RK3576

A low power, high performance AIoT processor

Features

CPU

- Quad Cortex-A72 and quad Cortex-A53
- 1MB unified L2 cache for Cortex-A72
- 512KB unified L2 cache for Cortex-A53
- ARM Cortex M0 for user application

GPU

- ARM Mali G52 MC3
- OpenGL ES 1.1, 2.0 and 3.2, OpenCL 2.1, Vulkan 1.2

NPU

- 6 TOPS*@INT8
- Support int4/int8/int16/FP16/BF16/TF32
- Support deep learning frameworks: TensorFlow, Caffe, Tflite, Pytorch, Onnx NN, Android NN, etc

Memory

- 32-bit LPDDR4/LPDDR4x/LPDDR5
- eMMC 5.1, SDIO 3.0 and FSPI
- UFS v2.0

Multimedia

- H.265 HEVC Main10 L5.1 yuv444: 4K 120fps
- H.264 AVC High10 L5.1 yuv422: 4K 60fps
- H.264 MVC up to 1080P 60fps
- VP9 Profile0/2 L5.1: 4K 120fps
- AVS2 Profile0/2 L10.2.6: 4K 120fps
- AV1 Main10 L5.3: 4K 120fps
- 4K@60fps video encoders for H.264/H.265

Video Input

- 16M Pixel ISP with HDR & 3DNR
- Triple MIPI CSI-2 with 4-lane interfaces
- 16-bit DVP interface, up to 150MHz

Display

- Multiple display up to (4K@120 + 2.5K@60 + 2K@60)

- HDMI v2.1 / eDP v1.3 Combo interface
- MIPI DSI, 4 lanes
- DP v1.4 and USB 3.0 combo (Type-C) interface
- Parallel output interface
- EBC output interface
- Picture Quality post-process module

Audio Interface

- 5x SAI interfaces, support I2S/TDM/PCM mode
- SPDIF TX and SPDIF RX
- PDM0/PDM1 with 8 channels
- Dual 2-ch and dual 4-ch ASRC
- Digital Audio Codec with 2 channels

High Speed Interface

- PCIe2.1/SATA3 combo interface with one data lane
- PCIe2.1/SATA3/USB3.0 combo interface with one data lane
- 2x RGMII interfaces

Industry

- 2x CAN FD
- 16-bit DSMC (Double Data Rate Serial Memory Controller)

Security

- ARM TrustZone security extension
- Secure boot and JTAG
- Key ladder
- Crypto (RSA 4096, AES 256, SHA-512...)
- HDCP 2.x for HDMI and DP/eDP

