

RX Family

RX DRW2D Driver

Introduction

This application note describes the RX DRW2D Driver. This driver does not conform to rules in Firmware Integration Technology (FIT).

Target Device

- RX65N, RX651 Groups, ROM capacity: 1.5 MB to 2 MB
- RX72M Group
- RX72N Group
- RX66N Group

This product contains DRW2D Driver Source program, User's Manual (HTML format), and ReadMe.txt. There is User's Manual (HTML format) at d2_driver folder in /r_drw2d_rx/doc inside r_drw2d_rx_v1.13.zip.

This product is not supported.

This product cannot be used in other than the above applied products.

Target Compilers

- Renesas Electronics C/C++ Compiler Package for RX Family
- GCC for Renesas RX
- IAR C/C++ Compiler for Renesas RX

For details of the confirmed operation contents of each compiler, refer to 1.1 Operation Confirmation Environment.

RX DRW2D Driver is dependent upon the following packages:

- Renesas Board Support Package (r_bsp). Rev.5.20 or higher

1. Appendices

1.1 Confirmed Operation Environment

This section describes confirmed operation environment for the RX DRW2D Driver.

Table 1.1 Confirmed Operation Environment (Rev. 1.10)

Item	Contents
Integrated development environment	Renesas Electronics e ² studio Version 7.7.0
C compiler	Renesas Electronics C/C++ Compiler Package for RX Family V3.2.0 Compiler option: The following option is added to the default settings of the integrated development environment. -lang = c99
Endian	little endian
Revision of the module	Rev.1.10
Board used	Renesas Starter Kit for RX65N-2MB (product No.: RTK500565Nxxxxxxxxx) Renesas Starter Kit for RX72N (product No.: RTK5572NNxxxxxxxxx)

Table 1.2 Confirmed Operation Environment (Rev. 1.11)

Item	Contents
Integrated development environment	Renesas Electronics e ² studio Version 2021-04
C compiler	Renesas Electronics C/C++ Compiler Package for RX Family V3.3.0 Compiler option: The following option is added to the default settings of the integrated development environment. -lang = c99 GCC for Renesas RX 8.3.0 202004 Compiler option: The following option is added to the default settings of the integrated development environment. -std = gnu99 IAR C/C++ Compiler for Renesas RX Version 4.20.1 Compiler option: The default settings of the integrated development environment.
Endian	little endian
Revision of the module	Rev.1.11
Board used	Renesas Starter Kit for RX65N-2MB (product No.: RTK500565Nxxxxxxxxx) Renesas Starter Kit for RX72N (product No.: RTK5572NNxxxxxxxxx)

Table 1.3 Confirmed Operation Environment (Rev. 1.12)

Item	Contents
Integrated development environment	Renesas Electronics e ² studio Version 2023-01
C compiler	<p>Renesas Electronics C/C++ Compiler Package for RX Family V3.5.0 Compiler option: The following option is added to the default settings of the integrated development environment. -lang = c99</p> <p>GCC for Renesas RX 8.3.0 202204 Compiler option: The following option is added to the default settings of the integrated development environment. -std = gnu99</p> <p>IAR C/C++ Compiler for Renesas RX Version 4.20.3 Compiler option: The default settings of the integrated development environment.</p>
Endian	little endian
Revision of the module	Rev.1.12
Board used	Renesas Starter Kit for RX65N-2MB (product No.: RTK500565Nxxxxxxxx) Renesas Starter Kit for RX72N (product No.: RTK5572NNxxxxxxxx)

Table 1.4 Confirmed Operation Environment (Rev. 1.13)

Item	Contents
Integrated development environment	Renesas Electronics e ² studio Version 2024-10
C compiler	<p>Renesas Electronics C/C++ Compiler Package for RX Family V3.6.0 Compiler option: The following option is added to the default settings of the integrated development environment. -lang = c99</p> <p>GCC for Renesas RX 8.3.0 202405 Compiler option: The following option is added to the default settings of the integrated development environment. -std = gnu99</p> <p>IAR C/C++ Compiler for Renesas RX Version 5.10.1 Compiler option: The default settings of the integrated development environment.</p>
Endian	little endian
Revision of the module	Rev.1.13
Board used	-

