Renesas RX Testimonials from Partners and Customers.

Learn more from the experiences of our partners and customers using RX MCU in the following applications:

- **Autonomous Security**
  - IAR/Secure Thingz
  - SECOM

- **Human-Machine Interface (HMI)**
  - Midea Group
  - Rinnai Corporation

- **Industrial Automation Functional Safety with Motor Control**
  - Daikin Industries
  - Delta Electronics

- **Wireless Connectivity**
  - Neona Embedded Labz
  - silex technology

Autonomous Security

Haydn Povey

CEO

Secure Thingz, an IAR Systems Company

Congratulations to Renesas on the 10th Anniversary of the RX family!

At Secure Thingz, an IAR Systems company, we have been working with the RX family for over 7 years, and it has been fantastic to see the family of devices grow strongly, and the wealth of applications using this technology being so successful in the marketplace.

As an organization, we focused on enabling developers using the Renesas RX family to develop secure applications easier and faster, and on enabling a secure supply chain covering development, prototyping, volume production, and lifecycle updates. The core capabilities of RX, alongside advanced features including Trusted Secure IP (TSIP), make it an ideal platform for developing applications meeting EN303645 consumer and IEC62443 industrial legislation.

Embedded Trust and Renesas RX simplify security implementation by including the development of flexible secure boot source code, the implementation of ownership and integration of security certificates, and simplified update models. The support of RX TSIP functionality in Embedded Trust and C-Trust ensures that keys are held securely and outside of the reach of attackers.

Our Secure Deploy platform, including the Secure Desktop Provisioner, enables organizations to securely prototype and provision devices utilizing Renesas E2 Emulator Lite. This native support is critical for organizations looking to develop and validate secure applications, with

	the introduction of unique identity per device, the generation of keys, and the management of keys and certificates. The RX family, in concert with Embedded Trust and the Secure Desktop Provisioner, brings this into the reach of every traditional embedded developer. Once the application is validated, the platform enables generation of production ready First Articles, ensuring a simple flow into initial volume production. The Secure Desktop Provisioner, alongside the E2 Emulator Lite, enables automated secure production and ensures a seamless transition to secure volume manufacturing. Renesas and the RX family, alongside the IAR and Secure Thingz tools, provide the first truly global security flow, from development through to secure production, and lifecycle management. As all applications need to meet the upcoming security legislation the RX Security Solutions, on its 10th anniversary, is a great place to start secure.

信頼される安心を、社会へ。
SECOM

Hiroki Kunii

Research Engineer

Cryptography and Authentication Platform Group

Systems Laboratory

SECOM CO., LTD

Congratulations on the 10th anniversary of the RX launch!

With a strong desire to create better services for society, under the mission of “helping to achieve a society free from concerns”, we have developed six operations including disaster prevention, medical care, insurance, geospatial information services, BPO and ICT, as well as security to provide reliable security trusted by society ever since our company was founded in 1962. In order to respond to the drastic changes in the external environment in recent years, we aim to create “ANSHIN platform”. This is a social infrastructure to provide enduring peace of mind in the daily life of the people and society, by bringing together various technologies and knowledge from our partners who share SECOM’s philosophy (“collaborative creation” strategy), based on the connections we have cultivated with the public.

Due to the emergence of IoT malware such as Mirai, the challenge of IoT security is becoming more and more serious in society. Three companies, SECOM, our group company, SECOM Trust Systems, and Renesas Electronics have started to collaborate on the development of a secure IoT security infrastructure since 2017. This is an indispensable collaboration to create the “ANSHIN platform”. Our relationship with Renesas had been that of a manufacturer and a supplier in which we selected Renesas MCUs for the development of our security products, but we have started working beyond that framework. SECOM has been providing online security systems for many years being the IoT pioneer in security business, and Renesas has an extensive track record in microcontrollers, including microcontrollers used in the core of IoT devices. The collaboration between SECOM’s experience and know-how with Renesas’ technology creates a great synergy.

Cryptography is one of the basic technologies of the security, managing a key which is the linchpin of this technology. The challenge of locating the key is the starting point and is one of the most significant challenges in

	security implementation. RX MCU is suitable to solve this challenge. The RX MCU has a consistent security function to enable cryptographic key management using Hardware Root of Trust known as Trusted Secure IP (TSIP). Although solutions equipped with security functions for IoT devices are available in the market, there are few product lineups that could cover different application usage as the RX MCU. Also, from the perspective of supply chain security, which is beginning to gain attention recently, Renesas is our reliable partner. We can count on Renesas to protect the whole life cycle of IoT devices thoroughly. We will continue to press ahead to create “ANSHIN platform” with Renesas in the future.

