



# RA MCU Family Software **FLEXIBLE SOFTWARE PACKAGE**



# Open, flexible development ecosystem provides easy-to-use, scalable, high-quality software for RA MCU embedded designs

The Renesas Flexible Software Package (FSP) is an enhanced software package designed to provide easy-to-use, scalable, high-quality software for embedded system designs using RA Family microcontrollers. With Arm<sup>®</sup> TrustZone<sup>®</sup> and other advanced security features, FSP provides a quick and versatile way to build secure, connected IoT devices using production-ready drivers, multiple supported RTOS and a variety of middleware stacks.

#### **FSP Structure**

Arm TrustZone										
Azure RTOS Connectivity NetX Duo & Add-ons, BLE, WIFI USBX (CDC, MSC, HID, Audio, OTG)			USB Middleware (CDC, MSC, HID) FreeRT		ectivity TOS+TCP, TT. BLE	<b>Storage</b> Virtual EEPROM Block Media USB, SDHI, SPI		Capacitive Touch Buttons. Sliders. Wheels Self & Mutual		
Security NetX Crypto HW Acceleration NetX Secure Graphics GUIX GUIX Studio	File System FileX, LevelX, exFAT Trace TraceX		Security PSA Crypto HW Acceleratic Mbed TLS Graphics emWin AppWizard	on CAT-M1, WIFI, BLE-Mesh		Security Security Secure Bootloader (MCUboot), TF-M FSP Crypto APIs TinyCrypt		Controls & Sensors Motor Cntrl Algorithms Sensor APIs		
Peel	Time OS	$\left[ \right]$	Hardware Abstraction Layer (HAL) Drivers							
Real-Time OS			ADC	I/O Ports	Clock Accuracy Circuit	Clock Generation Circuit	SD. MMC Host Interface	UART	Low Voltage Detection	
Azure RTOS ThreadX			DAC	Sigma Delta ADC	External Interrupt	Realtime Clock	USBHS/ USBFS	SPI	Low Power Modes	
			CRC	Operational Amplifier IRFA	2D Drawin Engine	g Even Link Controller	GLCDC/ Segment LCDC	I2C/I3C	Encryption/ Decryption (\$CE)	
FreeRTOS			DOC	Parallel Data Capture	Cap Touch Driver	n Timer/ Motor Contrl	DMA Controller	12S	Hashing (\$CE)	
			QSPI	Comparators	JPEG Code	watchdog	Flash	Ethernet/ PTPC	CAN-FD	
Board Support Package (BSP) CMSIS Core, DSP, NN										

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## Features & Benefits

- Provides easy-to-use, scalable, high-quality software for embedded system designs using RA MCUs
- Includes best-in-class HAL drivers with high performance and low memory footprint
- Middleware stacks with Azure RTOS and FreeRTOS integration are included to ease implementation of complex modules, such as communication and security
- e<sup>2</sup> studio IDE provides intuitive configurators and intelligent code generation to make programming and debugging easier and faster
- Uses an open software ecosystem and provides flexibility in bare-metal programming, including Azure RTOS, FreeRTOS, your preferred RTOS, legacy code and third-party ecosystem solutions



- Integrated package delivers all required components for easy setup and development start with a single installer for e<sup>2</sup> studio, CMSIS packs, tool chain and SEGGER J-Link drivers
- Complete source code available on <u>GitHub</u>

### **Tools and Support**

The RA family development environment offers flexibility with support for different on-chip debuggers, IDEs, and compilers. Customers can use Renesas e<sup>2</sup> studio, Keil MDK and IAR Embedded Workbench. All tools can use the RA configurators for FSP driver and middleware selection and configuration, in addition to pin mapping and clock tree configuration. e<sup>2</sup> studio offers a complete development flow from initial project generators, graphical FSP configuration and comprehensive debugger options.

IDE	Renesas e <sup>2</sup> studio	Keil MDK	IAR EWARM				
Compiler	<ul> <li>GCC</li> <li>LLVM</li> <li>Arm Compiler*</li> <li>IAR Arm Compiler*</li> </ul>	Arm Compiler*	<ul> <li>IAR Arm Compiler*</li> </ul>				
Debug Probe	<ul><li>Renesas E2/E2 Lite</li><li>SEGGER J-Link</li></ul>	<ul> <li>SEGGER J-Link</li> <li>Keil ULINK / CMSIS-DAP (limited support)</li> </ul>	<ul> <li>IAR I-jet</li> <li>SEGGER J-Link</li> <li>Renesas E2/E2 Lite</li> <li>CMSIS-DAP (limited support)</li> </ul>				
Smart Configurator	Built-in BSP Clock Pin Drivers Interrupts	Supplied as RASC • BSP • Clock • Pin • Drivers • Interrupts	Supplied as RASC • BSP • Clock • Pin • Drivers • Interrupts				
Application Specific Configurators	<ul> <li>QE for Capacitive Touch</li> <li>QE for BLE</li> <li>QE for AFE</li> <li>Motor Control Workbench</li> </ul>	NA	NA				
Production Programmer	Renesas PG-FP6 • SEGGER J-Flash • Partner solutions						

\* Compiler must be purchased and licensed directly from third party

For more details, please visit renesas.com/fsp