

# AN INTRODUCTION TO GENERAL-PURPOSE RA MCU KITS

[renesas.com/ra/kits](https://renesas.com/ra/kits)

RENESAS ELECTRONICS CORPORATION  
RENESAS ADVANCED (RA) MCU KITS

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# AGENDA

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**Renesas Advanced  
MCU Kits  
Vision, Objective &  
Strategy**

**Innovation  
Enablement &  
Product Lineup**

**Getting Started  
Is Easy!**

**More Information &  
Support**

# VISION OF RENESAS ADVANCED MCU KITS

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Deliver an **unmatched innovation experience** through scalable, flexible & ecosystem-ready Renesas Advanced MCU kits that enable users to **bring their innovative products to market faster.**

# OBJECTIVE

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To enable a large number of use cases so customers, engineers, developers, distributors, partners, etc. can do more



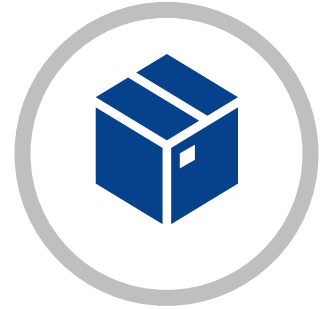
Proof-of-Concepts



Functional Evaluation



Getting Started Reference



Solutions & Demos



Trainings & Workshops



Maker Community

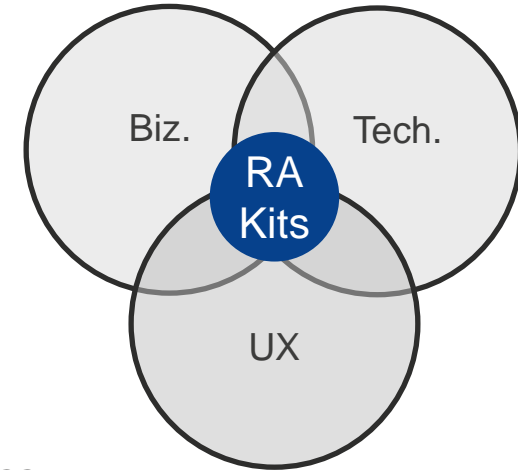
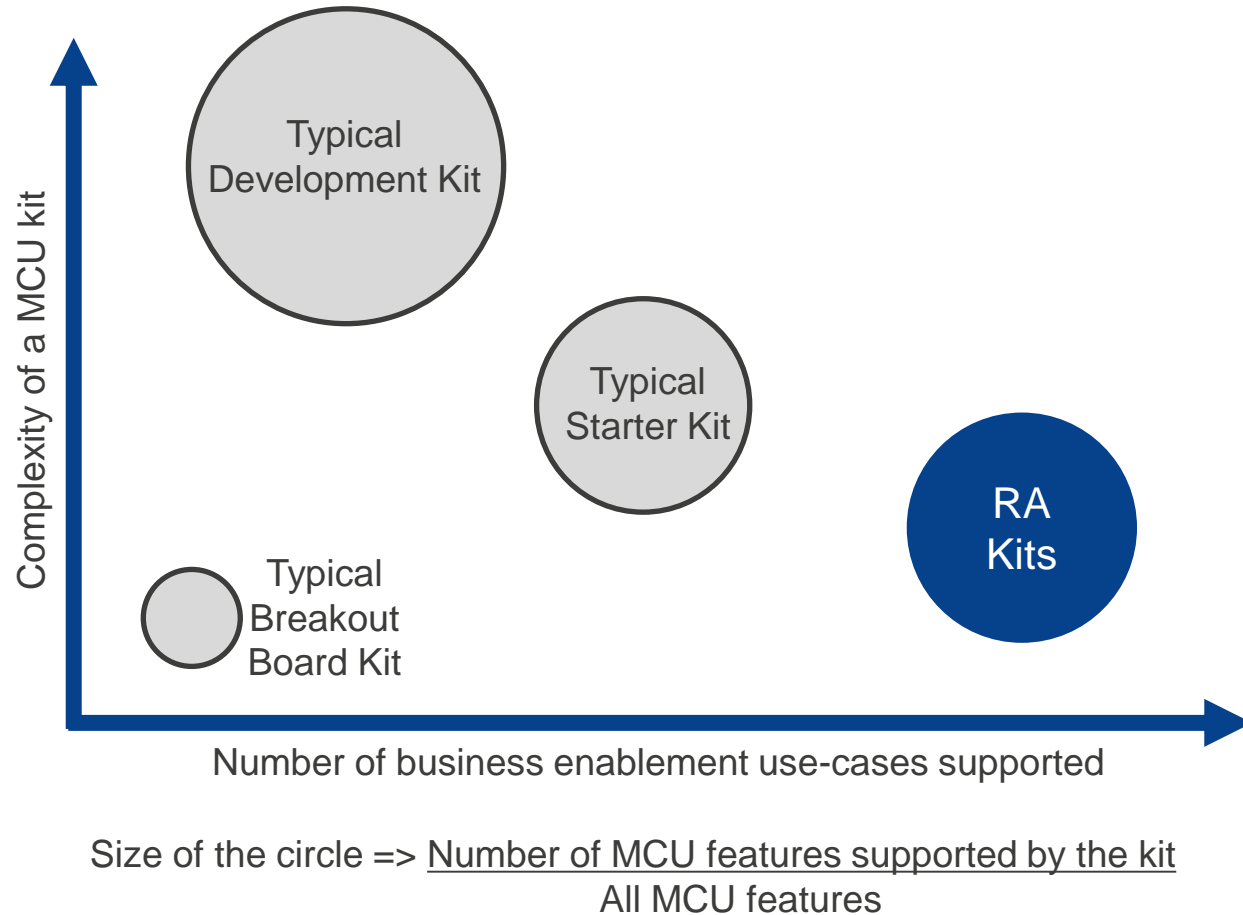


Research & Academia



Promotions & Lead Generation

# STRATEGY



## Business

- Serve global customer base
- Facilitate cross-selling
- Lower NRE & faster time to market

## Technical

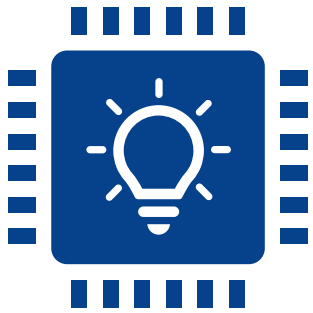
- Useful for innovation
- Support prioritized MCU peripherals
- Ecosystem ready

## User Experience

- Delightful to use
- Beautifully designed & presented

# DIFFERENTIATION THAT SETS YOU APART

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## Innovation Ready

A winning combination of standardization & flexibility



## Ecosystem Ready

Enhance functionality on your terms



## World Ready

Compliant with many international standards



## Fun Ready

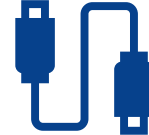
Take the guesswork out of your innovation experience

# INNOVATION READY

A winning combination of standardization & flexibility that enables shorter learning curve & faster time to market



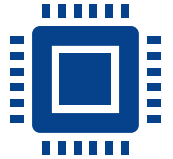
System & Control



Debugging



Connectivity



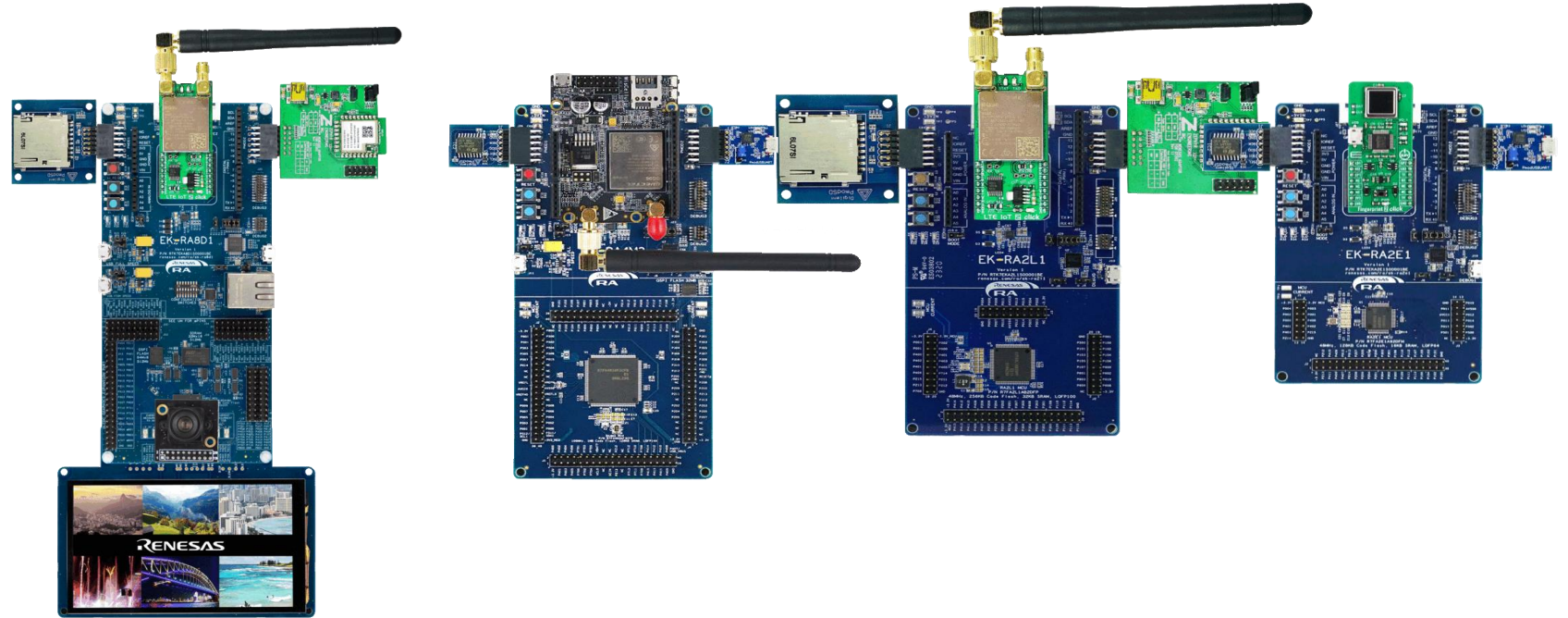
MCU Access

Standardized feature set across most RA kits			
User buttons & LEDs	Debug On-Board	USB FS (Device)	Male pin headers
MCU current measurement	Debug In	SPI, UART, I2C	Basic prototyping

