

QuickConnect Studio v1.7.0

Introduction

The QuickConnect Studio (QCS) is a unified, browser-based, no-code/low-code embedded system design platform that enables engineers to rapidly prototype and configure hardware and software using Renesas and partners products.

The platform provides a visual drag-and-drop interface where users can select MCU kits and peripherals across various supported interfaces (Pmods, Arduino, camera, USB). The platform generates software that includes drivers, middleware, and reference applications ranging from IoT to Edge AI. Users can customize, compile, and debug their application from the browser window leveraging Renesas managed Remote board farms.

Note: Debug is an evolving feature, and Renesas continues to expand the testing of it across all devices.

Key Engineering Capabilities

- Hardware-software co-design
- Automatic code generation and customization
- Unified debug interface (Direct/Remote) using QC-Debug
- Auto-validation of HW/SW design blocks using QC-Docking

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1. Release Summary

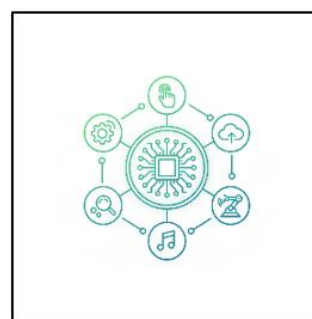
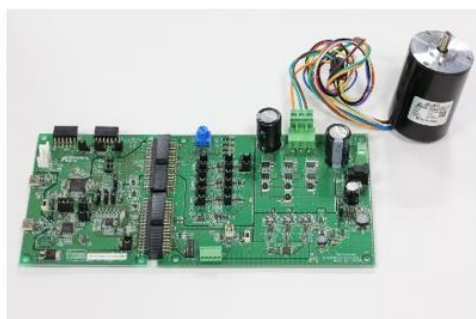
QCS Release v1.7 expands hardware versatility with new MCU, MPU, and peripheral kits, along with additional communication and connector interface support. This release also introduces several new RA and RZ application templates, enabling users to prototype a broader range of solutions more easily.

This release also delivers key architectural enhancements that improve overall platform performance. Additionally, users benefit from an improved experience through a redesigned tool palette with clearer device classification and an updated application configuration menu.

2. Kits and Applications

2.1 New Kits in QCS v1.7.0

The following new kits are added to QCS in this release. *Note:* A list of all the supported kits for QCS is in the appendix List of Kits Supported on QCS v1.7.



2.1.1 MCU/MPU Kits

MCK-RA6T2	Renesas Flexible Motor Control Kit for RA6T2 MCU Group
MCK-RA6T3	Renesas Flexible Motor Control Kit for RA6T3 MCU Group
RZ/G3S	Evaluation Board Kit for RZ/G3S MPU
RZ/V2H	RZ/V2H Quad-core Vision AI MPU Evaluation Kit

2.1.2 Peripheral Kits

Product Description	Interface ^[1]
Tdk invensense ICM20948 9-Axis IMU	Qwiic
Piezo buzzer	Grove
Rotary encoder	Grove
Momentary push button	Grove
Arduino motor shield - Adafruit v2.3	Arduino
Adafruit infrared IR remote receiver	Qwiic
QCIOT-ISL3173POCZ RS-485 transceiver	PMOD
Keypad with 12 buttons	GPIO

Product Description	Interface ^[1]
Sensirion SPS30 PM2.5 sensor	GPIO
Sunfounder ST0050 IR obstacle avoidance sensor	GPIO
URM09 ultrasonic distance sensor - analog /trig	GPIO

- The following are peripheral interfaces currently enabled on QCS: Pmod, Grove, MikroE Click, Arduino, Qwiic, GPIOs, Camera, and Display.

2.2 New Applications in QCS v1.7.0

The following new applications are added to QCS in this release. *Note:* A list of all the supported applications for QCS is in the appendix, List of Applications Supported by QCS v1.7.



2.2.1 MCU (RA) Based Applications

Application	Description
IoT sensor monitoring via serial interface	This application collects real-time sensor data and outputs it via a serial connection for monitoring, and data can be viewed on a serial monitor app on a PC.
Interface and control a piezo buzzer	This application drives a Grove Buzzer using a Renesas RA MCU through GPIO output control, toggling the buzzer to demonstrate peripheral interfacing and timing functions.
Motor rotation and speed control	A motor-control demo using a Renesas RA MCU and an Arduino Motor Shield to drive motor rotation and speed, showcasing basic PWM-based motor control for embedded applications.
Real-time key input visualization using 4x3 keypad	A simple demo using a 4x3 keypad with a Renesas RA MCU to detect key presses and display them in real time, showcasing basic input scanning and display interfacing in embedded systems.
Smart robot with obstacle avoidance	This demo uses the SunFounder ST0050 IR Obstacle sensor with Renesas RA MCU boards using GPIO interface to detect obstacles and automatically adjust the robot's direction, illustrating basic real-time navigation control.



