body Size 17 x 17 mm, 0.65 mm ball pitch, FCBGA 625 balls

POWER SUPPLY

- 0.9 V core voltage
- 3.3 V/2.5 V/1.8 V I/O voltage

BOOT MODE

- Boot Rom
- QSPI NOR/NAND Flash
- SD card/eMMC
- UART/USB/SD CARD update

CLOCK SOURCE

- OSC 24 MHz default for USB, GMAC and system main clock source
- OSC 32.768 KHz for RTC clock source