Additional feature set available on some RA kits			
Additional LDO current	Debug Out	Ethernet	Enhanced prototyping
Multiple power sources		Octo-SPI, Quad-SPI	Graphics Expansion Port
USB current measurement		USB FS (Host)	
Capacitive touch button		USB HS (Host & Device)	

# ECOSYSTEM READY

Enhance  
functionality on your  
terms & choose from  
hundreds of 3<sup>rd</sup> party  
add-ons from  
popular ecosystems



Connect RA kits with add-ons and prototyping board



# WORLD READY

**Compliant with many international standards**  
**Documentation available in English & Japanese**

### EMC/EMI Standards

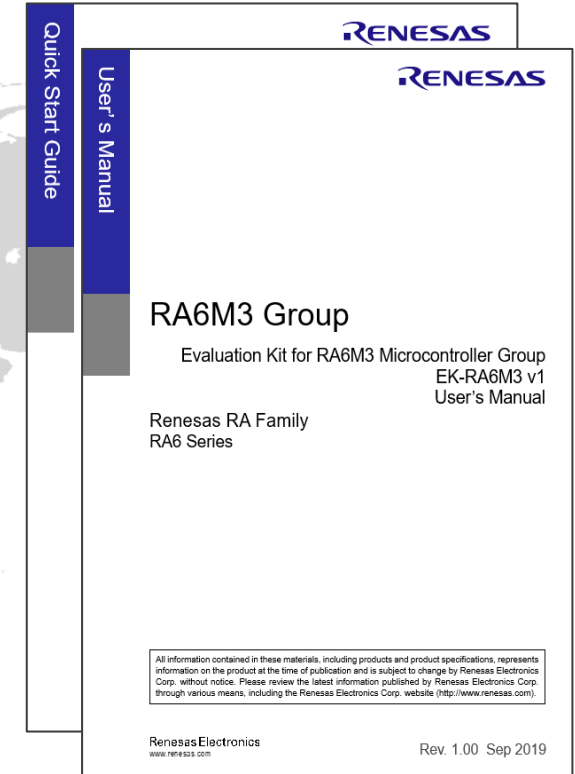
- FCC Notice (Class A) – Part 15
- Innovation, Science & Economic Development Canada ICES-003 Compliance: CAN ICES-3 (A)/NMB-3(A)
- CE Class A (EMC Directive 2004/108/EEC)
- Taiwan Chinese National Standard 13438, C6357 compliance, Class A limits
- Australia/New Zealand AS/NZS CISPR 32:2015, Class A

### Waste, Recycling & Material Selection

- EU RoHS
- China SJ/T 113642014, 10-year environmental protection use period

### Safety Standards

- UL 94V-0



User's manual & quick start guide



# FUN READY!

Take the guesswork out of your innovation experience for an unmatched, systematic & methodical approach to start developing

Watch the [video](#)

The screenshot shows the top navigation bar of the Renesas website with the logo and tagline 'BIG IDEAS FOR EVERY SPACE'. It includes a search bar, a 'Smart' dropdown, and icons for a globe, shopping cart, and lock, along with a 'LOG IN' button. Below the navigation bar are links for 'PRODUCTS', 'APPLICATIONS', 'DESIGN & SUPPORT', 'BUY & SAMPLE', and 'ABOUT'. The main content area features a video player with the title 'Innovate with Renesas Advanced (RA) Microcontrollers Kits in 5 Easy Steps'. The video player includes a 'Five Easy Steps' list on the left: 1. Get your kit, 2. Familiarize with your kit, 3. Download & install software & tools, 4. Explore & customize example projects, and 5. Expand functionality. The video frame shows a man in a blue shirt standing behind a table displaying several Renesas RA microcontroller kits, including boxes labeled 'EK-RA6M', 'EK-RA211', and 'EK-RA2F1'. A play button is centered over the video frame.

Click the image to watch the video

# RA KITS - PRODUCT PORTFOLIO

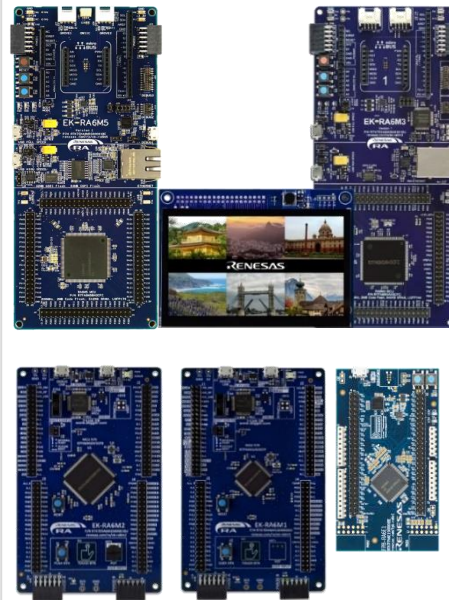
## General-Purpose MCU Kits

- Differentiated functionality
  - Remarkable ease-of-use
  - Broad ecosystem support
  - Multiple debugging modes
  - Feature standardization and scalability across RA8, RA6, RA4, and RA2 MCU Series
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- Basic MCU pin access
  - Limited ecosystem support
  - On-board debugging only
  - Design reuse across various Renesas MCU families: Synergy, RA, and RL78

