

# Extend RISC-V CPU Core Options for IoT Platform

## RENESAS RZ/FIVE GROUP

The RZ/Five general-purpose microprocessor (MPU) is embedded with a 64-bit RISC-V ISA\* compliant CPU (AX45MP Single) operating at 1.0 GHz. It has many built-in interfaces including 16-bit DDR3L/DDR4 interface, Gbit-Ethernet, CAN, and USB 2.0, making it ideal for applications such as entry-class social infrastructure gateway control equipment and industrial gateway control equipment. The RZ/Five MPU enables scaling of development through a mutual migration between Arm® and RISC-V cores.

\*Instruction Set Architecture



### Key Features

- 1x AX45MP (1.0GHz)
- 16-bit DDR3L/DDR4-1600 (in line ECC)
- 2x Gigabit Ethernet
- 2x CAN (CAN-FD)
- 2x USB2.0 (Host, Host/Peripheral)
- 2x SDHI (UHS-I, UHS-I/MMC)
- 1x SPI-Multi IO (4bit DDR)
- 4x I2C
- 5x UART
- 3x RSPI
- 2x 12bit ADC
- 1x Thermal sensor
- Package;
  - 13mm x 13mm, 0.5mm pitch 361pins BGA
  - 11mm x 11mm, 0.5mm pitch 266pins BGA

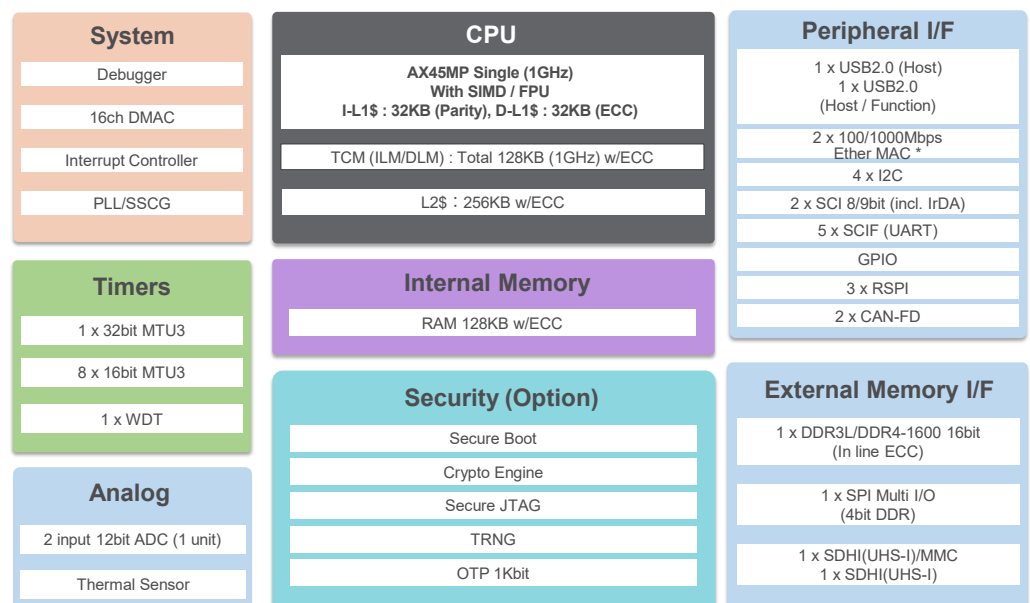
### Benefits

- Embedded with open RISC-V ISA reduces the risk in long-term usage of the technology
- High CPU performance @ 1.0GHz
- SMARC development environment enables mutual migration between RISC-V and Arm
- Easy migration between pin-compatible MPUs – RZ/Five (RISC-V core) and RZ/G2UL (Arm core)
- Optimized solution for IoT Edge
- High reliability and long-term maintenance Linux support
- Reduce total system cost with 4-layer PCB design

### Target Applications

- IoT Edge Equipment
- Solar Inverter
- Secure Home Gateway

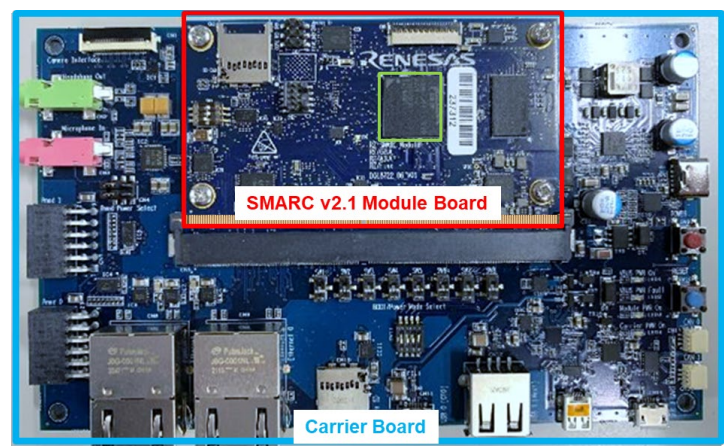
### RZ/Five Block Diagram



\* The 266pin package has one channel of Gigabit Ethernet.

Evaluation Board Kit (EVK)

The RZ/Five EVK consists of a SMARC v2.1 module board and a carrier board. You can easily evaluate each device by replacing the SMARC v2.1 module board.



Evaluate both RISC-V CPU and Arm CPU by replacing [SMARC module for RZ/Five \(RISC-V\)](#) and [SMARC module for RZ/G2UL \(Arm\)](#) on the carrier board.

- Module board (Dimension: 82 mm x 50mm)
  - Processor: RZ/Five (RISC-V)
  - Main Memory:1GB DDR4 (1GB x1)
  - QSPI NOR FLASH: 16MB
  - eMMC Memory: 64GB
  - External Storage: microSD x1 (Exclusive with eMMC)
  - A/D Converter Interface
  - JTAG connector
  - PMIC (DA9062)
- Carrier board (Dimension: 160mm x 100mm)
  - Gigabit Ethernet x2
  - USB2.0 x 2ch (OTG x1ch, Host x1ch)
  - External Storage: microSD x1
  - Audio Line in x1
  - Audio Line out x1
  - PMOD x2
  - USB-Type C for Power Input

Ordering Information

| Product Group                        | RZ/Five                    |                            |
|--------------------------------------|----------------------------|----------------------------|
|                                      | Part No.                   |                            |
|                                      | R9A07G043F01GBG            | R9A07G043F00GBG            |
| RISC-V AM45MP Single                 | ✓                          | ✓                          |
| 16-bit DDR3L/DDR4-1600 (in line ECC) | ✓                          | ✓                          |
| SDHI (UHS-I, UHS-I/MMC)              | ✓                          | ✓                          |
| QSPI Multi I/O                       | ✓                          | ✓                          |
| Gigabit Ethernet                     | 2ch                        | 1ch                        |
| CAN (CAN-FD)                         | ✓                          | ✓                          |
| 12bit ADC                            | ✓                          | ✓                          |
| Package Type                         | LFBGA                      | LFBGA                      |
| Pin Count                            | 361pin                     | 266pin                     |
| Package Information                  | 13mm x 13mm<br>0.5mm pitch | 11mm x 11mm<br>0.5mm pitch |

For more information, visit [renesas.com/rzfive](https://renesas.com/rzfive)

