

RENESAS SYNERGY™ 平台

一个全面的、认证合格的嵌入式MCU软件和硬件平台



率先一步

利用Renesas Synergy，更快更轻松地进入市场。
作为首个完全认证合格的MCU软件和硬件平台，
我们帮助您在更短时间内接触更多的人。



为何选择SYNERGY?

www.renesassynergy.com



加快开发

将API以下的一切都交给我们，
让您可以专注优化产品，让其脱颖而出。



降低总拥有成本

从始至终，帮助您降低成本——技术、开发
和维护均涵盖在内。



降低门槛

不会面临前期投入、复杂许可，
或从头开始等阻碍，可直接着手创新。

体验**该平台**的能效



平台

一种作为基础的软件和硬件架构。

软件

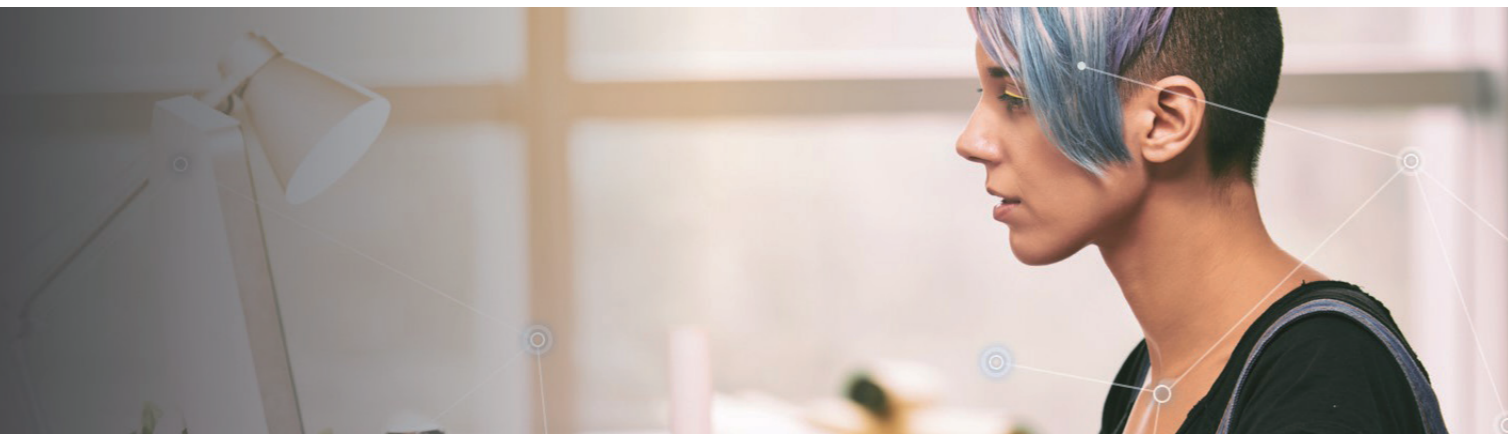
Synergy软件包括基于Synergy软件包(SSP)开发应用的工具,以及利用软件附件组件来满足您的特定软件功能要求。

硬件

Synergy硬件包含用于快速开发和原型制作的广泛套件,以及可通过软件API全方位访问的基于Arm® Cortex®-M的可扩展和可兼容的MCU系列。

解决方案

Synergy解决方案库负责管理所有与Synergy平台兼容的软件、硬件、套件、工具,以及合作伙伴公司提供的服务。瑞萨电子提供的Synergy平台组件也包含在内,用于实施快速选择和访问。



SYNERGY软件

为Synergy平台开发和优化、经过商业认证合格的软件

互联设备，尤其是面向物联网的设备，提高了对嵌入式系统软件的要求。实时操作系统(RTOS)、网络协议、安全性，以及电源管理只是其中几个示例。Synergy软件通过三种方式提供解决方案——您选择的专业开发工具、Synergy软件包

(SSP)，以及经过验证的软件附件。其中包括全面许可、维护、支持，以及不限量的使用SSP的工具开发席位和产品。无使用费和其他费用。



Synergy软件包

SSP是经过验证的框架和标准API，将顶级商业RTOS、一套中间件、多个库，以及低端驱动程序紧密集成在一起，帮助简化您遇到的复杂功能，同时开发互联嵌入式系统。

其分层架构让您能够使用通用API的应用框架来编写您的应用，或者根据需要直接连接至MCU器件的驱动层。瑞萨电子认证SSP需依照SSP数据表规格运行，同时提供全面的SSP维护和支持。



软件质量保证

为了确保做好生产准备，瑞萨电子依据涵盖整个软件开发生命周期的国际标准ISO/IEC/IEEE 12207来开发SSP。SSP的每个部分都受这些要求限定，并根据这些要求进行测试。会利用