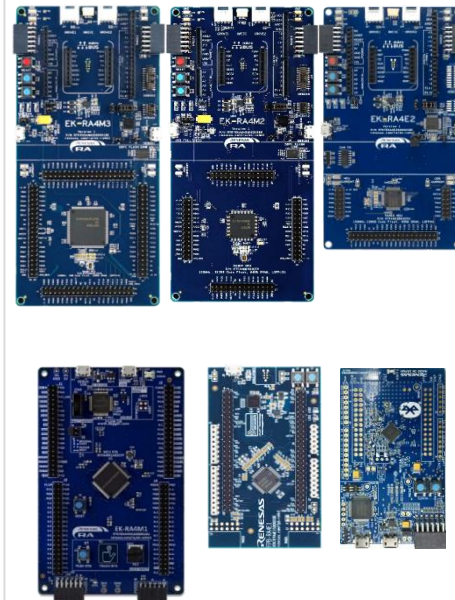
### RA8 Series MCUs



### RA6 Series MCUs



### RA4 Series MCUs



### RA2 Series MCUs



## 3<sup>rd</sup> Party/Partner Kits

- Access to partner's ecosystem & tools



A sampling of general-purpose RA MCU Evaluation Kits

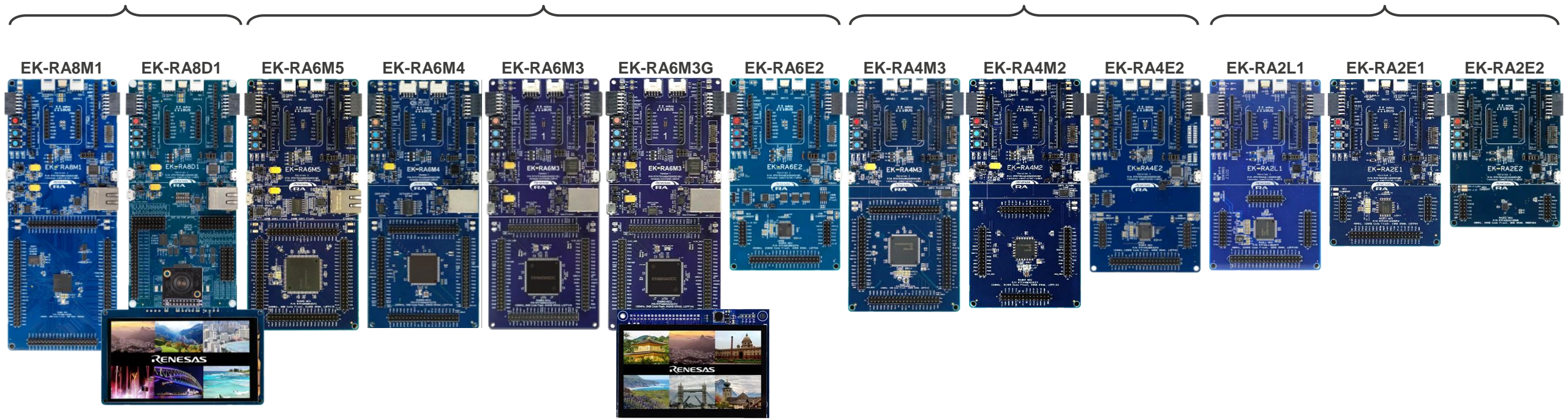
# PRODUCT LINE UP

RA8 Series MCUs

RA6 Series MCUs

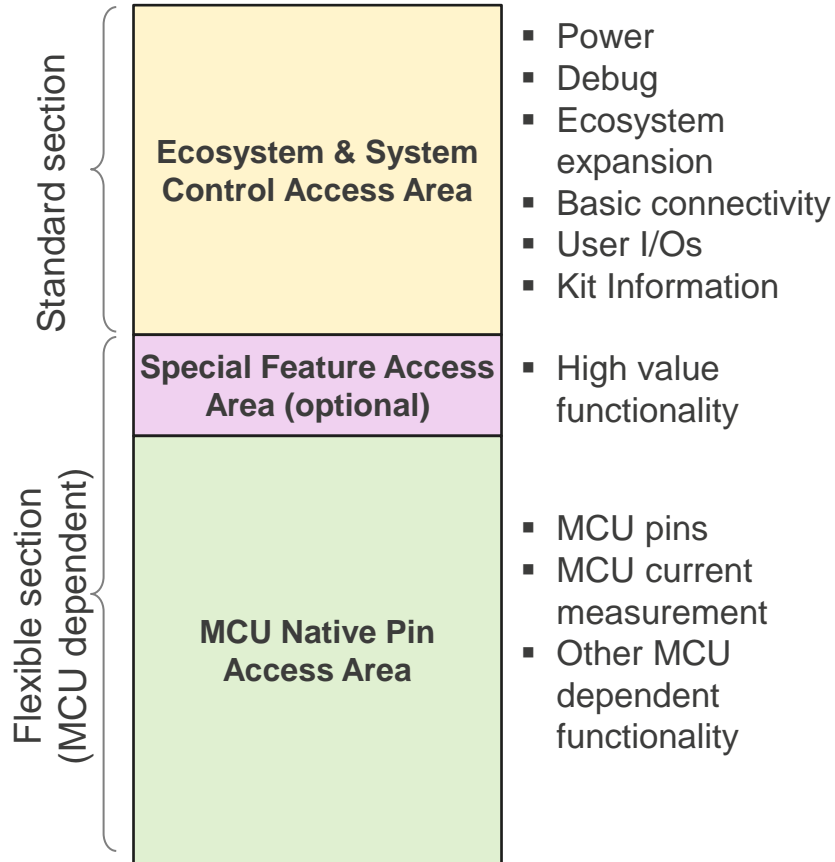
RA4 Series MCUs

RA2 Series MCUs



**Differentiated Functionality with Remarkable Ease-of-Use**  
Feature Standardization and Scalability across RA8, RA6, RA4, and RA2 MCU Series

# FEATURED INNOVATION KITS - ARCHITECTURE



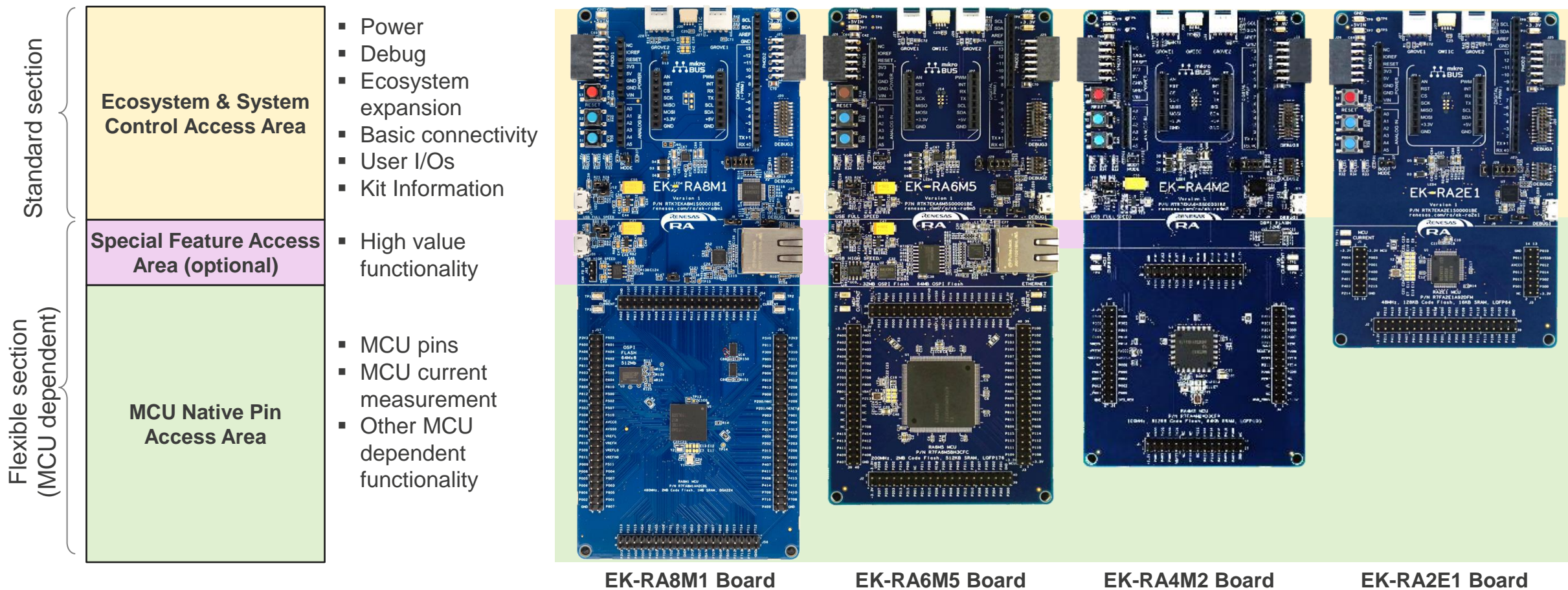
## Key Features of Architecture

- Scalable design framework
- Feature access organization
- On-board access to most-popular ecosystems

## Benefits of Architecture

- ✓ Applicable across RA MCUs – new kits
- ✓ Shorter learning curve for users
- ✓ Improved user experience
- ✓ Maximize hardware design reuse
- ✓ Lower NRE
- ✓ Faster time to market
- ✓ Brings more innovation to users
- ✓ Allows for vast functionality expansion
- ✓ Fuels partner engagement and ecosystem utilization

# FEATURED INNOVATION KITS - ARCHITECTURE



# EK-RA8D1

## EVALUATION KIT FOR RA8D1 MCU GROUP

### Key Features

#### Special Feature Access

- MIPI DSI & Parallel Graphics Expansion Ports
- Camera Expansion Port
- Ethernet
- USB High Speed Host & Device
- 64 MB SDRAM
- 64 MB External Octo-SPI Flash

#### MCU Native Pin Access

- R7FA8D1BHECBD MCU
- 480 MHz, Arm Cortex®-M85 core
- 2 MB Code Flash, 1 MB SRAM
- 224 pins, BGA package
- Native pin access
- MCU & USB current measurement
- DC/DC mode configuration

#### Ecosystem & System Control Access

- USB Full Speed Host & Device
- 5 V input through USB (Debug, FS, HS) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (ETM, SWD & JTAG)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I3C & analog)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- SparkFun® Qwiic® (I2C)
- MCU boot configuration jumper



[renesas.com/ra/ek-ra8d1](https://renesas.com/ra/ek-ra8d1)

(User manual, quick start guide, development tools, schematics, design files & example projects)

**RTK7EKA8D1S01001BE**

(Orderable part number)



# EK-RA8D1

## EVALUATION KIT FOR RA8D1 MCU GROUP

... continued

### Key Features

#### MIPI Graphics Expansion Board

- 4.5 Inch backlit TFT display, 16.7M display colors
- 480x854 pixels resolution
- 2-lane MIPI interface
- Capacitive touch overlay (I2C)

#### Camera Expansion Board

- Off-the-shelf Arducam CMOS OV3640 Camera Module
- ¼ Inch 3.1 Megapixel image sensor
- Up to 15 fps in QXGA (2048x1536 pixels) resolution



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# EK-RA8M1

## EVALUATION KIT FOR RA8M1 MCU GROUP

### Key Features

#### Special Feature Access

- Ethernet
- USB High Speed Host & Device
- 64 MB External Octo-SPI Flash
- CAN FD PHY

#### MCU Native Pin Access

- R7FA8M1AHECBD MCU
- 480 MHz, Arm Cortex®-M85 core
- 2 MB Code Flash, 1 MB SRAM
- 224 pins, BGA package
- Native pin access
- MCU & USB current measurement
- DC/DC mode configuration

#### Ecosystem & System Control Access

- USB Full Speed Host & Device
- 5 V input through USB (Debug, FS, HS) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (ETM, SWD & JTAG)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I2C/I3C)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- SparkFun® Qwiic® (I2C)
- MCU boot configuration jumper



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# EK-RA6M5

## EVALUATION KIT FOR RA6M5 MCU GROUP

### Key Features

#### Special Feature Access

- Ethernet
- USB High Speed Host & Device
- 64 MB External Octo-SPI Flash
- 32 MB External Quad-SPI Flash
- CAN FD

#### MCU Native Pin Access

- R7FA6M5BH3CFC MCU
- 200 MHz, Arm Cortex®-M33 core
- 2 MB Code Flash, 512 KB SRAM
- 176 pins, LQFP package
- Native pin access
- MCU & USB current measurement points

#### Ecosystem & System Control Access

- USB Full Speed Host & Device
- 5 V input through USB (Debug, FS, HS) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (ETM, SWD & JTAG)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I2C & analog)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- SparkFun® Qwiic® (I2C)
- MCU boot configuration jumper



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# EK-RA6M4

## EVALUATION KIT FOR RA6M4 MCU GROUP

### Key Features

#### Special Feature Access

- Ethernet
- 64 MB External Octo-SPI Flash
- 32 MB External Quad-SPI Flash

#### MCU Native Pin Access

- R7FA6M4AF3CFB MCU
- 200 MHz, Arm Cortex®-M33 core
- 1 MB Code Flash, 256 KB SRAM
- 144 pins, LQFP package
- Native pin access
- MCU & USB current measurement points