SDK
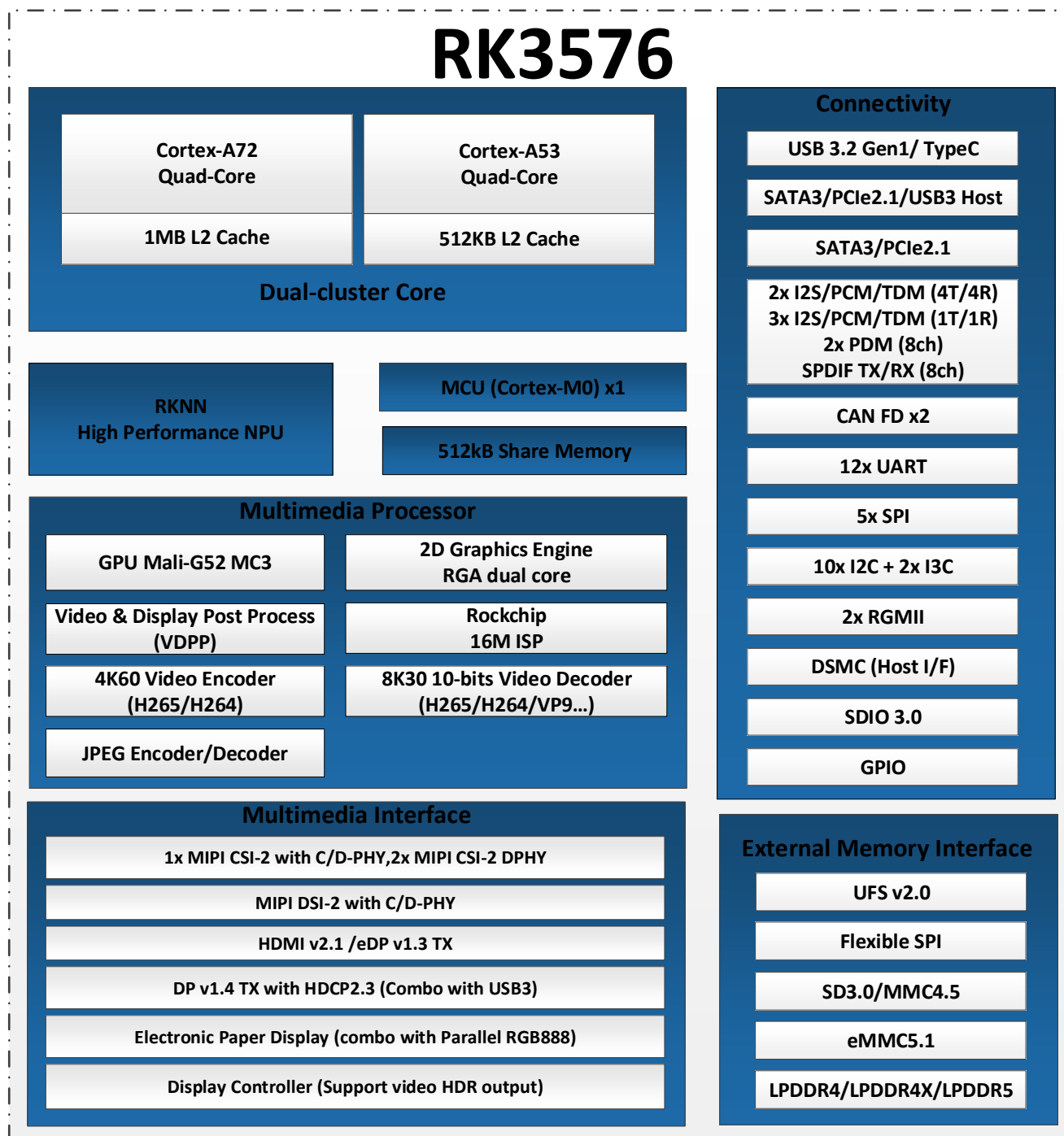
- Linux and Android
- Others

Package Information

- FCCSP698L (16.1 x 17.2mm, pitch: 0.55mm&0.6mm&0.65mm mixed)

*Sparsity

- Intelligent Cabin
- Virtual Desktop Infrastructure (VDI)
- ARM PC
- Tablet
- Robot Vacuum
- Advertising Machine
-

- Metting Bar
- Smart Whiteboard
- E-ink Screen
- large Monitor
- Cash Register
- Gateway

- OTT
- NVR
- HMI

Block Diagram

RK3576

Dual-cluster Core

Cortex-A72 Quad-Core	Cortex-A53 Quad-Core
1MB L2 Cache	512KB L2 Cache

RKNN
High Performance NPU

MCU (Cortex-M0) x1

512kB Share Memory

Multimedia Processor

GPU Mali-G52 MC3	2D Graphics Engine RGA dual core
Video & Display Post Process (VDPP)	Rockchip 16M ISP
4K60 Video Encoder (H265/H264)	8K30 10-bits Video Decoder (H265/H264/VP9…)
JPEG Encoder/Decoder	

Multimedia Interface

- 1x MIPI CSI-2 with C/D-PHY,2x MIPI CSI-2 DPHY
- MIPI DSI-2 with C/D-PHY
- HDMI v2.1 /eDP v1.3 TX
- DP v1.4 TX with HDCP2.3 (Combo with USB3)
- Electronic Paper Display (combo with Parallel RGB888)
- Display Controller (Support video HDR output)

Connectivity

- USB 3.2 Gen1/ TypeC
- SATA3/PCIe2.1/USB3 Host
- SATA3/PCIe2.1
- 2x I2S/PCM/TDM (4T/4R) 3x I2S/PCM/TDM (1T/1R) 2x PDM (8ch) SPDIF TX/RX (8ch)
- CAN FD x2
- 12x UART
- 5x SPI
- 10x I2C + 2x I3C
- 2x RGMII
- DSMC (Host I/F)
- SDIO 3.0
- GPIO

External Memory Interface

- UFS v2.0
- Flexible SPI
- SD3.0/MMC4.5
- eMMC5.1
- LPDDR4/LPDDR4X/LPDDR5

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Octa Core

Typical Application Diagram – AIoT

Camera Sensor	MIPI CSI RX *3
MIPI Panel	MIPI DSI TX
eDP Panel/HDMI	HDMI2.1 /eDP1.3
WiFi 6/BT/GPS Module	PCIe2.1, UART
USB Type-C	USB3.2 Gen1x1 PCIe/SATA, USB3.2 Gen1x1 TYPE-C/DP1.4

RK3576
4*A72+ 4*A53

DDR_Controller 2*16bit — LPDDR4/4X/5
eMMC/UFS — eMMC/UFS
SDMMC — SD Card
RGMII — Gigabit PHY

System Power — PMIC RK806S-5
SAI — Audio Codec
PDM — MIC Array
OSC 24MHz
SPI/I2C — Touch Panel