设备单元、功能、集成、性能、回归、动态和静态分析测试组合来跟踪和测量SSP的质量。

经过验证的软件附件

经过验证的软件附件(VSA)可以扩展SSP的功能,进而实现一系列特定的软件功能,包括通信协议、增强安全功能、控制算法、云连接以及云服务。VSA由第三方合作伙伴公司提供,由瑞萨电子验证是否与SSP兼容。

现已提供VSA示例:

- 工业协议CANopen、BACnet
- DALI 2.0数字照明协议
- 电力线载波协议
- 工业云服务
- 安全启动
- HTTPs等

Synergy软件工具

Synergy工具旨在通过加快代码开发来加快产品上市速度,它帮助简化了文件管理、软件和MCU配置、代码生成、编译、调试和直观的图形接口设计。

Synergy平台涵盖所有的Synergy工具、支持、开发席位和维护,价格却只相当于一个Synergy MCU。

您可以使用任意这些专业工具来为您的最终产品开发软件。

- e² studio集成开发环境(IDE),可以选择采用GCC或IAR C/C++编译器和自动代码生成
- 面向Renesas Synergy™ IDE的IAR Embedded Workbench®用于生成执行速度快、高度紧凑的代码
- TraceX®用于可视化地监测运行时性能
- GUIX Studio™用于支持拖放式图形用户界面(GUI)设计



SYNERGY硬件

基于Arm® Cortex®-M、运行功率为32MHz至240MHz、可扩展、可兼容的MCU硬件系列

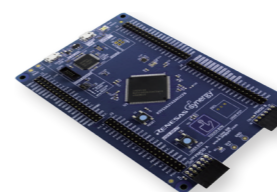
使用Synergy MCU系列来设计广泛的嵌入式系统和物联网设备,从由电池供电的高效应用到高性能连接产品。

选择一个Synergy套件,用来评估整个Synergy平台,访问Synergy MCU的功能性,并快速制作原型,以节省时间和资源。

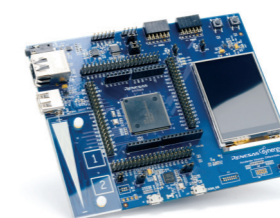


Synergy套件

选择一个Synergy套件,用来评估整个Synergy平台,访问Synergy MCU的功能性,并快速制作原型。



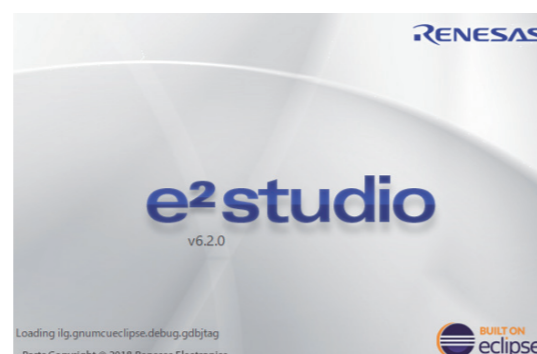
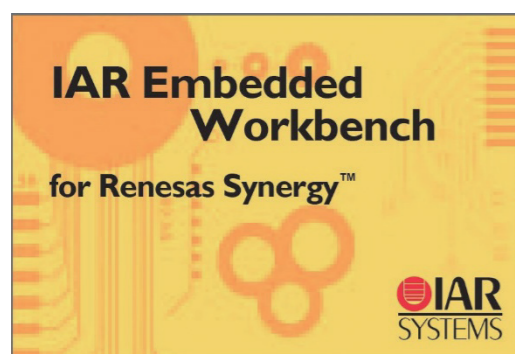
目标板套件