#### Ecosystem & System Control Access

- USB Full Speed Host & Device
- 5 V input through USB (Debug, FS) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (ETM, SWD & JTAG)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I2C & analog)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- SparkFun® Qwiic® (I2C)
- MCU boot configuration jumper



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# EK-RA6M3

## EVALUATION KIT FOR RA6M3 MCU GROUP

### Key Features

#### Special Feature Access

- Ethernet
- USB High Speed Host & Device
- 32 MB External QSPI Flash

#### MCU Native Pin Access

- R7FA6M3AH3CFC MCU
- 120 MHz, Arm Cortex®-M4 core
- 2 MB Code Flash, 640 KB SRAM
- 176 pins, LQFP package
- Native pin access through 4x 40-pin male headers
- MCU & USB current measurement points

#### Ecosystem & System Control Access

- USB Full Speed Host & Device
- 5 V input through USB (Debug, FS, HS) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (ETM, SWD & JTAG)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I2C)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- MCU boot configuration jumper



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(User manual, quick start guide, development tools, schematics, design files & example projects)

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(Orderable part number)



# EK-RA6M3G

## GRAPHICS EVALUATION KIT FOR RA6M3 MCU GROUP

### Key Features

#### Special Feature Access

- 4.3" 480x272 px color TFT LCD with capacitive touch
- Ethernet
- USB High Speed Host & Device
- 32 MB External QSPI Flash

#### MCU Native Pin Access

- R7FA6M3AH3CFC MCU
- 120 MHz, Arm Cortex®-M4 core
- 2 MB Code Flash, 640 KB SRAM
- 176 pins, LQFP package
- Native pin access through 4x 40-pin male headers
- MCU & USB current measurement points

#### Ecosystem & System Control Access

- USB Full Speed Host & Device
- 5 V input through USB (Debug, FS, HS) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (ETM, SWD & JTAG)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I2C)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- MCU boot configuration jumper

#### Featured Software Library

- Segger™ emWin Embedded GUI



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# EK-RA6E2

## EVALUATION KIT FOR RA6E24 MCU GROUP

### Key Features

#### Special Feature Access

- 32 MB External Quad-SPI Flash
- CAN FD PHY

#### MCU Native Pin Access

- R7FA6E2BB3CFM MCU
- 200 MHz, Arm Cortex®-M33 core
- 256 KB Code Flash, 40 KB SRAM
- 64 pins, LQFP package
- Native pin access through male pin headers
- MCU & USB current measurement

#### Ecosystem & System Control Access

- USB Full Speed Host & Device
- 5 V input through USB (Debug, FS) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (ETM, SWD & JTAG)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I2C & analog)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- SparkFun® Qwiic® (I2C)
- MCU boot configuration jumper



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# EK-RA4M3

## EVALUATION KIT FOR RA4M3 MCU GROUP

### Key Features

#### Special Feature Access

- 32 MB External QSPI Flash

#### MCU Native Pin Access

- R7FA4M3AF3CFB MCU
- 100 MHz, Arm Cortex®-M33 core
- 1 MB Code Flash, 128 KB SRAM
- 144 pins, LQFP package
- Native pin access through male pin headers
- MCU & USB current measurement points

#### Ecosystem & System Control Access

- USB Full Speed Host & Device
- 5 V input through USB (Debug, FS) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (ETM, SWD & JTAG)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I2C & analog)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- SparkFun® Qwiic® (I2C)
- MCU boot configuration jumper



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# EK-RA4M2

## EVALUATION KIT FOR RA4M2 MCU GROUP

### Key Features

#### Special Feature Access

- 32 MB External QSPI Flash

#### MCU Native Pin Access

- R7FA4M2AD2CFP MCU
- 100 MHz, Arm Cortex®-M33 core
- 512 KB Code Flash, 64 KB SRAM
- 100 pins, LQFP package
- Native pin access through male pin headers
- MCU & USB current measurement points

#### Ecosystem & System Control Access

- USB Full Speed Host & Device
- 5 V input through USB (Debug, FS) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (ETM, SWD & JTAG)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I2C & analog)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- SparkFun® Qwiic® (I2C)
- MCU boot configuration jumper



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# EK-RA4E2

## EVALUATION KIT FOR RA4E2 MCU GROUP

### Key Features

#### Special Feature Access

- CAN FD PHY

#### MCU Native Pin Access

- R7FA4E2B93CFM MCU
- 100 MHz, Arm Cortex®-M33 core
- 128 KB Code Flash, 40 KB SRAM
- 64 pins, LQFP package
- Native pin access through male pin headers
- MCU & USB current measurement

#### Ecosystem & System Control Access

- USB Full Speed Host & Device
- 5 V input through USB (Debug, FS) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (ETM, SWD & JTAG)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I2C & analog)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- SparkFun® Qwiic® (I2C)
- MCU boot configuration jumper



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# EK-RA2L1

## EVALUATION KIT FOR RA2L1 MCU GROUP

### Key Features

#### MCU Native Pin Access

- R7FA2L1AB2DFP MCU
- 48 MHz, Arm Cortex®-M23 core
- 256 KB Code Flash, 32 KB SRAM
- 100 pins, LQFP package
- Native pin access through male pin headers
- MCU current measurement points

#### Ecosystem & System Control Access

- 5 V input through USB (Debug) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (SWD)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I2C & Analog)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- SparkFun® Qwiic® (I2C)
- MCU boot configuration jumper



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# EK-RA2E1

## EVALUATION KIT FOR RA2E1 MCU GROUP

### Key Features

#### MCU Native Pin Access

- R7FA2E1A92DFM MCU
- 48 MHz, Arm Cortex®-M23 core
- 128 KB Code Flash, 16 KB SRAM
- 64 pins, LQFP package
- Native pin access through male pin headers
- MCU current measurement points
- DC/DC mode configuration

#### Ecosystem & System Control Access

- 5 V input through USB (Debug) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (SWD)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I2C & Analog)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- SparkFun® Qwiic® (I2C)
- MCU boot configuration jumper



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# EK-RA2E2

## EVALUATION KIT FOR RA2E2 MCU GROUP

### Key Features

#### MCU Native Pin Access

- R7FA2E2A72DNK MCU
- 48 MHz, Arm Cortex®-M23 core
- 64 KB Code Flash, 8 KB SRAM
- 24 pins, HWQFN package
- Native pin access through male pin headers
- MCU current measurement points
- DC/DC mode configuration

#### Ecosystem & System Control Access

- 5 V input through USB (Debug) or external power supply
- Debug on-board (Segger J-Link®)
- Debug in (SWD)
- Debug out (SWD)
- 3 User LEDs & 2 User buttons
- 2 SeeedGrove® system (I2C & Analog)
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MikroElektronika™ mikroBUS
- SparkFun® Qwiic® (I2C)
- MCU boot configuration jumper



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(User manual, quick start guide, development tools, schematics, design files & example projects)

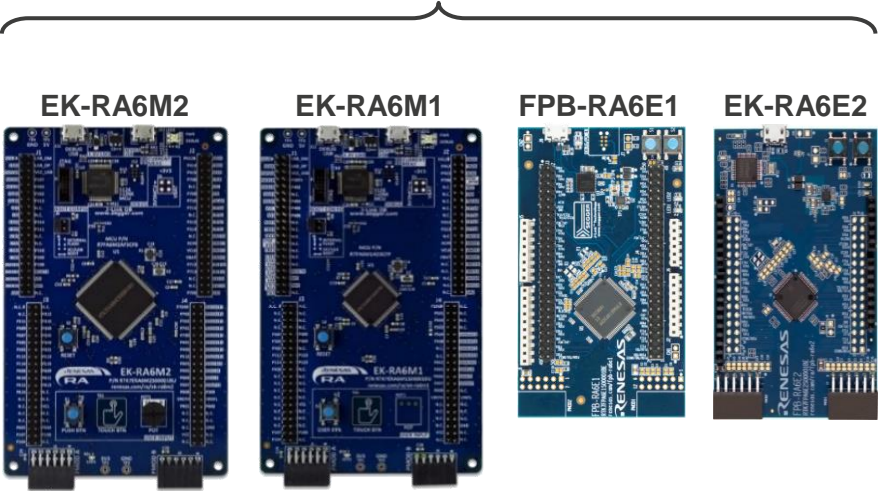
**RTK7EKA2E2S00001BE**

(Orderable part number)

