

RZ/G2 64-BIT MPUs with VERIFIED LINUX PACKAGE

High-Performance, High-Reliability MPUs with Advanced Graphics for Next-Generation HMI in Industrial and Building Automation

Developers using embedded controllers in Industrial Automation and Building Automation applications are demanding higher performance, higher reliability, and long-term software support. To address these demands Renesas Electronics created the new RZ/G2 group of microprocessors (MPU), which combine a powerful 64-bit multi-core architecture with advanced graphics capabilities and high-bandwidth memory interfaces to enable a new generation of systems with enhanced human-machine interfaces (HMI) for factory automation, process control, building power management, and video surveillance. Renesas supports RZ/G2 application development with an industrial-grade Linux software package, maintained for 10+ years to bring reliability, functional safety, security, and feature-richness to mission-critical systems.

RZ/G2 Platform Highlights

- **High Performance:**
64-bit Arm®v8-A cores, plus powerful graphics engine and 4k UHD video engine, to offer the highest performance per dollar
- **High Reliability:**
Built-in Error Correction Code (ECC) for internal and external memory, which is essential for high-reliability mission critical systems
- **Super Long Term Support (SLTS) for Linux:**
Civil Infrastructure Platform (CIP) offers 10+ years support for Linux kernel
- **RZ/G Linux Platform Solution:**
Reduce development cost and time with Renesas verified software for RZ/G MPUs

Next-Generation Architecture Delivers Highest Performance and Advanced Graphics Capabilities

Renesas RZ/G2 microprocessors offer higher performance per dollar than competing embedded 64-bit MPUs to reduce system cost while improving system performance.

- 64-bit architecture for faster, more efficient processing with Arm® Cortex®-A53 and Cortex®-A57 CPU cores
- Multicore combinations to scale from low-end to high-end applications, delivering up to 35.6k DMIPS in a single package
- Latest high-speed protocols for external memories including DDR3L and LPDDR4 up to 3200 MT/s
- Fast communication with integrated USB 3.0, SATA, PCI-e, Gigabit Ethernet, QSPI, and eMMC interfaces
- Powerful video and graphics with 600 MHz PowerVR 3D GFX, 4k UHD H.265 and H.264 codecs, HDMI, LVDS, and MIPI-CSI2 camera inputs

RZ/G2 Group Capabilities at a Glance

RZ/G2 Group	RZ/G2E	RZ/G2N	RZ/G2M	RZ/G2H
	Economical	Mid-Range		High Performance
Wide Range Pin Compatible				
CPU (64-bit Arm®v8-A)	2× Cortex®-A53@1.2 GHz L1L2 Parity/ECC	2× Cortex®-A57@1.5 GHz L1L2 Parity/ECC	2× Cortex®-A57@1.5 GHz 4× Cortex®-A53@1.2 GHz L1,L2 Parity/ECC	4× Cortex®-A57@1.5 GHz 4× Cortex®-A53@1.2 GHz L1,L2 Parity/ECC
Performance	5,500 DMIPS	12,300 DMIPS	23,300 DMIPS	35,600 DMIPS
DRAM I/F	DDR3L-1866 × 32-bit (ECC)	LPDDR4-3200 × 32-bit (ECC)	LPDDR4-3200 × 64-bit (ECC)	LPDDR4-3200 × 64-bit (ECC)
Video Codec	FHD resolution H.265 Decoder H.264/AVC	4k resolution H.265 Decoder H.264/AVC	4k resolution H.265 Decoder H.264/AVC	4k resolution H.265 Decoder H.264/AVC
3D Graphics	PowerVR GE8300@600 MHz	PowerVR GE7800@600 MHz	PowerVR GX6250@600 MHz	PowerVR GX6650@600 MHz
Other Peripheral Functions	USB 3.0, GbE, PCIe, MIPI-CSI LVDS	USB 3.0, SATA, PCI-e, GbE, MIPI-CSI HDMI	USB 3.0, PCI-e, GbE, MIPI-CSI HDMI	USB 3.0, SATA, PCI-e, GbE, MIPI-CSI HDMI

ECC for High Reliability

Error-correcting code (ECC) functions protect RAM against radiation-induced soft errors, a critical requirement for high-reliability systems.

