

World's Most Advanced Wireless Microcontroller

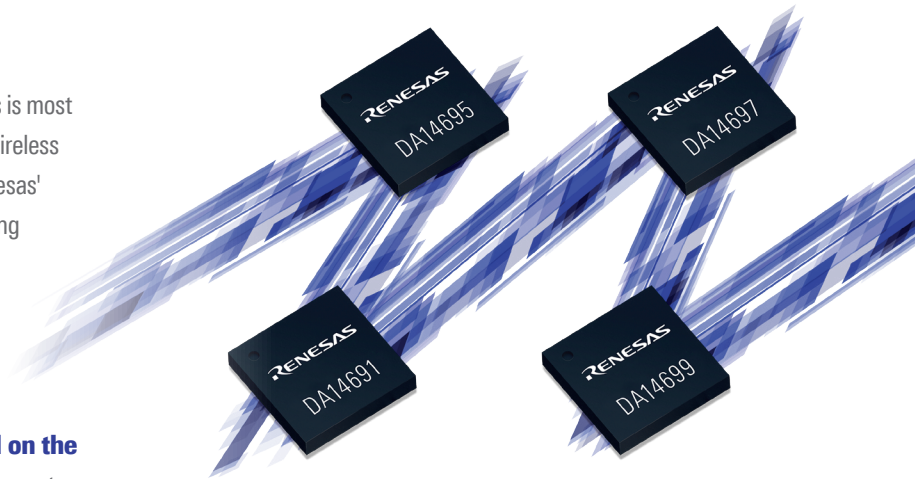
# SMARTBOND™ DA1469X FAMILY

The SmartBond™ DA1469x family of Bluetooth® low energy solutions is most advanced, feature rich range of multi-core microcontroller units for wireless connectivity. The new product family builds off the successes of Renesas' SmartBond line, boasting three new cores that offer greater processing power, resources, range and battery life, enabling developers to push the boundaries of a wide array of connected consumer applications.

The DA1469x line provides developers with advanced connectivity features to future-proof their devices and fit the needs of multiple applications. **As the first wireless MCU in production based on the Arm Cortex-M33 processor**, DA1469x products offer developers greater processing power for intensive applications like high-end fitness trackers, advanced smart home devices and virtual reality game controllers.

Additionally, these wireless MCUs have a Configurable MAC which enable manufacturers to deploy proprietary 2.4 GHz and the latest Bluetooth low energy protocol, opening up new possibilities such as accurate positioning for Real Time Location Systems (RTLS) and low latency communication exchange for applications like gaming. And, to enhance their sensing functionality, the line features a Sensor Node Controller (SNC) that runs autonomously and independently processes data from sensors connected to its interfaces.

Finally, the DA1469x family features a state-of-the-art Power Management Unit that utilizes best-in-class power management by controlling the different processing cores and only activating them as needed, while also eliminating the need for a separate PMIC and reducing the overall system size. Altogether, the DA1469x line represents Renesas' most advanced family of Bluetooth low energy products, perfectly suited to meet the demands of tomorrow's users.



smartbond		DA1469x	RENESAS	
Arm Cortex-M33 CPU		AES	HASH	
Sensor Node Controller			TRNG	
SWD	512kB RAM	RC32M		
UART x3 (ISO7816)		RC32K		
SPIx2		XTAL32k		
I2C		XTAL32M		
PDM/PCM/SRC	128kB ROM	PLL96M		
RTC		Configurable MAC	Digital PHY	RADIO
4x24bits Timers	QSPI FLASH I/F			
10 bit SAR ADC		QSPI PSRAM I/F	External power rails (PMU)	
14 bit SD ADC	Display driver			
LRA/ERM		Motor Controller		
USB	Up to 55 GPIOs			
Charger				
White LEDs				

## Benefits

- Supports complex applications while guaranteeing extreme low power consumption
- SW programmable protocol engine ensures end products are future proof
- Enables a rich user experience
- Provides banking-level security for application, data and communication
- Saves up to \$1.28 on BoM vs existing wireless MCUs
- Saves up to 38mm<sup>2</sup> of PCB space (components + routing) vs existing wireless MCUs

## Applications

- Fitness trackers
- Sport watches
- Toys
- Consumer appliances
- Home automation
- Industrial automation
- Voice-controlled remote controls
- Access control
- Game controllers and headsets

## DA1469x Product Family Selector Guide

Features	DA14691	DA14695	DA14697	DA14699
MCU	Cortex-M33F, Cortex-M0+, SNC	Cortex-M33F, Cortex-M0+, SNC	Cortex-M33F, Cortex-M0+, SNC	Cortex-M33F, Cortex-M0+, SNC
RAM size	384kB	512kB	512kB	512kB
Multi-core	✓	✓	✓	✓
USB Controller and USB pins	✓	✓	✓	✓
1.8V and 3.0V power rails	✓	✓	✓	✓
Audio Processing Unit	✓	✓	✓	✓
Parallel LCD Controller	✗	✓	✓	✓
Charger	✗	✓	✓	✓
QSPI RAM controller	✗	✓	✓	✓
White LEDs	✗	✗	✓	✓
LRA/ERM	✗	✗	✓	✓
Motor Controller	✗	✗	✗	✓

## Software and Hardware Tools

The DA1469x family parts are supported by Renesas SmartSnippets™ Studio, a royalty-free software development platform for all SmartBond devices.