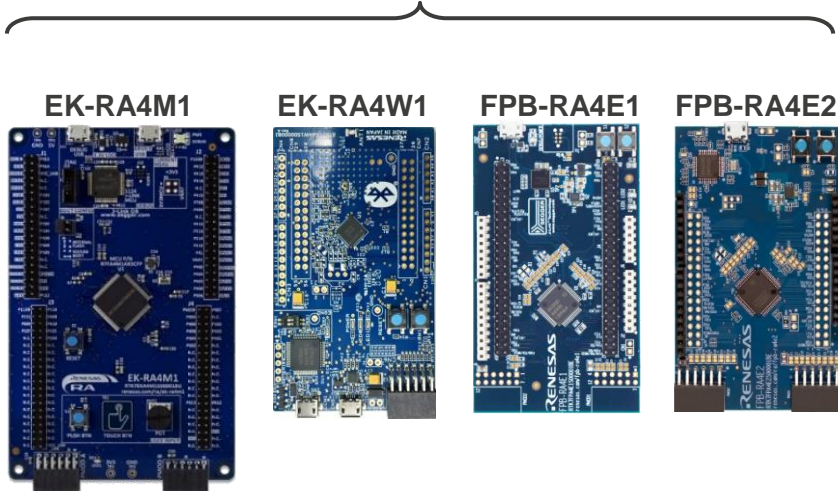


# BASIC PIN-OUT KITS – PRODUCT LINE UP

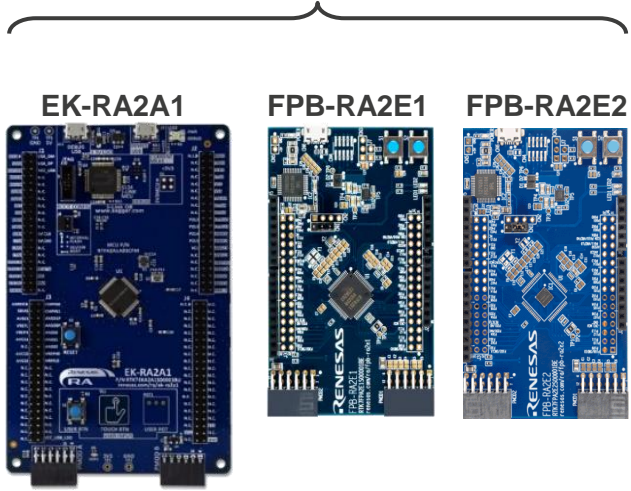
## RA6 Series MCUs



## RA4 Series MCUs



## RA2 Series MCUs



### Basic MCU Pin Access

Design reuse across various Renesas MCU families: Synergy, RA, and RL78

# EK-RA6M2

## EVALUATION KIT FOR RA6M2 MCU GROUP

### Key Features

- R7FA6M2AF3CFB MCU
- 120 MHz, Arm Cortex®-M4 core
- 1 MB Code Flash, 384 KB SRAM
- 144 pins, LQFP package
- Native pin access through 4x 40-pin male headers
- MCU current measurement points
- USB Full Speed Device
- 5 V input through USB Debug
- Debug on-board (Segger J-Link®)
- Debug in (SWD & JTAG)
- 2 Digilent Pmod™ (SPI & UART)
- User LED
- Mechanical user button
- Capacitive user button
- MCU boot configuration jumper



[renesas.com/ra/ek-ra6m2](https://renesas.com/ra/ek-ra6m2)

(User manual, quick start guide, development tools, schematics, design files & example projects)

**RTK7EKA6M2S00001BU**

(Orderable part number)



# EK-RA6M1

## EVALUATION KIT FOR RA6M1 GROUP

### Key Features

- R7FA6M1AD3CFP MCU
- 120 MHz, Arm Cortex®-M4 core
- 512 KB Code Flash, 256 KB SRAM
- 100 pins, LQFP package
- Native pin access through 4x 40-pin male headers
- MCU current measurement points
- USB Full Speed Device
- 5 V input through USB Debug
- Debug on-board (Segger J-Link®)
- Debug in (SWD & JTAG)
- 2 Digilent Pmod™ (SPI & UART)
- User LED
- Mechanical user button
- Capacitive user button
- MCU boot configuration jumper



[renesas.com/ra/ek-ra6m1](https://renesas.com/ra/ek-ra6m1)

(User manual, quick start guide, development tools, schematics, design files & example projects)

**RTK7EKA6M1S00001BU**

(Orderable part number)



# FPB-RA6E2

## FAST PROTOTYPING BOARD FOR RA6E1 MCU GROUP

### Key Features

- R7FA6E2BB3CFM MCU
- 200 MHz, Arm Cortex®-M33 core
- 256 KB Code Flash, 40 KB SRAM
- 64 pins, LQFP package
- Native pin access through male pin headers
- MCU current measurement points
- 5 V input through USB (Debug) or external power supply
- Debug on-board (Segger J-Link®)
- 2 User LEDs & 1 User button
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MCU boot configuration jumper



[renesas.com/ra/fpb-ra6e2](https://renesas.com/ra/fpb-ra6e2)

(User manual, quick start guide, development tools, schematics, design files & example projects)

**RTK7FPA6E2S00001BE**

(Orderable part number)



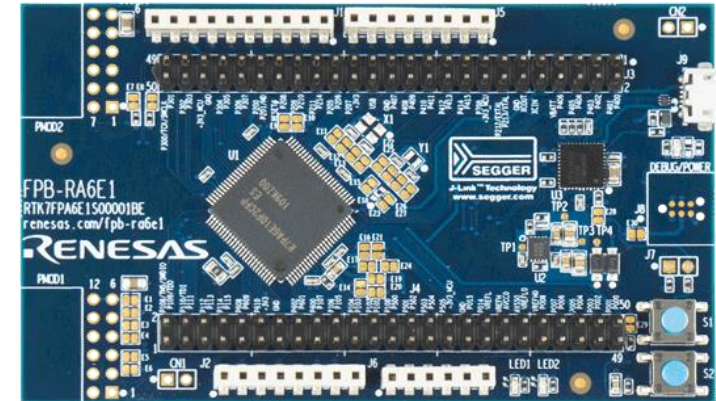


# FPB-RA6E1

## FAST PROTOTYPING BOARD FOR RA6E1 MCU GROUP

### Key Features

- R7FA6E10F2CFP MCU
- 100 MHz, Arm Cortex®-M33 core
- 1 MB Code Flash, 256 KB SRAM
- 100 pins, LQFP package
- Native pin access through male pin headers
- MCU current measurement points
- 5 V input through USB (Debug) or external power supply
- Debug on-board (Segger J-Link®)
- 2 User LEDs & 1 User button
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MCU boot configuration jumper



[renesas.com/ra/fpb-ra6e1](https://renesas.com/ra/fpb-ra6e1)

(User manual, quick start guide, development tools, schematics, design files & example projects)

**RTK7FPA6E1S00001BE**

(Orderable part number)



# EK-RA4M1

## EVALUATION KIT FOR RA4M1 MCU GROUP

### Key Features

- R7FA4M1AB3CFP MCU
- 48 MHz, Arm Cortex®-M4 core
- 256 KB Code Flash, 32 KB SRAM
- 100 pins, LQFP package
- Native pin access through 4x 40-pin male headers
- MCU current measurement points
- USB Full Speed Device
- 5 V input through USB Debug
- Debug on-board (Segger J-Link®)
- Debug in (SWD & JTAG)
- 2 Digilent Pmod™ (SPI & UART)
- User LED
- Mechanical user button
- Capacitive user button
- MCU boot configuration jumper



[renesas.com/ra/ek-ra4m1](https://renesas.com/ra/ek-ra4m1)

(User manual, quick start guide, development tools, schematics, design files & example projects)

**RTK7EKA4M1S00001BU**

(Orderable part number)



# EK-RA4W1

## EVALUATION KIT FOR RA4W1 MCU GROUP

### Key Features

- R7FA4W1AD2CNG MCU
- 48 MHz, Arm Cortex®-M4 core
- 512 KB Code Flash, 96 KB SRAM
- 56 pins, QFN package
- MCU headers: 28 pins x2
- MCU current measurement points
- USB Full Speed device
- 5 V input through USB debug
- Debug on-board (Segger J-Link®)
- Digilent Pmod™ (SPI)
- Arduino™ (Uno R3)
- User LED
- Mechanical user button
- MCU boot configuration jumper



[renesas.com/ra/ek-ra4w1](https://renesas.com/ra/ek-ra4w1)

(User manual, quick start guide, development tools, schematics, design files & example projects)

**RTK7EKA4W1S00000BJ**

(Orderable part number)



# FPB-RA4E2

## FAST PROTOTYPING BOARD FOR RA4E1 MCU GROUP

### Key Features

- R7FA4E2B93CFM MCU
- 100 MHz, Arm Cortex®-M33 core
- 128 KB Code Flash, 40 KB SRAM
- 64 pins, LQFP package
- Native pin access through male pin headers
- MCU current measurement points
- 5 V input through USB (Debug) or external power supply
- Debug on-board (Segger J-Link®)
- 2 User LEDs & 1 User button
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MCU boot configuration jumper



[renesas.com/ra/fpb-ra4e2](https://renesas.com/ra/fpb-ra4e2)

(User manual, quick start guide, development tools, schematics, design files & example projects)

**RTK7FPA4E2S00001BE**

(Orderable part number)

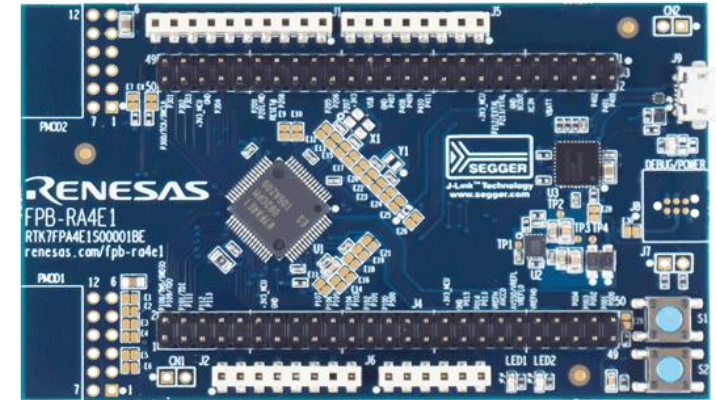


# FPB-RA4E1

## FAST PROTOTYPING BOARD FOR RA4E1 MCU GROUP

### Key Features

- R7FA4E10D2CFM MCU
- 100 MHz, Arm Cortex®-M33 core
- 512 KB Code Flash, 128 KB SRAM
- 64 pins, LQFP package
- Native pin access through male pin headers
- MCU current measurement points
- 5 V input through USB (Debug) or external power supply
- Debug on-board (Segger J-Link®)
- 2 User LEDs & 1 User button
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MCU boot configuration jumper



[renesas.com/ra/fpb-ra4e1](https://renesas.com/ra/fpb-ra4e1)

(User manual, quick start guide, development tools, schematics, design files & example projects)

**RTK7FPA4E1S00001BE**

(Orderable part number)