- The only embedded MPUs offering ECC on all internal and external memory interfaces for all device options
- RZ/G2 L1 and L2 cache SRAM memories have built-in ECC to reduce/eliminate soft errors
- DDR3L or LPDDR4 interfaces implement ECC to protect data on external memory devices

Code and Data Security

Renesas RZ/G2 microprocessors enable a secure trusted platform through many hardware features including:

- Arm® TrustZone partitioning
- Cryptographic acceleration
- Secure key generation and storage
- Secure boot
- Establishment of unique root of trust

Super Long Term Software Support

Renesas RZ/G2 microprocessors are the only embedded MPUs that meet the long-term support demands for industrial and infrastructure equipment manufacturers through the 10+ year support offered by the Super Long Term Support (SLTS) kernel maintained by the Civil Infrastructure Platform (CIP). The CIP SLTS Linux kernel supports countermeasures against vulnerability to security attacks with a long-term maintenance period of 10 years or more. This reduces Linux maintenance costs and simplifies adoption of reliable industrial-grade Linux.

RZ/G Linux Platform Reduces Cost and Simplifies Design

Start developing applications quickly with reduced costs. Minimize resources for maintenance. The RZ/G Linux Platform includes a reference board and the following no-charge development package:

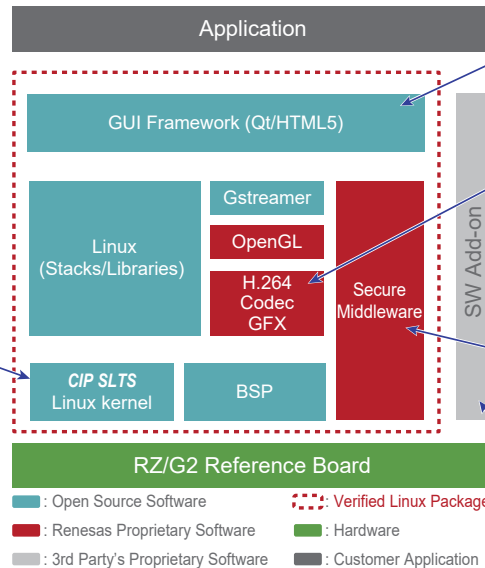
- Verified Linux Package (VLP) with CIP SLTS kernel
- GUI framework and multimedia middleware for HMI
- Security middleware
- A complete software development environment
- Verification test software so customers can perform re-verification in their own systems



CIP SLTS Kernel

- Civil Infrastructure Platform project
- 10+ years super long term support Reliability/Security/Real-time

Civil Infrastructure Platform (CIP) Project adopted Renesas RZ/G2M-96CE board as Arm64 reference board for the next CIP SLTS Kernel



GUI Framework

- Qt application framework
- HTML5 application framework



Multimedia

- H.264 codec
- H.265 decoder for 4k UHD
- 3D graphics

Secure Middleware

- Encrypted kernel boot
- Security communication
- Secure key storage

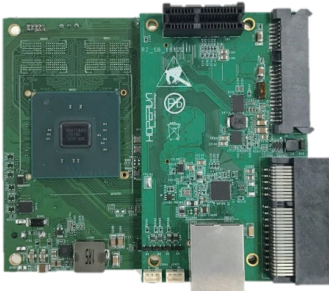


Renesas Sample Applications 3rd-party Software Add-ons

Flexible Development Kits

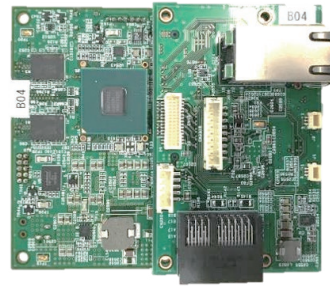
RZ/G2 development kits support the industry standard 96Boards specification to enable evaluation and speed development with a wide variety of mezzanine boards. Renesas provides circuit schematics, component BOMs, and board layout data to make it easy to spin your own custom hardware.

RZ/G2M 96 Development Kit



- Main Memory: 4 GB DDR4
- QSPI NOR FLASH 64 MByte
- I²C EEPROM 512 Byte
- External Storage: micro SD × 1
- Connectivity: USB 2.0 × 2ch, USB 3.0 × 1ch, GbE × 1
- HDMI out / LVDS out or MIPI DSI out
- Wi-Fi + BT

RZ/G2E 96 Development Kit



- Main Memory: 2 GB DDR3L
- QSPI NOR FLASH 64 MByte
- I²C EEPROM 512 Byte
- External Storage: micro SD × 1
- Connectivity: USB 2.0 × 2ch, USB 3.0 × 1ch, GbE × 1
- HDMI out / LVDS out or MIPI DSI out
- Wi-Fi + BT

Take the Next Step

Learn more about the new RZ/G2 MPUs and the RZ/G Linux Platform at: www.renesas.com/rzg2

Download the free Civil Infrastructure Platform white paper at: www.cip-project.org

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit: www.renesas.com/contact/

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