

The Most Cost-Effective Intelligent Speakers with Screen

Overview

R528 is an advanced application processor designed for intelligent speaker application. It integrates the high-performance dual-core Cortex™-A7 and single-core HiFi4 DSP to provide the most-efficient computing power. R528 supports full format decoding such as H.265, H.264, MPEG-1/2/4, JPEG, and so on. And the independent encoder can encode in JPEG or MJPEG. Integrated multi ADCs/DACs and I2S/PCM/DMIC/OWA audio interfaces can work seamlessly with the CPU to accelerate multimedia algorithms and improve the user experience. R528 supports RGB/LVDS/MIPI DSI display output interfaces to meet the requirements of the screen display. To reduce the BOM cost, a DDR3 or DDR2 die is embedded for R528. R528 comes with extensive connectivity and interfaces, such as USB, SDIO, EMAC, TWI, UART, SPI, PWM, GPADC, LRADC, TPADC, IR TX&RX, and so on. And R528 can connect with other different peripherals like WiFi and BT via SDIO and UART.

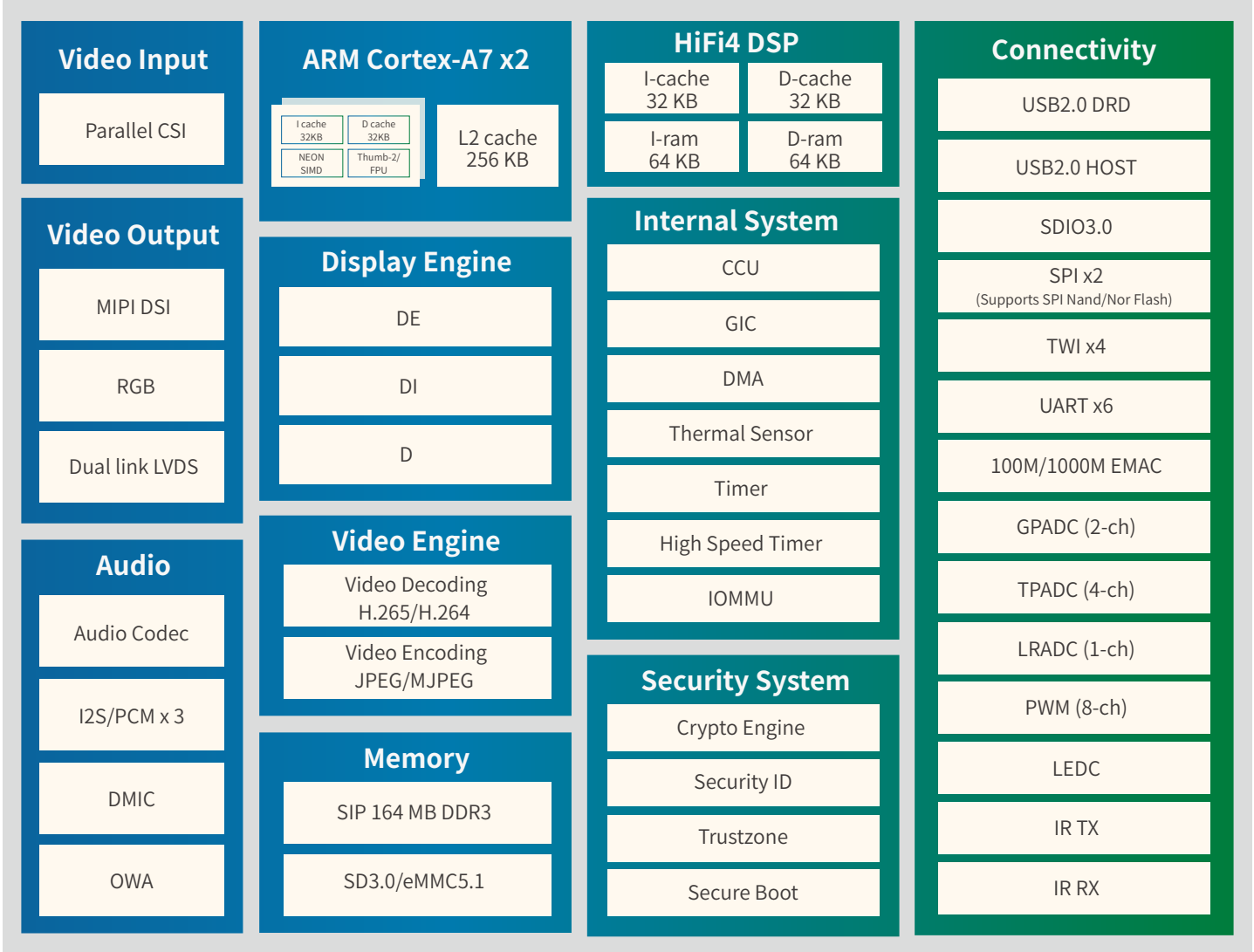
Highlights

- R528 integrates dual-core Cortex™-A7, single-core HiFi4 DSP, SIP DDR3 or DDR2, and high performance 3 ADCs, 2 DACs, 3 I2S/PCM, 8 digital microphones, which provide the perfect voice interaction solutions.
- R528 supports H.265/H.264 1080p decoding and SmartColor2.0 post processing to deliver the perfect video entertainment experience.
- Rich peripheral interfaces, such as RGB, LVDS, MIPI DSI, USB, SDIO, EMAC, TWI, UART, SPI, PWM, GPADC, LRADC, TPADC, IR TX&RX, and so on, greatly facilitate product expansion.
- The advanced process design with lower voltage and lower leakage, the power optimization design for typical scenes, and the enhanced heat dissipation package improve the heating experience of the product.
- Industrial level working temperature, 10-years chip life.