# EK-RA2A1

## EVALUATION KIT FOR RA2A1 MCU GROUP

### Key Features

- R7FA2A1AB3CFM MCU
- 48 MHz, Arm Cortex®-M23 core
- 256 KB Code Flash, 32 KB SRAM
- 64 pins, LQFP package
- Native pin access through 4x 40-pin male headers
- MCU current measurement points
- USB Full Speed Device
- 5 V input through USB Debug
- Debug on-board (Segger J-Link®)
- Debug in (SWD & JTAG)
- 2 Digilent Pmod™ (SPI & UART)
- User LED
- Mechanical user button
- Capacitive user button
- MCU boot configuration jumper



[renesas.com/ra/ek-ra2a1](https://renesas.com/ra/ek-ra2a1)

(User manual, quick start guide, development tools, schematics, design files & example projects)

**RTK7EKA2A1S00001BU**

(Orderable part number)

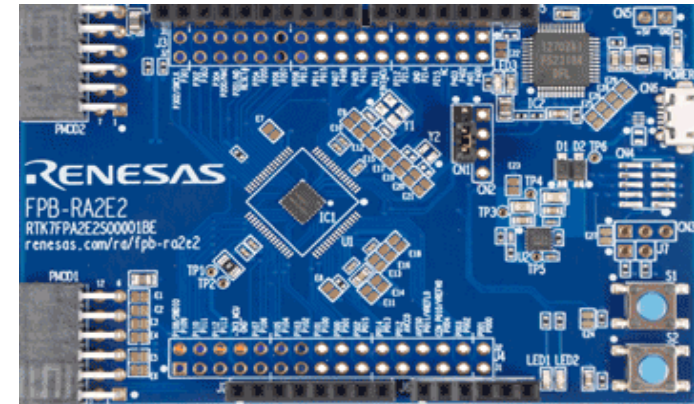


# FPB-RA2E2

## FAST PROTOTYPING BOARD FOR RA2E1 MCU GROUP

### Key Features

- R7FA2E2A74CNK MCU
- 48 MHz, Arm Cortex®-M23 core
- 64 KB Code Flash, 64 KB SRAM
- 24 pins, HWQFN package
- Native pin access through male pin headers
- MCU current measurement points
- 5 V input through USB (Debug) or external power supply
- Debug on-board (Renesas E2 Lite)
- 2 User LEDs & 1 User button
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MCU boot configuration jumper



[renesas.com/ra/fpb-ra2e2](https://renesas.com/ra/fpb-ra2e2)

(User manual, quick start guide, development tools, schematics, design files & example projects)

**RTK7FPA2E2S00001BE**

(Orderable part number)



# FPB-RA2E1

## FAST PROTOTYPING BOARD FOR RA2E1 MCU GROUP

### Key Features

- R7FA2E1A93CFM MCU
- 48 MHz, Arm Cortex®-M23 core
- 128 KB Code Flash, 16 KB SRAM
- 64 pins, LQFP package
- Native pin access through male pin headers
- MCU current measurement points
- 5 V input through USB (Debug) or external power supply
- Debug on-board (Renesas E2 Lite)
- 2 User LEDs & 1 User button
- 2 Digilent Pmod™ (SPI & UART)
- Arduino™ (Uno R3)
- MCU boot configuration jumper



[renesas.com/ra/fpb-ra2e1](https://renesas.com/ra/fpb-ra2e1)

(User manual, quick start guide, development tools, schematics, design files & example projects)

**RTK7FPA2E1S00001BE**

(Orderable part number)





# MIKROE RA4M1 CLICKER

## COMPACT STARTER BOARD FOR RA4M1 MCU GROUP

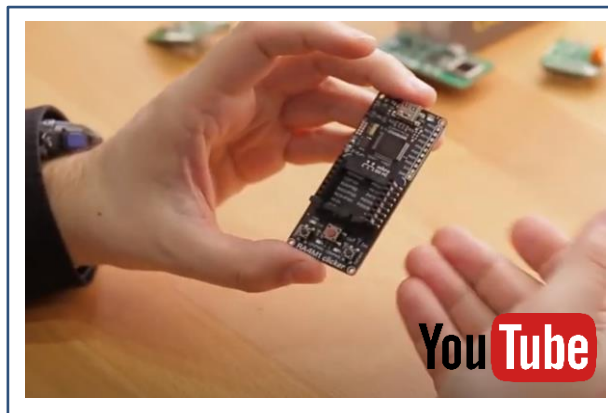
### Key Features

#### MCU Native Pin Access

- R7FA4M1AB3CFP MCU
- 48 MHz, Arm Cortex®-M4 core
- 256 KB Code Flash, 32 KB SRAM
- 100 pins, LQFP package

#### Ecosystem & System Control Access

- 5 V input through USB-C(Debug)
- Debug on-board (Segger J-Link®)
- 2 User LEDs & 2 User buttons
- Reset button
- MikroElektronika™ mikroBUS



[Introduction & Unboxing Video](#)



[mikroe.com/ra4m1-clicker](https://mikroe.com/ra4m1-clicker)

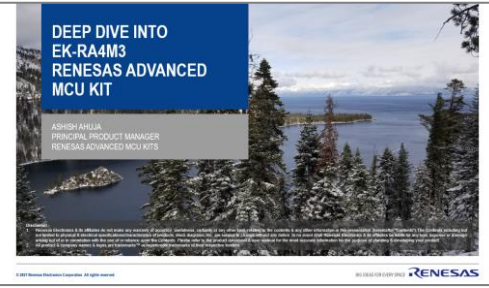
(User manual, quick start guide, schematics, design files & example project)

**MIKROE-4350**

(Orderable part number)



# TOP NOTCH COLLATERAL – DEEP DIVE PRESENTATIONS



Deep-dive presentations are available on [renesas.com/ra/<kit-name>](https://renesas.com/ra/<kit-name>)  
For example: [renesas.com/ra/ek-ra6m3](https://renesas.com/ra/ek-ra6m3)

# TOP NOTCH COLLATERAL – BLOGS

**Renesas RA6 Series Innovation Kits for Connected IoT Applications**

Ashish Ahuja  
Principal Product Manager and Product Marketing Manager

Published: April 5, 2022

The RA MCU innovation kits for IoT enable users to effortlessly evaluate the features of different RA MCU Groups and develop sophisticated IoT and embedded systems applications. The RA6 series kits feature high-performance MCUs with unmatched integrated connectivity, security, and HMI for your next intelligent IoT and embedded product.

The RA6 series innovation kits provide differentiated functionality that users can utilize to develop proof of concepts, solutions, and demos for wired connectivity, metering, robotics, fire detection, HVAC, and other home and industrial automation and

**Renesas RA4 Series Innovation Kits for Secure IoT Applications**

Ashish Ahuja  
Product Marketing Manager

Published: March 30, 2022

The RA MCU innovation kits for IoT enable users to effortlessly evaluate the features of different RA MCU Groups and develop sophisticated IoT and embedded systems applications. The RA4 series kits feature mid-performance MCUs with integrated connectivity, analog peripherals, and security for your next intelligent IoT and embedded product.

The RA4 series innovation kits provide differentiated functionality that users can utilize to develop proof of concepts, solutions, and demos for various panel control, energy metering, boiler control, theft detection, HVAC, and other home and industrial automation and control applications. The kits meet the requirements of international standards for EMC/EMI, waste, recycling, material selection, and safety allowing for multi-regional compliance and broad use-cases.

**Renesas RA2 Series Innovation Kits for Low-Power IoT Applications**

Ashish Ahuja  
Principal Product Manager and Product Marketing Manager

Published: March 25, 2022

The RA MCU innovation kits for IoT enable users to effortlessly evaluate the features of different RA MCU Groups and develop sophisticated IoT and embedded systems applications. The RA2 series kits feature small pin count MCUs based on Renesas' low-power process technology for your next energy-efficient IoT and embedded product.

The RA2 series innovation kits provide differentiated functionality that users can utilize to develop proof of concepts, solutions, and demos for various portable consumer, small kitchen, medical, healthcare, wearable, sensor, and data acquisition, and

**Beginning to Innovate Has Never Been Easier**

Ashish Ahuja  
Principal Product Manager and Product Marketing Manager

Published: November 11, 2021

Renesas recommends a five-step, systematic and methodical approach that takes the guesswork out of the innovation experience, making it hassle-free and fun. The five-step approach is recommended for most new users. It allows for structured and orderly exploration of resources that users can utilize to develop smart IoT and embedded products. These steps are listed below and are briefly described as follows:

1. Get your kit
2. Familiarize yourself with your kit
3. Download and install software and tools

**Quickly Programming RA MCU Innovation Kits for IoT**

Ashish Ahuja  
Principal Product Manager and Product Marketing Manager

Published: December 3, 2021

Sometimes users prefer to program a new microcontroller kit using simple programming utilities instead of using full-blown, bulky development toolchains. Doing so is particularly useful when users are getting acquainted with the kit, don't have an IDE installed on their computers, want to quickly explore the functionality of an example project on their RA kits, or are just not ready to dive deep into the source code. Users can quickly and easily program RA MCU innovation kits for IoT using popular flash programming utilities to explore the functionality offered by more than 600 example projects.

This blog provides useful information on programming a pre-built hex file onto an RA kit using Renesas Flash Programmer and Segger® J-Flash Lite without having to build the source code or use an IDE. The EK-RA6M3 kit and Quick Start example project

**Accelerate Debugging Using RA MCU Innovation Kits for IoT Applications**

Ashish Ahuja  
Principal Product Manager and Product Marketing Manager

Published: November 15, 2021

Taking new products to the market faster can sometimes be the difference between success and failure. As IoT and embedded products are becoming more secure and connected, the application software running on these products has become increasingly sophisticated, requiring more development, and debugging effort.