入门套件



开发套件



TRACE X



GUIX STUDIO

Synergy微控制器

S5D9

120 MHz Arm® Cortex®-M4 CPU

FPU | ARM MPU | NVIC | ETM | JTAG | SWD | 边界扫描

<div style="background-color: #f2f2f2; padding: 5px; margin-bottom: 5px;">存储器</div> <p>程式快闪记忆体 (高达2 MB)</p> <p>资料快闪记忆体(64 KB)</p> <p>SRAM (640 KB)</p> <p>闪存缓存</p> <p>内存保护单元</p> <p>内存镜像功能</p>	<div style="background-color: #f2f2f2; padding: 5px; margin-bottom: 5px;">模拟</div> <p>12位A/D转换器x2 (24通道)</p> <p>12位D/A转换器x2</p> <p>高速模拟比较器x6</p> <p>PGA x6</p> <p>温度传感器</p>	<div style="background-color: #f2f2f2; padding: 5px; margin-bottom: 5px;">定时与控制</div> <p>通用PWM定时器 32位增强型高分辨率x4</p> <p>通用PWM定时器 32位增强型x4</p> <p>通用PWM定时器 32位x6</p> <p>异步通用定时器x2</p> <p>WDT</p>	<div style="background-color: #f2f2f2; padding: 5px; margin-bottom: 5px;">HMI</div> <p>电容式触摸感应单元 (18通道)</p> <p>LCD图形控制器</p> <p>2D绘图引擎</p> <p>JPEG编解码器</p> <p>并行数据采集单元</p>
<div style="background-color: #f2f2f2; padding: 5px; margin-bottom: 5px;">互联</div> <p>以太网MAC控制器</p> <p>以太网DMA控制器</p> <p>以太网PTP控制器</p> <p>USBHS USBFS</p> <p>CAN x2 SDHI x2</p> <p>串行通信接口x10</p> <p>IrDA接口</p> <p>QSPI SPI x2</p> <p>IIC x3 SSI x2</p> <p>采样率转换器</p> <p>外部存储器总线</p>	<div style="background-color: #f2f2f2; padding: 5px; margin-bottom: 5px;">系统和电源管理</div> <p>DMA控制器 (8通道)</p> <p>数据传输控制器</p> <p>事件链接控制器</p> <p>低功耗模式</p> <p>多时钟</p> <p>端口功能选择</p> <p>RTC</p> <p>SysTick</p>	<div style="background-color: #f2f2f2; padding: 5px; margin-bottom: 5px;">安全</div> <p>SRAM中的ECC</p> <p>SRAM奇偶错误校验</p> <p>闪存区域保护</p> <p>ADC诊断</p> <p>时钟频率精度测量电路</p> <p>CRC计算器</p> <p>数据操作电路</p> <p>面向GPT的端口输出使能</p> <p>IWDT</p>	<div style="background-color: #f2f2f2; padding: 5px; margin-bottom: 5px;">安全性与加密</div> <p>128位独有ID</p> <p>TRNG</p> <p>AES (128/192/256)</p> <p>3DES/ARC4</p> <p>RSA/DSA</p> <p>SHA1/SHA224/SHA256</p> <p>GHASH</p>

S5D9系列中的Synergy MCU示例



超低功率



高效率



高度集成

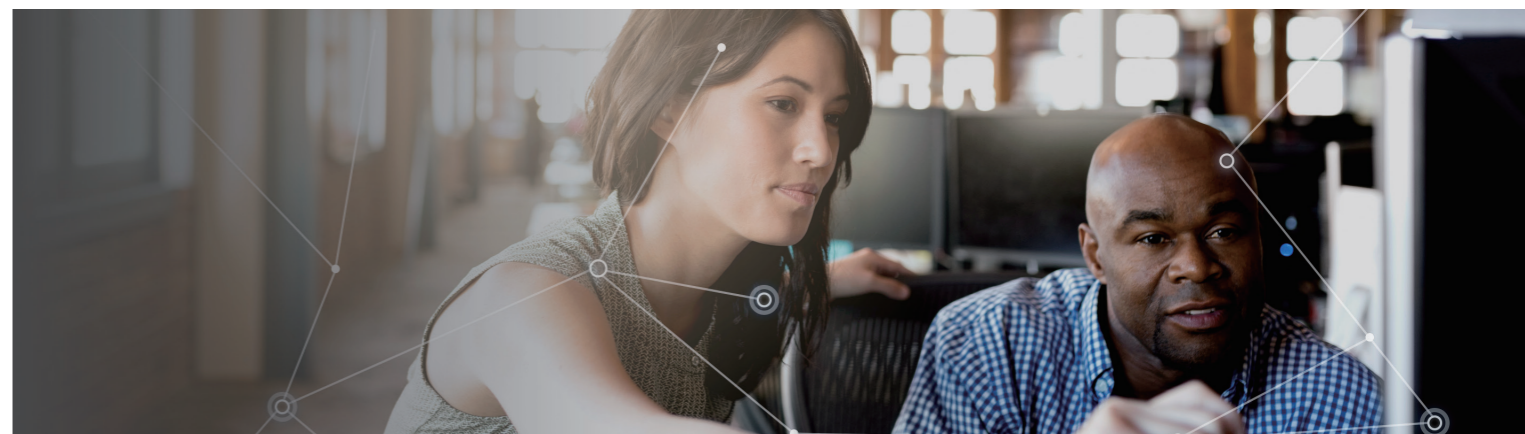


高性能

可扩展、可兼容

Synergy MCU涵盖广泛的基于Arm Cortex-M的微控制器，可通过软件API全面访问，运行频率为32MHz至240MHz，闪存容量为64KB至4MB。