Features

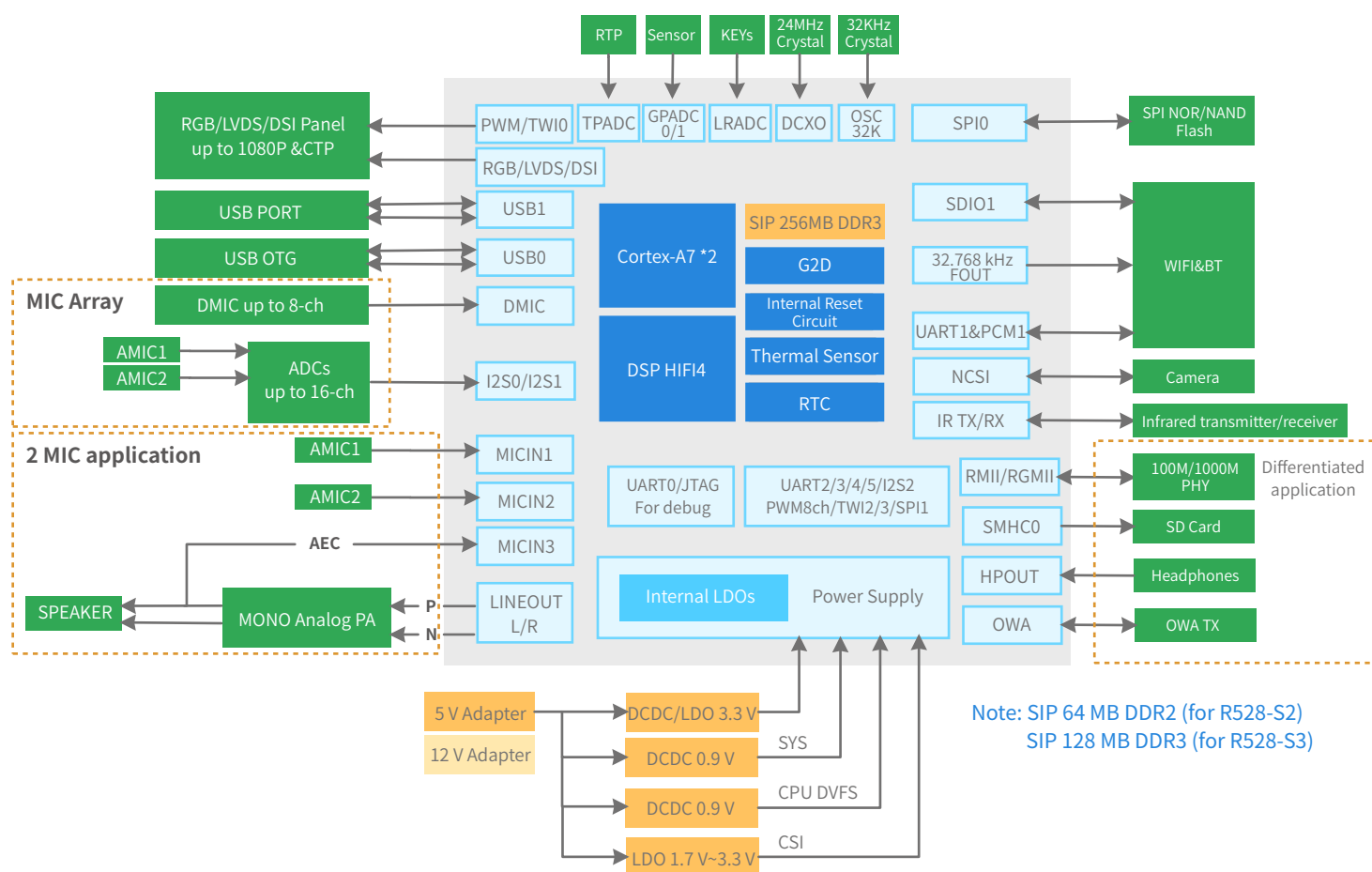
CPU	<ul style="list-style-type: none">• Dual-core ARM Cortex™-A7• 32 KB L1 I-cache + 32 KB L1 D-cache per core, and 256 KB L2 cache
DSP	<ul style="list-style-type: none">• Single-core HiFi4• 32 KB I-cache + 32 KB D-cache• 64 KB I-ram + 64 KB D-ram
Memory	<ul style="list-style-type: none">• SIP 64 MB DDR2 (R528-S2)• SIP 128 MB DDR3 (R528-S3)• SD3.0/eMMC 5.1, SPI Nor/Nand Flash
Video Engine	<ul style="list-style-type: none">• Video decoding<ul style="list-style-type: none">- H.265 up to 1080p@60fps, or 4K@30fps (4K@30fps only for R528-S3)- H.264 up to 1080p@60fps, or 4K@24fps (4K@24fps only for R528-S3)- H.263, MPEG-1/2/4, JPEG, Xvid, Sorenson Spark, up to 1080p@60fps• Video encoding<ul style="list-style-type: none">- JPEG/MJPEG up to 1080p@60fps- Supports input picture scaler up/down
Display Engine	<ul style="list-style-type: none">• Allwinner SmartColor2.0 post processing for an excellent display experience• Supports de-interlace (DI) up to 1080p@60fps• Supports G2D hardware accelerator including rotate, mixer, lbc decompression functions
Video OUT	<ul style="list-style-type: none">• RGB LCD output interface up to 1920 x 1080@60fps• Dual link LVDS interface up to 1920 x 1080@60fps• 4-lane MIPI DSI interface up to 1920 x 1200@60fps