2.2.2 MPU (RZ) Applications

Application	Description
Defense wild animals for crop	A vision-based application that detects and identifies animals entering farm areas to enable early alerts and reduce crop or livestock damage.
Smart point of sales	A camera-based demographic analysis system that uses DNN models to estimate age and gender in real time, enabling automated validation of age-restricted purchases and seamless POS integration.
Touchless controller for elevator	An AI-based gesture-recognition application that interprets dynamic hand-gesture patterns for contact-free elevator control. It uses real-time inference to enable hygienic, intuitive floor selection and door operations.

Application	Description
Preceding vehicle movement alert	A real-time vision system using lightweight object-detection models (e.g., TinyYOLOv3) to track leading vehicles and detect motion events, providing timely alerts to improve driver responsiveness and urban mobility safety.

3. Platform Enhancements

3.1 Project and Workspace Update

This release introduces major architectural improvements designed to enhance platform performance and prepare the foundation for advanced capabilities in future updates.

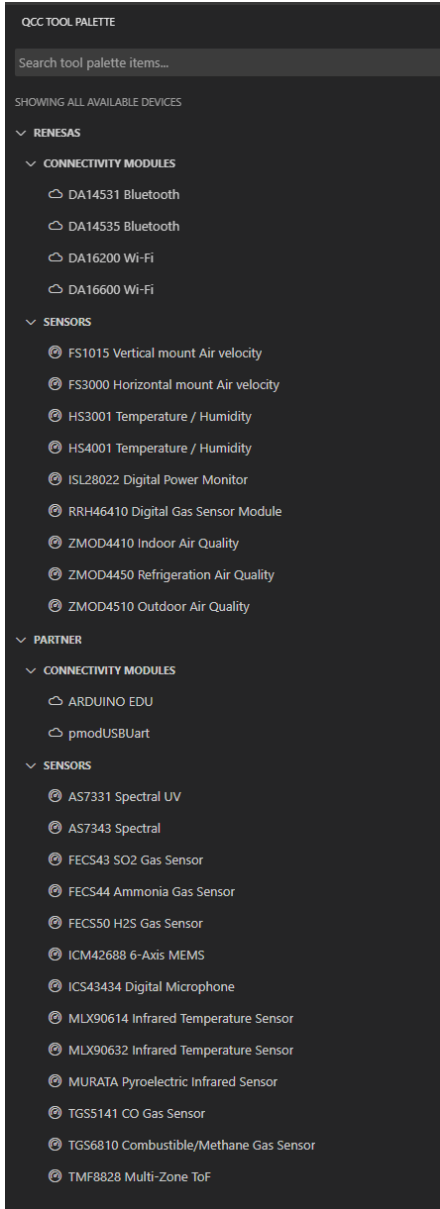
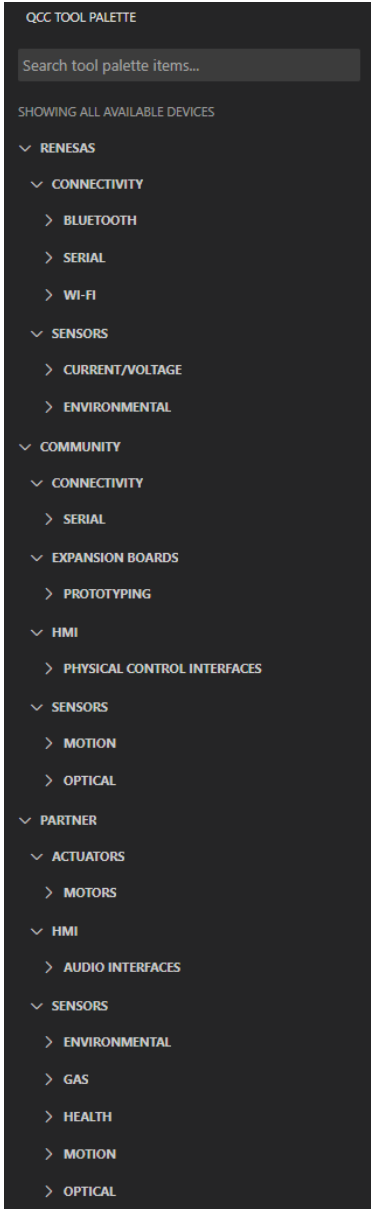
Project and workspace handling has been updated and is now aligned with the e²studio structure using REST APIs. Please note that these changes are not backward-compatible with existing projects. As a result, all current projects in user workspaces must be recreated in v1.7.0.

For details on how these changes impact user workflows, refer to the *QuickConnect v1.7 Migration Guide*.