从具备可扩展功能，支持连接、安全、模拟和人机界面(HMI)的四种不同Synergy MCU系列中选择一种，以实现高度的代码复用。



SYNERGY解决方案库

轻松找到所有兼容Synergy平台的组件、软件、硬件、工具、套件和服务。

您所看到的内容都已通过验证，与Synergy平台兼容，因此您可以放心浏览并选择。选择合作伙伴公司和瑞萨电子提供的产品和服务。

[Sign in](#) [Corporate Headquarters](#)

[About Renesas](#) [Press Center](#) [Investor Relations](#)

[Share](#) [Add to my favorites](#)

SOLUTIONS GALLERY

Find all Synergy Platform components, software, hardware, tools, kits, and services from Renesas and partner companies.

JUMP TO

Software Show only Renesas items

SOFTWARE

Synergy Software Package (SSP) and all compatible software from partner companies for secure, connected IoT solutions.

 SYNERGY SOFTWARE PACKAGE Renesas Synergy Software SSP	 S3A7 IEC60730 SELF-TEST LIBRARY Renesas Safety Library	 THREADX-µITRON WRAPPER Grape Systems Inc. Cloud Connection VSA	 FLOODGATE SECURITY FRAMEWORK (FSF) Icon Laboratories, Inc. Communication, Securit... VSA	 S5D9 IEC60730 SELF-TEST LIBRARY Renesas Safety Library	 SKKYNET EMBEDDED TOOLKIT SkkyNet Cloud System... Security, Communicatio... VSA	 DWEI AGEN Bug La... Commu... VSA
---	--	--	--	--	--	--

[See all Software >](#)

解决方案库部分

- 软件
- 软件工具
- 硬件组件
- 套件
- 合作伙伴项目
- 硬件工具
- 生产工具
- 应用项目
- 安全性
- 云连接
- 人机界面
- 设计和测试服务

SYNERGY网站

如需了解整个Synergy平台，请访问www.renasssynergy.com

Renesas Electronics Corporation

Notes:

1. All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any document is issued. Such information, however, is subject to change without prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics on additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
 2. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
 3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
 4. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products. Descriptions of circuits, software, and information in the design of your equipment, application examples, and information in the design of your equipment, Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information in the design of your equipment.
 5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and, you should comply with the applicable export control laws and regulations followed by the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for the development of weapons of mass destruction. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
 6. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant the information included in this document, but Renesas Electronics does not warrant that the information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
 7. Renesas Electronics products are classified according to the following three quality grades: "Standard", "High Quality", and "Specific". The recommended three quality grades: "Standard", "High Quality", and "Specific". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below. You must check the quality grade of product's quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application categorized as "Specific" without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for an application categorized as "Specific" or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of a product to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is "Standard" unless otherwise expressly specified in a Renesas Electronics data sheet or data books, etc.
"Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home appliances; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots.
"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems (ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems safety equipment; and medical equipment not specifically designed for life support.
"Specific": Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g., excision, etc.); and any other applications or purposes that pose a direct threat to human life.
 8. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics.
 9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as failure rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
- (Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.
(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.



瑞萨电子中国销售·技术支持网点:

www.renesas.com/zh-cn

瑞萨电子（中国）有限公司

北京市海淀区知春路27号量子芯座1709室

邮编: 100191 电话: +86 10 8235 1155 传真: +86 10 8235 7679

大连分公司 辽宁省大连市中山区中山路88号天安国际大厦2103室

邮编: 116001 电话: +86 411 3980 5858 传真: +86 411 3980 5877

青岛分公司 山东省青岛市市南区香港中路10号颐和国际大厦A栋23A楼07室

邮编: 266071 电话: +86 532 6677 7600 传真: +86 532 6677 7608

成都分公司 四川省成都市武侯区二环路南三段15号天华大厦608室

邮编: 610041 电话: +86 28 8512 5224 传真: +86 28 8512 5334

深圳分公司 广东省深圳市福田区益田路4068号卓越时代广场1802-1807室

邮编: 518048 电话: +86 755 8283 5080 传真: +86 755 2399 5080

瑞萨电子管理（上海）有限公司

上海市普陀区岚皋路555号品尊国际中心A座301室

邮编: 200333 电话: +86 21 2226 0888 传真: +86 21 2226 0999

瑞萨电子香港有限公司

香港九龙旺角太子道西193号新世纪广场第2座1601-1611室

电话: +852 2265 6688 传真: +852 2886 9022

瑞萨电子大中国地区（包括香港地区）代理商及分销商的联系方式: www.renesas.com/zh-cn/buy



瑞萨电子官方微信

R70ZZ0175CU0201