RENESAS

BIG IDEAS FOR EVERY SPACE

RENESAS RZ

ENTRY-CLASS 64-BIT ARM® CORTEX®-A55 MPU
RENESAS RZ/A3UL GROUP

Entry-class 64-bit Arm® Cortex®-A55 MPU (1 GHz, Single Core)

The RZ/A3UL delivers significant performance, including the highest operating frequency of 1GHz and the ability to connect to high-speed DDR3L/DDR4 RAM. In addition to its high-performance features, RZ/A3UL is an entry-class device providing a cost-effective solution for HMI, IoT Gateway, and audio equipment.

361-pin, 13x13mm PBGA
(0.5mm pitch)

Key Features

- 64-bit Arm® Cortex®-A55 (1GHz, single core)
- 16-bit, DDR3L/DDR4-1600 (in line ECC)
- Octal-SPI Flash/RAM I/F*
- CMOS sensor interfaces (MIPI-CSI2) for camera input
- Display interfaces (Parallel RGB888/RGB666)
- Memory with Error Checking and Correction(ECC)

- Pin-compatible with Linux-based RZ/G2UL and RISC-V based RZ/Five
- RZ/A3UL evaluation kit includes recommended analog devices such as PMIC solution (DA9062), programmable clock generator (5P35023), GreenPAK (SLG46538) and Renesas flash memory (AT25QL128A)

*The Octa Memory Controller in the RZ/A3UL can connect to one OctaFlash / OctaRAM each that supports the Macronix Serial Multi-I/O (MXSMIO®) Octa Peripheral Interface (OPI). OctaRAM can only be connected to OPI-compatible memory.
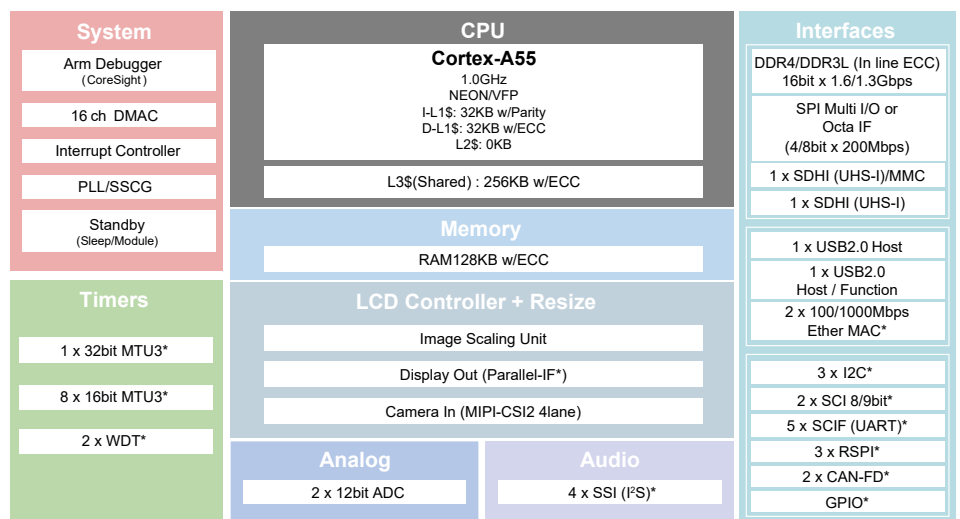
Benefits

- Cost-effective solution based on high operating frequency of 1GHz on 64bit CPU
- Compatible with major RTOS – Azure RTOS and FreeRTOS
- Build compact systems at low cost with fast RTOS-based startup
- Free to choose between DDR3L/DDR4 or Octal-SPI memory interface that best-fit the product design
- Octal-SPI memory interface enables compact size and cost reduction due to lesser layers of PCB needed

Target Applications

- Simple camera/ Simple HMI in home appliances and industrial display
- Retail Point of System (POS)
- IoT Gateway/Controller
- Sound System