QCS 1.6.0	QCS 1.7.0
Project Name └ Configuration (QCC file) └ Build-workspace (build logs) └ <Board+OS> (FSP project)	Project Name (now represents the actual FSP project) └ Configuration (QCC file) └ Build-workspace (build logs)

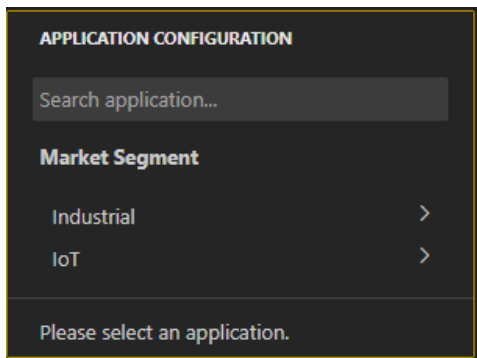
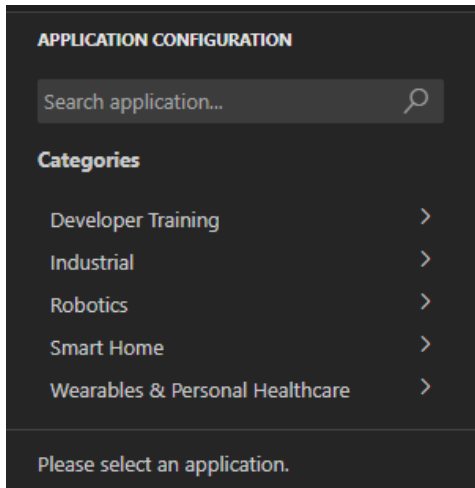
3.2 QCC Tool Palette

The device tool palette is reorganized in v1.7.0 to present a cleaner, more intuitive layout because the boards and modules are now organized by category.

QCS 1.6.0	QCS 1.7.0
Boards and modules were organized in Renesas/Partner.	Items are organized by categories.
	

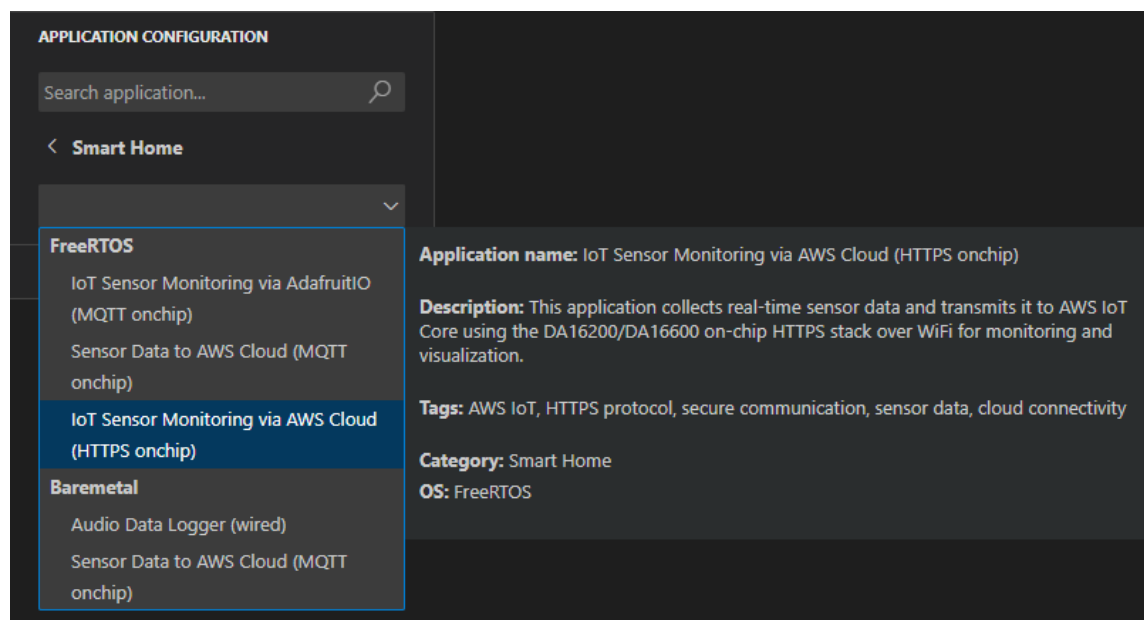
3.3 Application Configuration Menu

The application configuration panel is redesigned with an improved layout and enhanced search capabilities. Projects are now grouped by categories (instead of by Market Segment → End Equipment) resulting in a smoother search for application based on categories.

QCS 1.6.0	QCS 1.7.0
Market Segment->End equipment->projects	Categories->Projects
	

3.4 Improved Application Search

A new tagging system allows users to find projects using relevant keywords for an improved user experience.



3.5 Infrastructure

This version upgrades QCS EKS clusters to version 1.33 resulting in improved stability and overall system performance.

3.6 Compliance and Security Enhancements

- Load balancers are now protected with TLS/SSL encryption reducing exposure risk.
- OWASP ZAP vulnerability scanning is added.

3.7 Advanced Configuration Settings – Phase 1

Phase 1 of advanced configuration capabilities is deployed. These advanced configuration settings for compilers (GCC, LLVM) and build options allow users to customize their build settings (add libraries, enable debugging etc). This feature is deployed as an engineering test to public release for consecutive versions.

4. Deprecations

- Blinky App – Removed Blinky examples for FreeRTOS and Azure RTOS because of low usage. Bare-Metal Blinky remains available.+
- FS1015 Module Removal – The FS1015 module has been removed as it is no longer supported in the latest Flexible Software Package (FSP).