Table 1.5 Confirmed Operation Environment (Rev. 1.14)

Item	Contents
Integrated development environment	Renesas Electronics e ² studio Version 2025-01
C compiler	Renesas Electronics C/C++ Compiler Package for RX Family V3.7.0 Compiler option: The following option is added to the default settings of the integrated development environment. -lang = c99
	GCC for Renesas RX 8.3.0 202411 Compiler option: The following option is added to the default settings of the integrated development environment. -std = gnu99
	IAR C/C++ Compiler for Renesas RX Version 5.10.1 Compiler option: The default settings of the integrated development environment.
Endian	little endian
Revision of the module	Rev.1.14
Board used	-

1.2 “for”, “while” and “do while” statements

In this module, “for”, “while” and “do while” statements (loop processing) are used in processing to wait for register to be reflected and so on. For these loop processing, comments with “WAIT_LOOP” as a keyword are described. Therefore, if user incorporates fail-safe processing into loop processing, user can search the corresponding processing with “WAIT_LOOP”.

The following shows example of description.

```
while statement example :
/* WAIT_LOOP */
while(0 == SYSTEM.OSCOVFSR.BIT.PLOVF)
{
    /* The delay period needed is to make sure that the PLL has stabilized. */
}

for statement example :
/* Initialize reference counters to 0. */
/* WAIT_LOOP */
for (i = 0; i < BSP_REG_PROTECT_TOTAL_ITEMS; i++)
{
    g_protect_counters[i] = 0;
}

do while statement example :
/* Reset completion waiting */
do
{
    reg = phy_read(ether_channel, PHY_REG_CONTROL);
    count++;
} while ((reg & PHY_CONTROL_RESET) && (count < ETHER_CFG_PHY_DELAY_RESET)); /* WAIT_LOOP */
```

2. Reference Documents

User's Manual: Hardware

RX65N Group, RX651 Group User's Manual: Hardware (R01UH0590)

(The latest version can be downloaded from the Renesas Electronics website.)

RX72M Group User's Manual: Hardware (R01UH0804)

(The latest version can be downloaded from the Renesas Electronics website.)

RX72N Group User's Manual: Hardware (R01UH0824)

(The latest version can be downloaded from the Renesas Electronics website.)

RX66N Group User's Manual: Hardware (R01UH0825)

(The latest version can be downloaded from the Renesas Electronics website.)

Technical Update/Technical News

(The latest version can be downloaded from the Renesas Electronics website.)

User's Manual: Development Tools

[CS+][e² studio] RX C/C++ Compiler CC-RX User's Manual (R20UT3248)

(The latest version can be downloaded from the Renesas Electronics website.)

Related Technical Updates

This module reflects the content of the following technical updates.

None

Revision History

Rev.	Date	Description	
		Page	Summary
1.10	Feb.28.2020	—	First edition issued.
1.11	June.04.2021	—	Supported for GCC and IAR compilers.
1.12	Mar.31.2023	3	Updated 1.1 Confirmed Operation Environment.
		program	Fixed XML file. Added the r_config folder and remove the ref folder.
1.13	Nov.15.2024	3	Updated 1.1 Confirmed Operation Environment.
		4	Added “1.2 for,while and do while statements”
		program	Added WAIT_LOOP comments.
1.14	Mar.20.2025	4	Updated 1.1 Confirmed Operation Environment.
		program	Changed the disclaimer in program sources

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Precaution against Electrostatic Discharge (ESD)

A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity.

Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.

2. Processing at power-on

The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.

3. Input of signal during power-off state

Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.

4. Handling of unused pins

Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.

5. Clock signals

After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.

6. Voltage application waveform at input pin

Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).

7. Prohibition of access to reserved addresses

Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.

8. Differences between products

Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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