Block Diagram

- 64-bit Arm® Cortex®-A55 (1 GHz, single core)
- 16-bit DDR3L/DDR4-1600 (in line ECC)
- Octal-SPI Flash/RAM IF
- Camera IF; MIPI-CSI2 (4 lanes)
- Display IF; Parallel RGB888/RGB666
- 2x Gigabit Ethernet
- 2x CAN (CAN-FD)
- 2x USB2.0 (Host, Host/Peripheral)
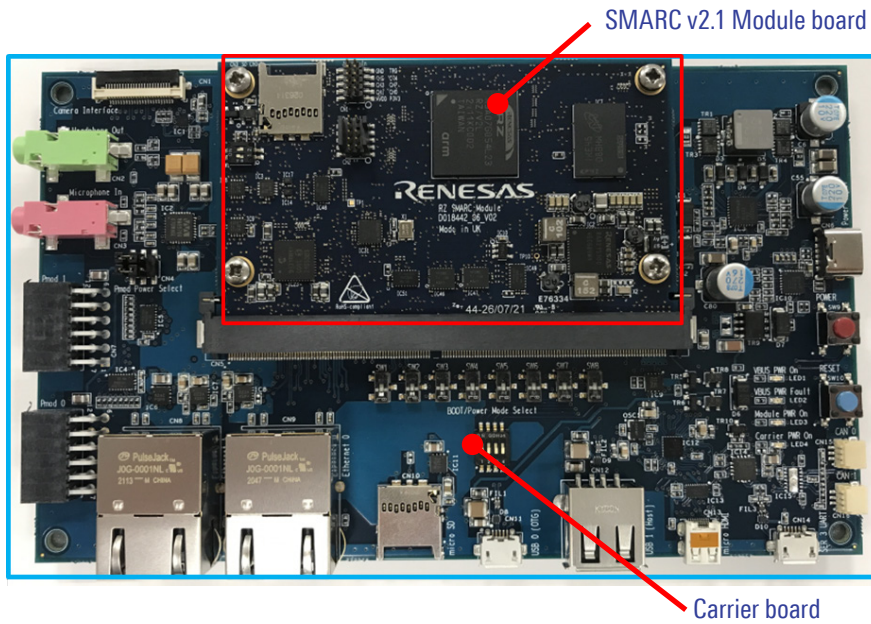- 2x SDHI (UHS-I, UHS-I/MMC)

System
- Arm Debugger (CoreSight)
- 16 ch DMAC
- Interrupt Controller
- PLL/SSCG
- Standby (Sleep/Module)

Timers
- 1 x 32bit MTU3*
- 8 x 16bit MTU3*
- 2 x WDT*

CPU
Cortex-A55
1.0GHz
NEON/VFP
I-L1$: 32KB w/Parity
D-L1$: 32KB w/ECC
L2$: 0KB
L3$(Shared) : 256KB w/ECC

Memory
RAM128KB w/ECC

LCD Controller + Resize
- Image Scaling Unit
- Display Out (Parallel-IF*)
- Camera In (MIPI-CSI2 4lane)

Analog
2 x 12bit ADC

Audio
4 x SSI (I²S)*

Interfaces
- DDR4/DDR3L (In line ECC) 16bit x 1.6/1.3Gbps
- SPI Multi I/O or Octa IF (4/8bit x 200Mbps)
- 1 x SDHI (UHS-I)/MMC
- 1 x SDHI (UHS-I)
- 1 x USB2.0 Host
- 1 x USB2.0 Host / Function
- 2 x 100/1000Mbps Ether MAC*
- 3 x I2C*
- 2 x SCI 8/9bit*
- 5 x SCIF (UART)*
- 3 x RSPI*
- 2 x CAN-FD*
- GPIO*

*Shared

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Reference Board (Evaluation Kit)

The reference board of RZ/A3UL has a SMARC v2.1 Module board + Carrier board configuration.

SMARC v2.1 Module board

Carrier board

- **Module board (Dimension: 82 mm x 50mm)**
  - Processor: RZ/A3UL
  - Main Memory: 1GB DDR4 (1GB x1)
  - QSPI NOR FLASH: 128Mb
  - eMMC Memory: 64GB
  - External Storage: micro SD x1
  - JTAG connector
  - PMIC (DA9062), Programmable clock generator (5P35023), GreenPAK (SLG46538) and Flash memory (AT25QL128A) used in RZ/A3UL EVK
- **Carrier board (Dimension: 160mm x 100mm)**
  - Gigabit Ethernet x2
  - USB2.0x 2ch (OTG x1ch, Host x1ch)
  - MIPI-CSI Camera connector
  - Parallel Output (RGB888)
  - CAN-FD x2
  - External Storage : micro SD x1
  - Audio Line in x1
  - Audio Line out x1
  - PMOD x2
  - USB-Type C for Power Input

Product Information

	R9A07G063U02GBG	R9A07G063U01GBG
CPU/Frequency	Cortex-A55/1.0GHz	Cortex-A55/1.0GHz
On-Chip RAM	128KB (w/ ECC)	128KB (w/ ECC)
Supported Flash ROM	Serial (DDR), Octal-SPI Flash	Serial (DDR), Octal-SPI Flash
RAM Interface	DDR3L/DDR4, Octa-SPI RAM	- Octal-SPI RAM
Graphics Engine	Unavailable	Unavailable
LCD Controller	LCDC (1ch)	LCDC (1ch)
Camera Interface	Digital (Serial:MIPI)	Digital (Serial:MIPI)
Ethernet	2 x 10/100/1000 Ethernet	2 x 10/100/1000 Ethernet
Connectivity	1 x USB2.0 Host, 1 x USB2.0 (Host/Function), 2x SDHI (UHS-I)	1 x USB2.0 Host, 1 x USB2.0 (Host/Function), 2x SDHI (UHS-I)
DDR-RAM I/F	Yes	No
Package	361PBGA	361PBGA

Visit www.renesas.com/rza3UL for more information.