The advanced debugging capabilities available on RA kits provide you the flexibility and convenience to debug the code quickly, easily, and cost-effectively.

**Develop Faster Using Example Projects for RA MCU Innovation Kits for IoT**

Ashish Ahuja  
Principal Product Manager and Product Marketing Manager

Published: December 3, 2021

The firmware running on intelligent and secure IoT products is quite sophisticated. Users who are beginning embedded and IoT application development using RA MCU innovation kits for IoT can utilize 600+ example projects as building blocks to create feature-rich IoT and embedded proof-of-concepts quickly and easily. Example projects for RA kits allow for structured and systematic exploration of the features available on the RA microcontrollers so that the users can provide state-of-art functionality to their customers.

Blogs are available on [renesas.com/ra/<kit-name>](https://renesas.com/ra/<kit-name>)  
For example: [renesas.com/ra/ek-ra6m3](https://renesas.com/ra/ek-ra6m3)

# TOP NOTCH COLLATERAL – GETTING STARTED VIDEOS



[RA Kit Introduction](#)

[5 Steps to Get Started](#)

[Programming Kits](#)

[Accelerate Debugging](#)

[Example Projects](#)



[RA8 Series Kits Intro & Unboxing](#)

[RA6 Series Kits Intro & Unboxing](#)

[RA4 Series Kits Intro & Unboxing](#)

[RA2 Series Kits Intro & Unboxing](#)

[EK-RA6M4 Intro & Unboxing](#)

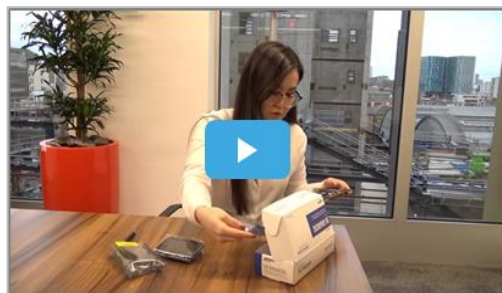
[EK-RA6M3 Intro & Unboxing](#)

Available on [renesas.com/ra/kits](https://renesas.com/ra/kits) and on [renesas.com/ra/<kit-name>](https://renesas.com/ra/<kit-name>). For example: [renesas.com/ra/ek-ra6m3](https://renesas.com/ra/ek-ra6m3)

# MANY USEFUL VIDEOS BY PARTNERS & DISTRIBUTORS



[Segger emWin Graphics Solution running on EK-RA6M3G](#)



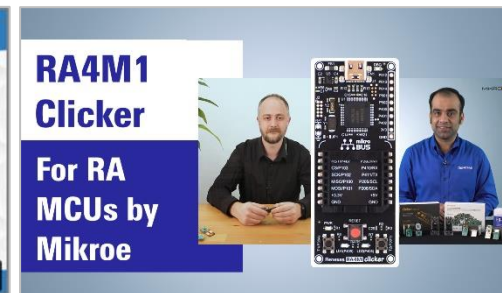
[RS Components Design Spark EK-RA6M3 Unboxing](#)



[PR TechTalk EK-RA2E1 Getting Started](#)



[Mouser Electronics EK-RA4M1 Engineering Bench Talk](#)



[Mikroe RA4M1 Clicker](#)



[RS Components Design Spark EK-RA6M4 Unboxing](#)



[EK-RA6M3 Clarinox IoT on Renesas RA MCUs](#)



[Dev Kit Weekly EK-RA6M3 Introduction](#)



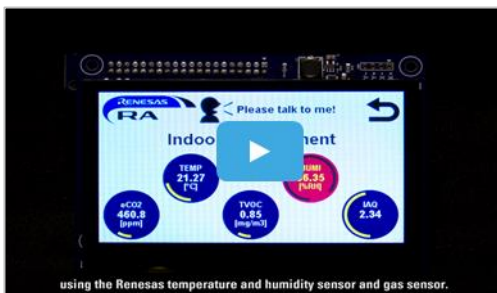
[RS Components Design Spark EK-RA2L1 Unboxing](#)



[Mouser Electronics Connecting EK-RA6M3 to Cloud](#)

Sampling of videos. Click the captions to view videos.

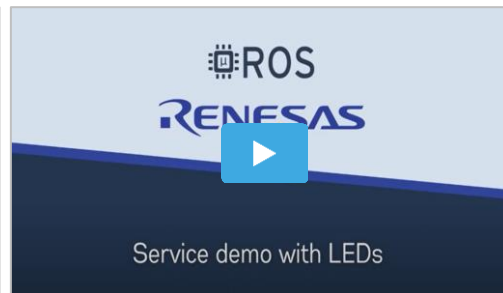
# MANY USEFUL VIDEOS BY PARTNERS & DISTRIBUTORS



[HMI Solutions using EK-RA6M3G](#)



[eProxima EK-RA6M5: Publisher demo with timer and LED blinking](#)



[eProxima EK-RA6M5: Service demo with LEDs](#)



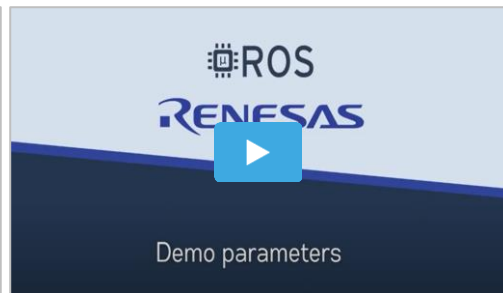
[ARM Pelion Device Management for EK-RA6M3](#)



[PR TechTalk EK-RA6M3 as External Debugger](#)



[EK-RA6M3 Multizone Security Demo](#)



[eProxima EK-RA6M5: Demo parameters](#)



[eProxima EK-RA6M5: Getting started with micro-ROS](#)



[PR TechTalk EK-RA6M3 Segger RTT installation](#)

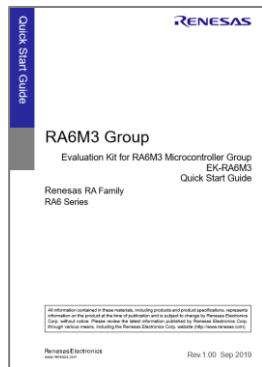


[PR TechTalk EK-RA2L1 Getting Started](#)

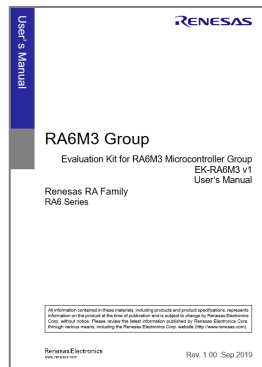
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# TOP NOTCH COLLATERAL – ENGINEERING

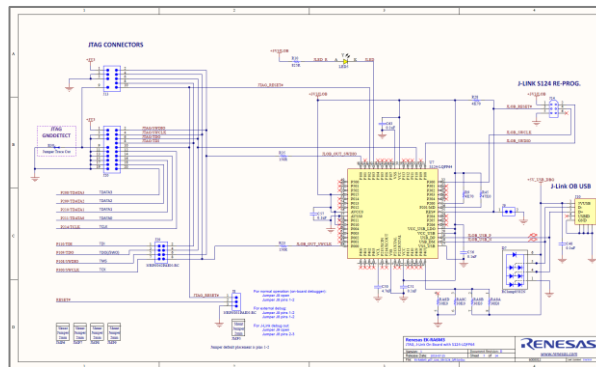
## Design Package



Quick start guide

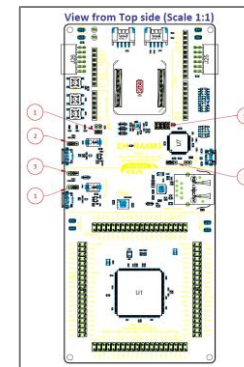


User's manual

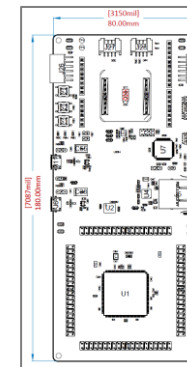


Schematics

Bill of Materials



Design & manufacturing files



Example Projects

All items available on kit website [renesas.com/ra/<kit-name>](https://renesas.com/ra/<kit-name>)  
 For example: [renesas.com/ra/ek-ra6m3](https://renesas.com/ra/ek-ra6m3)

# GETTING STARTED IS EASY!

- 1 Get your kit
- 2 Familiarize with your kit
- 3 Download & install software & tools
- 4 Explore & customize example projects
- 5 Expand functionality