Human-Machine Interface (HMI)

 **Wei Hong, Hong** Senior Software Engineer Commercial Air-Conditioning Division – R&D Center Midea Group	Congratulations to RX in launching their products to the market for the tenth year. After 52 years of development, Midea Group has become a global technology group integrating consumer electronics, HVAC, robotics and automation systems, and digital business. About 400 million users in more than 200 countries and regions around the world have benefited from its products and services. Midea’s commercial air-conditioning division got to know about Renesas RX products three years ago. The RX product line is rich, with different products and development kits for various applications, having a variety of packages, and responding well to the products’ model upgrade. In addition to the increasing requirements for energy efficiency in air-conditioning products, the number of intelligent and TFT color screen

 **Long Qin, Huang** Head of Drum Development Software Washing Machine Division – Electronic control Development Department Midea Group	displays is also increasing. RX651 series is able to easily realize a single-chip display solution with its high-performance CPU, rich peripherals, integrated TFT drivers and 2D hardware graphics acceleration, and large-capacity embedded on-chip flash and RAM. RX130 has a rich product line, with multiple touch channels, multiple packaging options, and rich peripherals. The 32-bit core has better computing speed, and the button's waterproof performance is stable and reliable. Also, the PC-based debugging tool makes development more convenient. These features of RX130 solve the problems encountered in the development of washing machine touch buttons. Congratulations to Renesas RX Family on its 10th anniversary. We look forward to Renesas' continuous innovation in the future and providing more cost-effective products and services.

Rinnai

 **Koji Yokoyama** Deputy General Manager Electronics Section, R&D Headquarters Rinnai Corporation	Rinnai Corporation offers products and services based on 'safety and security', 'comfort', and 'environment' contributing to a better lifestyle with home appliances, such as water heater, kitchen appliances, and air conditioning. Rinnai, celebrates its 100th anniversary this year, is focusing on branding with the aim to become a global brand creating a healthy and comfortable way of life. With that in mind, a posh and elegant domino-style built-in stove (G:101) is developed. The operating circuit of this stove was developed by the touch key method controlled by RX130. The key challenge to develop an elegant product in both static and in operation mode, is to have a key display that is simple and intuitive to use when the power is turned on. And, when the power is turned off, it

	becomes a decorative craft without revealing the operating circuit. In order to achieve this, a thickness of 4 mm black glass is used on the entire top surface of the stove, and the operating circuit must be placed on the top surface. For these reasons, we have chosen to use the touch keys. RX130 is selected as it has a capacitive touch key function that can penetrate 4 mm thick glass and has 36 channels of touch key ports. In addition, the port that was unused for touch key can be used as a general-purpose port for future product development is a merit that other companies could not provide. Moreover, the standby current is small in a battery-powered household stove and external oscillator is not required due to the high accuracy of the built-in oscillator. In the development phase, we made more prototypes than usual, including the electrode pattern, in order to ensure the product design, heat measures, and safety are in place. Thanks to the free QE for Capacitive Touch tool, which automatically adjusts the touch key parameters' program code enables the hardware engineer to adjust the sensitivity by himself to complete the edits and tests quickly. This enables the development to overcome very strict requirements within the deadline and was a great help to the overall development. This built-in stove with a stringent product concept, has won the "Good Design Award" and "Red Dot Design Award", and is highly evaluated by the market. In the future, various advanced developments are required in the four areas namely sensing, communication, power electronics, as well as UI. I look forward to the further evolution of Renesas and RX and moving

	forward together to the next stage of sensing information and connecting to services.

Industrial Automation Functional Safety with Motor Control

 **Taiki Taguchi** Senior Engineer Product Development Group Air-Conditioning Manufacturing Division Daikin Industries, Ltd.	Daikin Industries, Ltd., a major air conditioner supplier creates the supporting infrastructures for the society including the working and living environment and contributed to improving the quality of our life. The first model using RX microcontroller was the outdoor unit of the “Ururu Sarara“ series (2012 model) home-use air-conditioner with moisture humidification. The deciding factor of RX was the high real-time processing performance. After this product, we developed a basic model with a single microcontroller controlling both the fan and compressor of the outdoor unit without sensors to reduce the size. The RX62T demonstrated its true value with the ability to control two inverters with high real-time processing performance. As a result, we reduced the number of parts such as hall sensors; and achieved in developing smaller PCB board and housing in the industry. During development, a trouble was prolonged, and the prototype was transported from Shiga to Renesas in Tokyo on the Shinkansen line for debugging. It is a memorable experience now, but it was tough then. For all future models developed, RX is used in the outdoor units. We implemented a new control technique of the convertor and the compressor with a single chip that does not require smoothing capacitor in the PFC (Power Factor Correction) control section. In so doing, we need to shorten the control cycle of inverters and at the same time, gaining faster access to flash memory. RX66T is a high performance MCU meeting the criteria and we started to use RX66T in the latest models. In addition, we are working on developing platforms using multiple product series for multiple regions with limited resources. For example, air-conditioners with