### SmartSnippets Studio contains:

- SmartSnippets Toolbox: A tool suite covering all software development needs, including power profiling, Flash or OTP programming and testing
- SmartSnippets IDE: An Eclipse CDT-based IDE with pre-configured plugins for easy out of the box set-up of the build / debug environment
- SmartSnippets DA1469x Software Development Kit and documentation

## Key Features

### Powerful Application Processor

- 32-bit Arm Cortex-M33 microcontroller with floating point unit
- Up to 144 Dhrystone MIPS
- CoreMark score 3.574 CM/MHz
- Dynamically controllable clock frequency from 32 kHz up to 96 MHz
- 4-way associative cache controller with 16 kB cache RAM memory
- Secure Execute in Place (XIP) from QSPI FLASH with on-the-fly image decryption
- 512 kBytes of RAM
- QSPI RAM at system speed for RAM expansion

### Configurable MAC processor

- Arm Cortex -M0+ microcontroller with hardware accelerators
- Dedicated AES128 engine
- Supports Bluetooth 5.2 and proprietary 2.4 GHz protocols

### Sensor Node Controller

- Programmable dedicated micro-DSP for data acquisition
- DMA operation for storing data from sensors to RAM

### Integrated Power Management

- Wide input voltage range: 2.4 V - 4.75 V
- Integrated SIMO DC/DC buck converter
- Integrated LDOs for active and sleep operation
- Brownout detection on all power rails
- External power supply rails: two 1.8V rails and one 3.3V rail for external components (50mA each)
- Fully JEITA-compliant charger for Lithium-Ion and Lithium-Polymer batteries
- USB charge detection and protection

### Dedicated Crypto engine

- AES-256 all modes of operation
- True Random Number Generator
- Hash functions: SHA-1, SHA-2, SHA-512 accelerators

### RF performance

- Configurable transmit output power up to +6 dBm
- Receive sensitivity: -97 dBm
- Integrated balun
- 50  $\Omega$  matched single-wire antenna interface
- Coexistence interface for multi-radio systems

### Selection of digital and analog interfaces

- 55 (BGA100) or 44 (BGA86) general purpose I/Os with programmable voltage levels
- Haptic Driver for LRA/ERM support, 250mA maximum drive
- Parallel/SPI LCD Controller with dedicated DMA
- Motor controller with autonomous FSM driving up to 20 GPIOs with PWM waveforms
- Three UARTs up to 1 Mbps, one UART extended with ISO7816 support
- Two SPI+ interfaces
- Two I2C controllers at 100 kHz, 400 kHz or 3.4 MHz
- PDM interface with HW sample rate converter (2 mics or 2 speakers)
- I2S/PCM master/slave interface up to 8 channels
- USB Full Speed (FS) device interface
- 8-channel 10-bit SAR-ADC with oversampling (11b ENOB), 3.4 Msamples/sec
- 8-channel 14-bit  $\Sigma\Delta$ -ADC, 1 ksamples/sec
- Two matched white LED drivers
- Real Time Clock and four 24-bit General Purpose Timers
- Temperature sensor

## Ordering Information

### DA1469x SoC's

Part number	Package	Pitch(mm)	Size (mm)	Shipment	Pack Quantity
DA14691-00000HQ2	VFBGA86	0.55	6 x 6	Reel	4k
DA14695-00000HQ2	VFBGA86	0.55	6 x 6	Reel	4k
DA14697-00000HQ2	VFBGA100	0.475	6 x 6	Reel	5k
DA14699-00000HQ2	VFBGA100	0.475	6 x 6	Reel	5k

### DA1469x Development Kits

Part number	Description
DA14695-00HQDEVKT-U	USB development kit for DA14695 for SW development Supports mikroBUS™ shields
DA14695-00HQDEVKT-P	Pro development kit for DA14695 for SW development and power measurements: includes motherboard, daughterboard and cables Supports Arduino and mikroBUS™ shields
DA14695-00HQDB-P	Daughterboard for DA14695 to be used with Pro development kit
DA14699-00HRDB-P	Daughterboard for DA14699 to be used with Pro development kit

For more information and purchasing please visit:

[www.renesas.com/DA14695](http://www.renesas.com/DA14695)



**DA14695  
Development Kit-Pro**



**DA14695  
Development Kit-USB**



**DA14695 Daughterboard**



**DA14699 Daughterboard**



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