5. Fixes and Improvements

- Fixes
 - Disabled **Generate / Build** button when **Clean / Build** or **Incremental Build** is started.
 - **Generate / Build** button stays disabled when browser is refreshed after starting a build.
 - Disabled **Incremental Build** and **Clean & Build** buttons when project build is in progress.
 - Enabled Project Duplicate feature .
 - Workspace - QCS Project Diagram auto-fit when the project is reopened.

6. Known Limitations

- Regenerating projects with different HW configurations can cause build errors
Workaround – Create a new project using a different project name when modifying the HW configuration by selecting a new MCU or MPU kit.
- Creating a project with the same name as a recently deleted project can cause build errors
Workaround – Create a new project using a different project name.
- Editor area closes or shows configuration of previously opened project – Initiating a project generate operation by clicking the **Generate** button on the toolbar temporarily closes the active project configuration file to allow for project generation. The configuration file is restored once the generate operations complete.
- Because of changes in the dependent extension, the debug breakpoints are not working for RA6E2 based MCU boards in v1.7.0.

7. Support

- Follow the link for FAQs: [QuickConnect Studio | Renesas Customer Hub](#)
- For more information and queries, reach out to: QuickConnect@dm.renesas.com

8. Lists of Supported Kits and Applications

8.1 List of Kits Supported on QCS v1.7

Device Name	Description
Adafruit Infrared IR Remote Receiver	Adafruit Infrared IR Remote Receiver
Adafruit Motor Shield	Adafruit Motor Shield
AIK-RA4E1	AI Kit Development Platform with RA4E1
AIK-RA6M3	AI Kit Development Platform with RA6M3
Arducam Mega SPI Camera	Arducam Mega SPI Camera
ARDUINO EDU	Arduino Education Shield
OSRAM AS7331 Spectral UV	Spectral UV → Ambient light sensor
OSRAM AS7331 QWIIC Spectral UV	Spectral UV → Ambient light sensor
OSRAM AS7343 Spectral	Spectral → Ambient light sensor
BGK-RA6E2	Beginners Kit for RA6E2 MCU Group
BMA456 STEP COUNTER	Step Counter
Button Grove	Button Grove
Buzzer Grove	Buzzer Grove
CK-RA6M5	Cloud Kit Based on RA6M5 MCU Group
DA14531 Bluetooth	Low Power Bluetooth Pmod Board
DA14535 Bluetooth	Low Power Bluetooth Pmod Board
DA16200 Wi-Fi	Ultra Low Power Wi-Fi Pmod Board
DA16600 Wi-Fi	Ultra-Low-Power Wi-Fi + Bluetooth Low Energy Combo Pmod Board
DA7212 Mikrobis	DA7212 Ultra Low Power Stereo Codec
EK-RA2A1	Evaluation Kit for RA2A1 MCU Group
EK-RA2A2	Evaluation Kit for RA2A2 MCU Group
EK-RA2E1	Evaluation Kit for RA2E1 MCU Group
EK-RA2E2	Evaluation Kit for RA2E2 MCU Group
EK-RA2L1	Evaluation Kit for RA2L1 MCU Group
EK-RA2L2	Evaluation Kit for RA2L2 MCU Group
EK-RA4E2	Evaluation Kit for RA4E2 MCU Group
EK-RA4M1	Evaluation Kit for RA4M1 MCU Group
EK-RA4M2	Evaluation Kit for RA4M2 MCU Group
EK-RA4M3	Evaluation Kit for RA4M3 MCU Group
EK-RA4W1	Evaluation Kit for RA4W1 MCU Group
EK-RA6E2	Evaluation Kit for RA6E2 MCU Group

Device Name	Description
EK-RA6M1	Evaluation Kit for RA6M1 MCU Group
EK-RA6M2	Evaluation Kit for RA6M2 MCU Group
EK-RA6M3	Evaluation Kit for RA6M3 MCU Group
EK-RA6M4	Evaluation Kit for RA6M4 MCU Group
EK-RA6M5	Evaluation Kit for RA6M5 MCU Group
EK-RA8D1	Evaluation Kit for RA8D1 MCU Group
EK-RA8D1-HMI	Evaluation Kit for RA8D1 MCU Group
EK-RA8M1	Evaluation Kit for RA8M1 MCU Group
EK-RA8P1	Evaluation Kit for RA8P1 MCU Group
Encoder	Encoder
Everspin EVEM064LX Pmod	Everspin 64 Mb MRAM PMOD
FEATHER-RA8M1	RA8M1 Feather SoM
Figaro FECS43 SO2 Gas Sensor	SO2 Gas Sensor
Figaro FECS44 Ammonia Gas Sensor	Ammonia Gas Sensor
Figaro FECS50 H2S Gas Sensor	H2S Gas Sensor
FPB-RA0E1	Fast Prototyping Board for RA0E1 MCU Group
FPB-RA0E2	Fast Prototyping Board for RA0E2 MCU Group
FPB-RA2E3	Fast Prototyping Board for RA2E3 MCU Group
FPB-RA4E1	Fast Prototyping Board for RA4E1 MCU Group
FPB-RA4E2	Fast Prototyping Board for RA4E2 MCU Group
FPB-RA6E1	Fast Prototyping Board for RA6E1 MCU Group
FPB-RA6E2	Fast Prototyping Board for RA6E2 MCU Group
FPB-RA8E1	Fast Prototyping Board for RA8E1 MCU Group
FS3000 Horizontal mount Air velocity	Air Velocity Sensor Pmod Board
GNSS5CLICK GPS	GNSS 5 Click
HS3001 Temperature / Humidity	Relative Humidity Sensor Pmod Board
HS4001 Temperature / Humidity	Relative Humidity Sensor Pmod Board
TDK ICM20948 9-axis MEMS	9-Axis MEMS QWIIC
TDK ICM42670 6-Axis MEMS	6-Axis MEMS
TDK ICM42688 6-Axis MEMS	6-Axis MEMS
TDK ICS43434 Digital Microphone	Digital Microphone
ISL28022 Digital Power Monitor	Digital Power Monitor
Keypad 3X4 GPIO	Keypad 3X4 GPIO
MCK-RA4T1	MCK for RA4T1 MCU Group