	ventilation are gaining attention as part of the COVID-19 measures, but having a platform is essential to enable such development variations. The RX microcontroller facilitates the development of a platform as it is pin-compatible and upward compatibility in features. Considering the utilization of environmental data around air conditioners, we expect further improvements in processing performance per frequency and expanding memory sizes for future RX. We believe that Renesas is a partner with whom we can work together to improve the quality of life of society as a whole.

Andy Liu

General Manager,

Industrial Automation BG

Delta Electronics, Inc.

Congratulations to the 10th Anniversary of Renesas RX product series!

Delta has been deeply involved in the field of industrial automation for 25 years - having a complete automation product line, including AC motor drives, AC servo drives, programmable logic controllers, human-machine interfaces, machine vision, temperature controllers, etc. In addition to our strong R&D team, we are also grateful to our supplier partners in providing key components with excellent performance, allowing us to provide complete and reliable products and solutions to help customers emerge from the market competition.

Renesas RX product series with its related packages and solutions supporting motor control, industrial network, human-machine interface and functional safety (FuSa) helps Delta in the application of intelligent manufacturing, greatly improving productivity and safety needs. For example, the RX66T series is equipped with RXv3 third-generation CPU core, controlling up to four motors and other peripherals with a maximum operating frequency of 160 MHz and motor control peripheral modules.

	The IC built-in protection circuit and FuSa provide new added value for frequency conversion control applications. In terms of functional safety, Renesas' FuSa provides a complete solution including SIL3 software packages, hardware evaluation boards, documents, safety certified compilers, and FSoE (Functional Safety over EtherCAT), etc., helping customers to pass the IEC61508 certification in the shortest time. Sending my best greetings to RX product series on their 10th Anniversary! Hope that RX will have more new products launching in the future. Let's continue to cooperate, and jointly create greater value for customers!

Wireless Connectivity

NEONA
EMBEDDING IMAGINATIONS

 **Anchunath R** Founder/CEO Neona Embedded Labz Pvt. Ltd	Neona is an Independent Design and Services Company with strong expertise in embedded design and service in IoT/Cloud, such as smart home and smart meter solution. In the last 6 months, we are using RX23W with BT5.0 in our Smart Home Automation and Smart Locker project. It's easy to use even for a beginner and it's easy and quick to develop the prototype and first level demo to my client. The Smart Configurator makes it much easier to create sample application for BT5.0, which are ready to build and test with just a simple click in the GUI. It's a breeze to do code modification, as we were able to customize the Cap Touch application for user interface without affecting the rest of the codes. And, the touch calibration works well with the RX Cap Touch Kit.

	The combination of Cap Touch with BT5.0 and the rest of the major peripheral functions (analog, digital, USB etc) embedded in a single chip is ideal for my development. And, the most beautiful aspect of RX23W is the size. A small BGA package containing many important features helps to save board space too. It would be ideal if it could include a Wi-Fi functionality in the future.

silex technology

 **Takahiro Kiji** Senior Product Manager, Global Marketing Center silex technology, Inc.	Congratulations on the 10th Anniversary of RX Family. Our core technology is wireless, and we provide both hardware and software solutions for wireless connectivity such as wireless LAN modules and networking access points. The first business collaboration with the RX team started when they showed their interests in our 'Absolutely Must Connect Technology' and adopted our wireless LAN module (SX-ULPGN-2000) for the RX65N Cloud Kit. The demo unit developed with the RX65N Cloud Kit could immediately connect to the cloud, we were able to focus on wireless connectivity development to prove our expertise on 'Absolutely Must Connect wireless even in places where signal reception is poor like exhibition venues. Now, we can prove our strength in wireless technology and the RX65N Cloud Kit's strong processing power through the demonstration of stable connectivity from sensors to the cloud. Visitors at our exhibition were impressed with the stress-free connectivity we had developed. With the success story, we look forward to growing our wireless connectivity business with Renesas by enhancing our wireless LAN modules which is imperative to cloud connectivity and working together on RX23W collaboration.