

# Contributing to more efficient embedded system development

## Renesas C Compilers

[https://www.renesas.com/compiler\\_licenses](https://www.renesas.com/compiler_licenses)

### Powerful Forms of Optimization to Shorten the Execution Times of Programs and Reduce Code Size

Renesas C compilers bring out the performance of Renesas original cores and provide powerful optimization facilities which contribute to greater efficiency in the development of embedded systems.

<b>C compiler package for RL78 family</b>	<b>(CC-RL)</b>	<a href="https://www.renesas.com/rl78_c">https://www.renesas.com/rl78_c</a>
<b>C/C++ compiler package for RX family</b>	<b>(CC-RX)</b>	<a href="https://www.renesas.com/rx_c">https://www.renesas.com/rx_c</a>
<b>C compiler package for RH850 family</b>	<b>(CC-RH)</b>	<a href="https://www.renesas.com/rh850_c">https://www.renesas.com/rh850_c</a>

#### Joining the EEMBC\*

Renesas has joined the EEMBC\* as a measure for further improving the performance of Renesas C compilers.

\*Embedded Microprocessor Benchmark Consortium  
<https://www.eembc.org/memberinfo/memberlist.php>

#### Obtaining the highest score (1)

The combination of the RX66T (RXv3 core) and CC-RX V3.03 obtained the highest score for a single-core device on the CoreMark® benchmark of the EEMBC.

<https://www.eembc.org/coremark/scores.php>

#### Obtaining the highest score (2)

The combination of the RL78/I1D (R5F117GC) and CC-RL V1.08 obtained the highest score on the ULPMark™-PeripheralProfile (ULPMark™ -PP) benchmark of the EEMBC.

<https://www.eembc.org/ulpmark/scores.php>

### Try C Compilers: Easy and Free to Download

Renesas C Compilers are available for download at the Renesas Compiler web pages (URLs listed above) free of charge. Please feel free to try them. Restrictions on functionality can be removed by purchasing the compiler and registering the license key.

**During the evaluation period:** You can use the C compilers with no limitations on functionality.

The evaluation period expires 60 days after the first build following the initial installation of the compiler.

**After the evaluation period:** You can continue to use the C compiler, although limitations apply to the functionality and the size of linkable object code.

The functionality is limited to that of the standard edition and the size of linkable object code is limited as follows: 64 KB for CC-RL, 128 KB for CC-RX, and 256 KB for CC-RH.

### Extended Functionality for Embedded System Development

The C compilers provide a wide range of extended functionality (macro definitions, #pragma directives, and so on) to simplify the development of embedded systems. The extended functionality of a given compiler depends on the architecture of the MCU family and thus differs slightly from compiler to compiler.

#### #pragma directives

The #pragma directives we provide to work with our C compilers simplify specifying the allocation of functions and data, the writing of functions to work as interrupt handlers, and other tasks required in the writing of embedded software.

#### Defined macro names

Macro names to allow reference to information on compilation are pre-defined.

#### Optimization options

Individual levels of and items for optimization can be specified. The volatile option is used to suppress optimization by the compilers to the extent that the order and number of times in access to external variables match the corresponding items in the source program.

#### Using assembly language

The compilers simplify calls of assembly language routines and reference to data in assembly code.

## Professional Editions: Even Greater Efficiency and Quality of Development

See the table below for the features and the supported compilers. Refer to [the application note for the professional editions](#) for details of the features (using R20UT4026 as a search keyword).

✓: Supported. —: Support not intended.

Features of the professional editions	CC-RL	CC-RX	CC-RH
Checking of source code against MISRA-C:2004/2012 rules	✓	✓	✓
Detection of stack smashing	✓	✓	✓
Enhanced security for dynamic memory management functions	✓	✓	✓
Detection of illicit indirect function calls	✓	✓	✓
Half-precision floating point	—	—	✓
Synchronization features in the updating of control registers	—	—	✓

## Various Licenses Selectable to Suit Your Pattern of Development

You can choose the license that best suits your development needs from among the eight combinations of Renesas compiler license types shown at right.

The permanent licenses we provide impose no limit on the period of use, while annual licenses are valid for one year. The various combinations give you flexibility in terms of introducing licenses in response to changes in patterns of development.

[https://www.renesas.com/compiler\\_licenses](https://www.renesas.com/compiler_licenses)

\*1 The same license can be used for both CS+ and e<sup>2</sup> studio.

\*2 The installation medium (CD/DVD) is no longer provided. Please download the installer from the Renesas website.

### Floating Licenses



Flexibility of the site of use



### Node Locked Licenses



Efficiency in development



Upgrade (edition) License\*

\*Applicable only to a permanent node-locked license.

## License Video Tutorial

You can learn about the types of compiler licenses and license registration by watching the video.

[https://www.renesas.com/compiler\\_licenses\\_video](https://www.renesas.com/compiler_licenses_video)

## Services and Products Related to Long-Term Use and Functional Safety

### Compiler maintenance service

<https://www.renesas.com/compiler-maintenance>

Renesas offers a maintenance service for a specific compiler version. This is intended to provide a sense of ease to long-term users of the given compiler. This service incurs a charge.

### Compiler qualification service

<https://www.renesas.com/compiler-qualification>

Renesas offers a support service for certifying that development tools meet the requirements of ISO 26262, *Road vehicles — Functional safety*. This service incurs a charge.

### IEC 61508 Certification Kit for RX Compilers

<https://www.renesas.com/iec61508-certification-kit-rx-c>

This kit supports the certification of RX compilers as development tools that meet the requirements of the IEC 61508 functional safety standard.

**renesas.com**

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### Contact information

For further information on a product technology, to most up-to-date version of a document, or your nearest office, please visit [www.renesas.com/contact/](http://www.renesas.com/contact/)