Device Name	Description
MCK-RA6T2	MCK for RA6T2 MCU Group
MCK-RA6T3	MCK for RA6T3 MCU Group
Melexis MLX90614 Infrared Temperature Sensor	Infrared Temperature Sensor
Melexis MLX90614 QWIIC Infrared Temperature Sensor	Infrared Temperature Sensor
Melexis MLX90632 Infrared Temperature Sensor	Infrared Temperature Sensor
Melexis MLX90632 QWIIC Infrared Temperature Sensor	Infrared Temperature Sensor
MONOCHROME_128x64_OLED_DISPLAY	Monochrome 1.3
MURATA Pyroelectric Infrared Sensor	Pyroelectric Infrared Sensor
NXP PN5180 NFC Card Reader	NXP PN5180 NFC Card Reader
Mikroe OLED W CLICK	Mikroe OLED W CLICK
Arducam OV3640 Camera	Arducam 1/4
PCT2075 Temperature	Temperature Sensor QWIIC & Arduino Board
pmodUSB UART	USB to serial UART interface
PTX105R NFC Card Reader	NFC Card Reader
QCIOT-ISL3173POCZ RS-485 Transceiver	QCIOT-ISL3173POCZ RS485 board
Red Quad Alphanumeric Display	Red Quad Alphanumeric Display
Resistive Soil Moisture Sensor	Resistive Soil Moisture Sensor
RRH46410 Digital Gas Sensor Module	Outdoor Air Quality Sensor Pmod Board
RZ-G2L	General-Purpose MPU with Dual-Core Arm Cortex-A55 and Single Cortex-M33 CPUs
RZ-G3S	General-Purpose MPU with Dual-Core Arm Cortex-A55 and Single Cortex-M33 CPUs
RZ-V2H	General-Purpose MPU with Dual-Core Arm Cortex-A55 and Single Cortex-M33 CPUs
RZ-V2L	General-Purpose MPU with Dual-Core Arm Cortex-A55 and Single Cortex-M33 CPUs
Capacitive Soil Moisture Sensor	Capacitive Soil Moisture Sensor
SHT40 Temperature / Humidity	Relative Humidity and Temperature Sensor qwiic Board
SparkFun Qwiic OLED	SparkFun Qwiic OLED
SPS30 Sensirion	SPS30 Sensirion
ST0050 IR SENSOR	IR sensor for obstacle avoid
Figaro TGS5141 CO Gas Sensor	CO Gas Sensor
Figaro TGS6810 Combustible/Methane Gas Sensor	Combustible/Methane Gas Sensor
OSRAM TMF8828 Multi-Zone ToF	Multi-Zone ToF
URM09 Analog Ultrasonic Sensor	URM09 Analog Ultrasonic Sensor

Device Name	Description
URM09 Trig Ultrasonic Sensor	URM09 Trig Ultrasonic Sensor
VCNL4200 MikroBUS	Proximity 3 Click
VL53L0X ToF laser-ranging module	VL53L0X ToF laser-ranging module
VOICE-RA6E1	RA6E1 Voice User Reference Kit
YELLOW_BLUE_128X64_OLED_DISPLAY	OLED Yellow&Blue Display 0.96 (SSD1315)
ZMOD4410 Indoor Air Quality	TVOC and Indoor Air Quality Sensor Pmod Board
ZMOD4450 Refrigeration Air Quality	Refrigeration Air Quality Sensor Platform
ZMOD4510 Outdoor Air Quality	Outdoor Air Quality Sensor Pmod Board