Video IN	<ul style="list-style-type: none">• 8-bit parallel CSI interface• Supports 8-bit digital camera interfaces (RAW8/YUV422/YUV420)• Supports BT656, BT601 interfaces (YUV422)
Audio	<ul style="list-style-type: none">• 2 DACs and 3 ADCs• Analog audio interfaces: MICIN1P/N, MICIN2P/N, MICIN3P/N, FMINL/R, LINEINL/R, LINEOUTLP/N, LINEOUTRP/N, HPOUTL/R• Digital audio interfaces: I2S/PCM, DMIC, OWA
Security System	<ul style="list-style-type: none">• AES, DES, 3DES encryption and decryption algorithms• RSA signature verification algorithm• MD5/SHA and HMAC tamper proofing• Hardware random number generator• Integrated 2 Kbits OTP storage space
Connectivity	<ul style="list-style-type: none">• USB2.0 DRD, USB2.0 Host• SDIO 3.0, SPI x 2, UART x 6, TWI x 4• PWM (8-ch), GPADC (2-ch), LRADC (1-ch), TPADC (4-ch), IR TX&RX• 10/100/1000M EMAC with RMII and RGMII interfaces
Package	<ul style="list-style-type: none">• LFBGA 226 balls, 14.5 mm x 12 mm (R528-S2)• LFBGA 226 balls, 12 mm x 12 mm (R528-S3)

Block Diagram



Note: SIP 64 MB DDR2 (for R528-S2), SIP 128 MB DDR3 (for R528-S3)

Application 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.

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