## I. Choose your favorite kit

RA MCU Kit Name	RA MCU					Ecosystem Expansion					Debug				Connectivity						Ordering	
	Core Frequency (Hz)	Code Flash (KB)	SRAM (KB)	Terminals	Package	PMOD	Grove	Qwiic	MicroBus	Arduino	Debug MCU	Debug OB	Debug In	Debug Out	UART, SPI, I2C	USB FS	USB HS	CAN-FD	QSPI	OSPI	Ethernet	Part Number
EK-RA8D1	480	2048	1024	224	BGA	x	x	x	x	x	RA4M2	x	x	x	x	x	x			x	x	RTK7EKA8D1S01001BE
EK-RA8M1	480	2048	1024	224	BGA	x	x	x	x	x	RA4M2	x	x	x	x	x	x			x	x	RTK7EKA8M1S00001BE
EK-RA6M5	200	2048	512	176	LQFP	x	x	x	x	x	S124	x	x	x	x	x	x	x	x	x	x	RTK7EKA6M5S00001BE
EK-RA6M4	200	1024	256	144	LQFP	x	x	x	x	x	S124	x	x	x	x				x	x	x	RTK7EKA6M4S00001BE
EK-RA6M3G	120	2048	640	176	LQFP	x	x		x	x	S124	x	x	x	x	x			x		x	RTK7EKA6M3S01001BU
EK-RA6M3	120	2048	640	176	LQFP	x	x		x	x	S124	x	x	x	x	x			x		x	RTK7EKA6M3S00001BU
EK-RA6M2	120	1024	384	144	LQFP	x					S124	x	x		x	x						RTK7EKA6M2S00001BU
EK-RA6M1	120	512	256	100	LQFP	x					S124	x	x		x	x						RTK7EKA6M1S00001BU
EK-RA6E2	200	256	40	64	LQFP	x	x	x	x	x	RA4M2	x	x	x	x	x		x	x			RTK7EKA6E2S00001BE
EK-RA4M3	100	1024	128	144	LQFP	x	x	x	x	x	S124	x	x	x	x	x			x			RTK7EKA4M3S00001BE
EK-RA4M2	100	512	64	100	LQFP	x	x	x	x	x	S124	x	x	x	x	x			x			RTK7EKA4M2S00001BE
EK-RA4M1	48	256	32	100	LQFP	x					S124	x	x		x	x						RTK7EKA4M1S00001BU
EK-RA4E2	100	128	40	64	LQFP	x	x	x	x	x	RA4M2	x	x	x	x	x			x			RTK7EKA4E2S00001BE
EK-RA2L1	48	256	32	100	LQFP	x	x	x	x	x	S124	x	x	x	x							RTK7EKA2L1S00001BE
EK-RA2E2	48	64	8	24	HWQFN	x	x	x	x	x	S124	x	x	x	x	x						RTK7EKA2E2S00001BE
EK-RA2E1	48	128	16	64	LQFP	x	x	x	x	x	S124	x	x	x	x							RTK7EKA2E1S00001BE
EK-RA2A1	48	256	32	64	LQFP	x					S124	x	x		x	x						RTK7EKA2A1S00001BU

Sampling of RA kits. [Full table](https://www.renesas.com/ra/kits) is available on [renesas.com/ra/kits](https://www.renesas.com/ra/kits)



# GETTING STARTED IS EASY!

- 1 Get your kit
- 2 Familiarize with your kit
- 3 Download & install software & tools
- 4 Explore & customize example projects
- 5 Expand functionality

II. Order it from one of the leading global or regional distributors



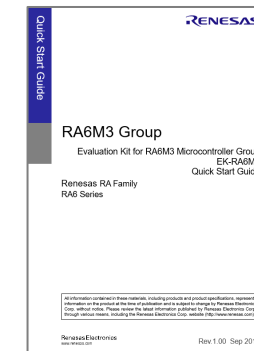
Sampling of distributors  
 (List subject to change; please refer to [renesas.com/ra/<kit-name>](https://renesas.com/ra/<kit-name>) for the list of distributors stocking the kit)

# GETTING STARTED IS EASY!

- 1 Get your kit
- 2 Familiarize with your kit
- 3 Download & install software & tools
- 4 Explore & customize example projects
- 5 Expand functionality

I. Obtain the quick start guide & user's manual for your kit from [renesas.com/ra/<kit-name>](https://renesas.com/ra/<kit-name>)

Kit Name	Kit Homepage
EK-RA8D1	<a href="https://renesas.com/ra/ek-ra8d1">renesas.com/ra/ek-ra8d1</a>
EK-RA8M1	<a href="https://renesas.com/ra/ek-ra8m1">renesas.com/ra/ek-ra8m1</a>
EK-RA6M5	<a href="https://renesas.com/ra/ek-ra6m5">renesas.com/ra/ek-ra6m5</a>
EK-RA6M4	<a href="https://renesas.com/ra/ek-ra6m4">renesas.com/ra/ek-ra6m4</a>
EK-RA6M3G	<a href="https://renesas.com/ra/ek-ra6m3g">renesas.com/ra/ek-ra6m3g</a>
EK-RA6M3	<a href="https://renesas.com/ra/ek-ra6m3">renesas.com/ra/ek-ra6m3</a>
EK-RA6M2	<a href="https://renesas.com/ra/ek-ra6m2">renesas.com/ra/ek-ra6m2</a>
EK-RA6M1	<a href="https://renesas.com/ra/ek-ra6m1">renesas.com/ra/ek-ra6m1</a>
EK-RA6E2	<a href="https://renesas.com/ra/ek-ra6e2">renesas.com/ra/ek-ra6e2</a>
EK-RA4M3	<a href="https://renesas.com/ra/ek-ra4m3">renesas.com/ra/ek-ra4m3</a>
EK-RA4M2	<a href="https://renesas.com/ra/ek-ra4m2">renesas.com/ra/ek-ra4m2</a>
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EK-RA4E2	<a href="https://renesas.com/ra/ek-ra4e2">renesas.com/ra/ek-ra4e2</a>
EK-RA2A1	<a href="https://renesas.com/ra/ek-ra2a1">renesas.com/ra/ek-ra2a1</a>
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EK-RA2L1	<a href="https://renesas.com/ra/ek-ra2l1">renesas.com/ra/ek-ra2l1</a>



Quick start guide



User's manual

II. Run the Quick Start (QS) example project (EP) that is pre-programmed on the kit

# GETTING STARTED IS EASY!

- 1 Get your kit
- 2 Familiarize with your kit
- 3 Download & install software & tools**
- 4 Explore & customize example projects
- 5 Expand functionality

- I. Download & install software & tools using the *FSP with e<sup>2</sup> studio installer* that includes:
  - **Flexible Software Package** – includes Hardware Abstraction Layer (HAL) drivers, Board Support Package (BSP), libraries, etc.
  - **e2 studio** – Integrated Development Environment

Item	Download page
FSP with e <sup>2</sup> studio installer	<a href="https://renesas.com/ra/fsp">renesas.com/ra/fsp</a>

- II. Need help anytime?
  - Ask questions, get answers from experts & collaborate with community [renesas.com/ra/forum](https://renesas.com/ra/forum)

# GETTING STARTED IS EASY!



## I. Explore & customize Quick Start Example Project

- Visit kit page, for example, EK-RA6M3 webpage [renesas.com/ra/ek-ra6m3](https://renesas.com/ra/ek-ra6m3) and scroll down to “Documentation & Downloads” section
- Download EK-RA6M3 Example Project Bundle
- Extract the downloaded file xxxx-ek-ra6m3-exampleprojects.zip
- Browse to xxxx-ek-ra6m3-exampleprojects\ek\_ra6m3\\_quickstart\quickstart\_ek\_ra6m3\_ep to locate the source code of the QS EP
- Refer to the quick start guide for instructions on modifying, rebuilding & programming the QS EP on your kit

## II. Explore & customize additional Example Projects

- In the EK-RA6M3 Example Project Bundle downloaded in the step above, browse to xxxx-ek-ra6m3-exampleprojects\ek\_ra6m3\ to locate the example projects provided for this kit
- Open xxxx-ek-ra6m3-exampleprojects.pdf to view the list of tool chain supported for each example project and additional reference documents

# GETTING STARTED IS EASY!

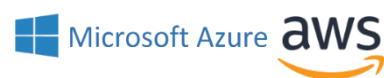
- 1 Get your kit
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- I. Choose from hundreds of add-on modules from the supported ecosystems to build custom proof-of-concept hardware

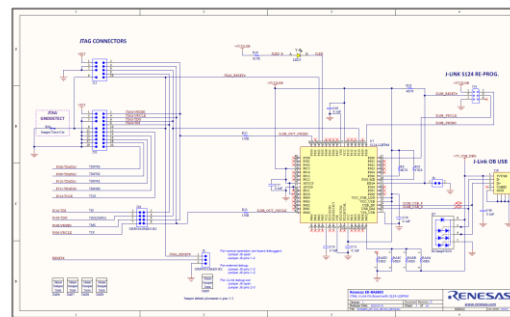


mikroBUS™  
a rocking new pinout standard!

- II. Choose from numerous software IPs from Renesas ecosystem partners for additional features

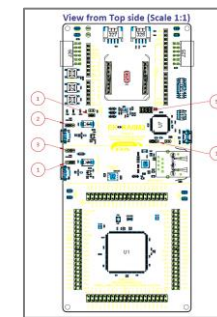


- III. Refer to the kit design package to develop your custom board with feature enhancements

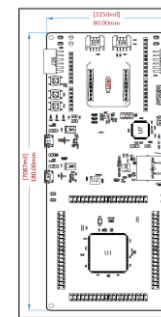


Schematics

BOM



Design & manufacturing files



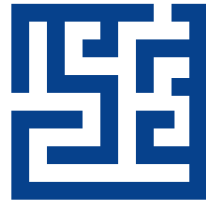
# USEFUL RESOURCES

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## Ordering & Documentation

User Manual, Design Package, Quick Start Guide  
[renesas.com/ra/<kit-name>](https://renesas.com/ra/<kit-name>)



## Example Projects

Access FSP and Example Projects for RA Kits  
[renesas.com/ra/kitEP](https://renesas.com/ra/kitEP)



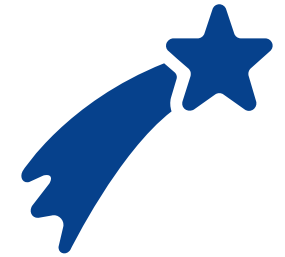
## Video Library

Learn more about RA MCU, Kits, FSP, and Tools  
[renesas.com/ra/videos](https://renesas.com/ra/videos)



## Support Community

Ask questions from experts  
Collaborate with community  
[renesas.com/ra/forum](https://renesas.com/ra/forum)



## Feedback & Feature Requests

Tell us how we are doing and how can enhance your experience  
[renesas.com/ra/kitFeedback](https://renesas.com/ra/kitFeedback)

# BRING YOUR BIG IDEAS TO LIFE

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<https://www.renesas.com/ra>