8.2 List of Applications Supported by QCS v1.7

Application Name	Category	Description
IoT Sensor Monitoring via AdafruitIO (MQTT)	Smart Home	This application collects real-time sensor data and transmits it to Adafruit IO using FreeRTOS coreMQTT over WiFi for monitoring and visualization, allowing to analyze data remotely via live dashboards.
AI Motion detection with LED notification	Wearables & Personal Healthcare	This application uses the RealityAI model to analyze real-time accelerometer data, inferring movements like drop, shake, and circle, and visually representing them with LED color and blink patterns for interactive feedback. Ideal for wearables, robotics, or motion-triggered systems for interactive feedback.
AI motion detection with BLE notification	Wearables & Personal Healthcare	This application uses the RealityAI model to analyze real-time accelerometer data, inferring movements like drop, shake, and circle, and transmits the detected type via BLE to the QC Sandbox mobile app for remote monitoring and analysis. Ideal for wearables, smart devices, or motion-tracking systems.
Audio Data Logger (wired)	Smart Home	This project streams microphone data to a PC using Segger RTT in real-time, enabling low-latency audio monitoring and processing, ideal for real-time audio data analysis applications.
IoT Sensor Monitoring via AWS Cloud (MQTT)	Smart Home	This application collects real-time sensor data and transmits it to AWS IoT Core using FreeRTOS coreMQTT over WiFi for monitoring and visualization.
Sensor Data to AWS Cloud (MQTT onchip)	Smart Home	This application collects real-time sensor data and transmits it to AWS IoT Core using the DA16200/DA16600 on-chip MQTT stack over WiFi for monitoring and visualization.
IoT Sensor Monitoring via AdafruitIO (MQTT onchip)	Smart Home	This application collects real-time sensor data and transmits it to Adafruit using the DA16200/DA16600 on-chip MQTT stack over WiFi for monitoring and visualization.
IoT Sensor Monitoring via AWS Cloud (HTTPS onchip)	Smart Home	This application collects real-time sensor data and transmits it to AWS IoT Core using the DA16200/DA16600 on-chip HTTPS stack over WiFi for monitoring and visualization.
Blink LEDs	Developer Training	This application toggles the board LEDs in sequence at regular intervals to verify hardware and software setup. Enabling verification of microcontroller configurations, GPIO functionality, and timing control
Wired Live Camera Feed	Smart Home	This application streams live camera video feed over an HTTP connection for real-time viewing on a web browser or compatible device, ideal for security applications and camera-based projects.

Application Name	Category	Description
Sensor Data over BLE	Wearables & Personal Healthcare	This application sends sensor data via BLE to the QC Sandbox mobile app for real-time monitoring and analysis. Ideal for smart homes, environmental monitoring, or health tracking
IoT Sensor Monitoring via Serial Interface	Industrial	This application collects real-time sensor data and outputs it via a serial connection for monitoring and data can be viewed on a serial monitor app on a PC.
Quick Start Example	Developer Training	This is an example project that demonstrates some of the capabilities of the evaluation board. More details can be found in the project README. https://github.com/renesas/ra-fsp-examples
USBX Host Mass Storage Example	Developer Training	This project demonstrates the basic functionality of USBX Host MSC module using FileX on Renesas RA MCUs based on Renesas FSP using AzureRTOS.
Arduino PWM Control	Developer Training	This application demonstrates how to use the PWM pins on the Arduino header. It generates PWM signals on all PWM-capable pins of the Arduino header.
Arduino GPIO Control	Developer Training	This application demonstrates how to use the digital GPIOs of the Arduino header. It sequentially pulses all digital pins (Dx) of the Arduino header.
Arduino External Interrupt	Developer Training	This application demonstrates how to use external interrupt capability on the Arduino header. A falling edge on D2 caused the LED to blink slowly and a falling edge on D3 causes it to blink fast.
Arduino Analog Input	Developer Training	This application demonstrates how to use the analog pins of the Arduino header. It logs via Segger RTT the readings of pins A0 and A1.
Arduino Audio Tune Player	Developer Training	This application project plays tunes on an Arduino Education Shield connected to the Arduino header. Plug a headphone or speaker to the audio jack and enjoy the tunes!
On Display Live Camera Feed (OV3640)	Smart Home	In this application, the evaluation kit captures real-time images from the OV3640 camera and streams it directly to MIPI LCD connected to the kit. This setup enables easy access to the camera feed without additional software, showcasing the kit's capabilities for IoT and embedded solutions.
On Display Live Camera Feed (ARDUCAM)	Smart Home	In this application, the evaluation kit captures real-time images from the Arducam Mega camera and streams it directly to MIPI LCD connected to the kit. This setup enables easy access to the camera feed without additional software, showcasing the kit's capabilities for IoT and embedded solutions.
IoT Sensor Monitoring via USB Interface	Industrial	This application collects real-time sensor data and outputs it via a USB connection for monitoring and data can be viewed on a serial monitor app on a PC.
Smart Lock Application using PTX105R NFC	Smart Home	This application project showcases the NFC Card integration with RA family of microcontrollers. The project implements the support for PTX105R PMOD module and performs the NFC validation using AWS Lambda. The application also supports RTT logging of the scanned NFC IDs.
USBX Peripheral Human Interface Example	Developer Training	This project demonstrates basic functionality of USBX Peripheral Human Interface Device Class module on Renesas RA MCUs based on Renesas FSP using Azure RTOS
USBX Device Mass Storage Example	Developer Training	This project demonstrates the basic functionality of USBX Device MSC module using FileX on Renesas RA MCUs based on Renesas FSP using AzureRTOS.

Application Name	Category	Description
File Transfer over Ethernet	Developer Training	This project showcases the implementation of an FTP client using the NetX Duo networking stack on Renesas RA MCUs. The project demonstrates file transfer functionality over Ethernet. It serves as a practical example for developing connected applications that require reliable network-based file communication.
Low Power Mode Example	Developer Training	This project demonstrates the basic functionalities of the Low Power Mode module (LPM) on Renesas MCU. More details can be found in the project README.
Smart IoT Data Logger with Cloud Sync (MQTT)	Industrial	This application collects real-time sensor data and stores in ospi flash and can be retrieved on-demand via mqtt request which then transmits it to AWS IoT Core using the DA16200/DA16600 on-chip MQTT stack over WiFi for monitoring and visualization
Zalmotek Robot Dog	Robotics	This application showcases a quadruped robot mimicking the movement of four-legged animals. these robots can navigate challenging environments making them ideal for applications like search and rescue and planetary exploration
MikroBus PWM Control	Developer Training	This application demonstrates how to use the PWM functionality on the MikroBus header. It generates a signal on pin PWM of the MikroBus header.
MikroBus Analog Input	Developer Training	This application demonstrates how to use the analog pin on the MikroBus header. It reads an analog signal from pin AN and prints it to RTT log.
MikroBus External Interrupt	Developer Training	This application demonstrates how to use the interrupt functionality on the MikroBus header. It blinks the green LED and when an external interrupt is detected on the INT pin on MikroBus header the LED blinks at a different rate for 5 seconds.
Audio Playback using DA7212	Smart Home	The application demonstrates the functionality and performance of the DA7212-ultra-low power audio codec, by playing the Audio File data from the MCU.
Graphical Image Viewer using LVGL	Smart Home	This graphic application showcases a local image viewer designed to run on a device equipped with an HDMI interface. It utilizes LVGL to provide a GUI for displaying images stored on the device's filesystem.
Graphical Video Player using LVGL	Smart Home	This graphic application showcases a local video player designed to run on a device equipped with an HDMI interface. It utilizes LVGL to provide a GUI for displaying videos stored on the device's filesystem.
Graphical Audio Player using LVGL	Smart Home	This graphic application showcases a local audio player designed to run on a device equipped with an HDMI interface. It utilizes LVGL to provide a GUI for playing audio files stored on the device's filesystem.
Edge AI multi object detection	Smart City	This project showcases real-time object detection powered by edge AI technology. The application highlights the power of on-device intelligence for smart surveillance, automation, and vision-based systems.
IoT Sensor Monitoring via OLED Display using SSD1306 driver	Developer Training	This application demonstrates the use of OLED displays with Renesas RA MCUs. The application sends the sensor data read from the first channel of a connected sensor to the display.
IoT Sensor Monitoring via Alphanumeric LED Display	Developer Training	This application demonstrates the use of Alphanumeric LED displays with Renesas RA MCUs. The application sends the sensor data read from the first channel of a connected sensor to the display.
IoT Sensor Monitoring via OLED Display using SSD1315 driver	Developer Training	This application demonstrates the use of OLED displays with Renesas RA MCUs. The application sends the sensor data read from the first channel of a connected sensor to the display.

Application Name	Category	Description
Helmet and safety vest wearing monitor	Industrial	This application demonstrates the use of computer vision and AI to enhance workplace safety by detecting the proper usage of Personal Protective Equipment (PPE) like safety helmets and reflective vests by construction workers.
Security Area Intrusion Detection	Smart Building	Line crossing object counting is a sample application that demonstrates counting of the objects when they cross a virtual line drawn by the user. Application uses a deep learning-based object detector to detect and track the objects.
Elevator passengers Counting	Smart Building	This application demonstrates the use of computer vision and AI to automatically count the number of human heads present in a live video feed. It is designed to support crowd monitoring, occupancy tracking, and safety compliance in various environments such as public venues, workplaces, and transportation hubs.
Distracted driving detection	Smart City	This application showcases the use of computer vision and AI to perform gaze detection—the task of predicting where a person is looking. Human gaze is a powerful indicator of attention, intent, and cognitive state, making this technology highly valuable across multiple industries.
Driver Monitoring System	Industrial	This application demonstrates a basic Driver Monitoring System (DMS) that uses camera input and AI-based analysis to assess a driver's attentiveness and detect signs of fatigue or distraction. It is designed to enhance road safety by monitoring key behavioral indicators in real time.
MRAM Test Suite using EM064LXQAB313I	Developer Training	This is a reference application for executing targeted performance benchmarks on Everspin MRAM EM064LXQAB313I over single SPI.
Smart Lock Application using PN5180 NFC	Smart Home	This application project showcases the NFC Card integration with RA family of microcontrollers. The project implements the support for NXP PN5180 based NFC 3 CLICK mikroBUS module and performs the NFC validation using AWS Lambda. The application also supports RTT logging of the scanned NFC IDs.
Interface and Control a Piezo Buzzer	Smart Home	This project demonstrates the integration of the Grove Buzzer module with Renesas RA MCUs for simple audio signaling. The application toggles the buzzer ON and OFF at one-second intervals to showcase basic output control. It serves as an introductory example of peripheral interfacing and timing functions in embedded applications.
Button Controlling LEDs	Smart Home	This project demonstrates how to use a Grove button with Renesas RA MCUs to control an LEDs blink rate. The LED blinks every 100 ms by default and slows to 500 ms when the button is pressed. This application highlights basic digital input handling and real-time output control in embedded systems.
Defense wild animals for crop	Agriculture	This project helps farmers protect their crops and livestock by automatically detecting and identifying animals entering their farms or barns. Using advanced image recognition, it distinguishes between a list of animal species to support targeted pest control and deterrence. The app enables early detection and alerting, reducing crop damage and enhancing farm security.
Smart Point of Sales	Retail	This project showcases a use case for retail checkout systems with intelligent, camera-based age and gender recognition. By accurately estimating a customer's age group in real time, it helps verify age-restricted purchases and streamline compliance. The app demonstrates advanced deep neural network capabilities for demographic detection, offering improved usability and seamless integration with modern POS systems.

Application Name	Category	Description
Touchless Controller for elevator	Smart Building	This project showcases a use case for contact-free elevator operation through intuitive hand gesture recognition, enhancing hygiene and convenience in smart buildings. Powered by deep neural networks, it accurately interprets various hand gestures to select floors or control doors without physical contact. The application demonstrates advanced AI-based gesture prediction with improved responsiveness and user-friendly performance.
Preceding Vehicle Movement Alert	Smart City	This project showcases a use case for driver awareness by detecting when the vehicle ahead begins to move, helping prevent delayed starts at traffic lights or in congestion. Using deep learning-based object detection with TinyYoloV3, it identifies and tracks vehicles in real time. The application demonstrates intelligent vision capabilities for smart city mobility and safer, more efficient driving experiences.
Getting Started with RZ/G3S	Developer Training	This project introduces developers to creating a basic “Hello World” application using the Yocto build system for RZ/G3S devices. This project provides a simple starting point for understanding embedded Linux application development. It serves as an essential first step for building, compiling, and deploying custom software on RZ/G3S platforms.
Motor Rotation and Speed Control	Robotics	This project showcases a use case for motor operation using Renesas RA MCUs paired with an Arduino Motor Shield. The application enables users to control motor rotation patterns and adjust speed with high precision. It serves as a practical demonstration of flexible and reliable motor control for embedded system applications.
Distance Measurement with URM09 Sensor Analog	Smart Building	This project showcases distance measurement using the Gravity URM09 Ultrasonic Sensor integrated with Renesas RA MCUs. The MCU converts the sensor's analog voltage into precise distance data and transmits it wirelessly via Bluetooth Low Energy. This application demonstrates seamless analog sensing and BLE communication for smart proximity and IoT applications.
Distance Monitoring with URM09 Trig Sensor	Smart Building	This project demonstrates distance measurement using the Gravity URM09 Ultrasonic Sensor with digital trigger output, interfaced to Renesas RA MCUs. The MCU reads the sensor's digital signal to determine distance and transmits the data wirelessly via Bluetooth Low Energy. This application showcases seamless digital sensing and BLE communication for real-time proximity and IoT solutions.
Real-Time Rotary Position and Direction Tracking	Industrial	This project demonstrates how to interface a rotary encoder with Renesas RA MCUs for real-time position and direction feedback. The application displays encoder movement data instantly as the user rotates the knob. It can be applied in use cases such as volume adjustment, menu selection panels, or other digital input controls.
Real-Time Infrared Remote Signal Decoder	Smart Home	This project demonstrates how to interface an RC6-compatible IR receiver with Renesas RA MCUs for decoding infrared remote signals. When a button is pressed on the RC6 remote, the decoded signal name is displayed in real time. This application highlights reliable IR communication and decoding for embedded control systems.
Real-Time Key Input Visualization using 4x3 keypad	Smart Home	This project showcases the integration of a 4x3 keypad with Renesas RA MCUs for detecting and displaying key presses. Each button press is captured and instantly shown on the connected display. This application demonstrates simple user input handling and display interfacing for embedded control systems.

Application Name	Category	Description
Real-Time Air Quality Data Streaming via BLE	Smart Home	This project demonstrates how to transmit Sensirion SPS30 sensor data wirelessly via Bluetooth Low Energy to the QC Sandbox mobile app. The application enables real-time monitoring and analysis of particulate matter for environmental awareness. It is ideal for smart home automation, health tracking, and air quality monitoring solutions

9. Revision History

Revision	Date	Description
1.00	Jun 26, 2026	Initial release.

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