

# Sample Drivers for R8C/M12A

R01AN0503EJ0000

Rev.1.00

Application Note: <Sample Drivers for R8C/M12A>

Jan 31 , 2011

This document is designed to describe an outline of various sample driver software created for R8C/M12A.

## Table of Contents

- 1. File Composition of Sample Driver Software ..... 1
- 2. Lists of Sample Driver Software ..... 2
- 3. Usage Outlines of Sample Driver Software ..... 3

### 1. File Composition of Sample Driver Software

- This document of sample driver software consists of a source list and directions (\* pdf format) for each function. On decompression of a downloaded file, a “source” folder and a “doc” folder are generated. In the sub folders in the “source” folder, source lists of each function are stored. In the sub folders in the “doc” folder, directions for each function are stored.

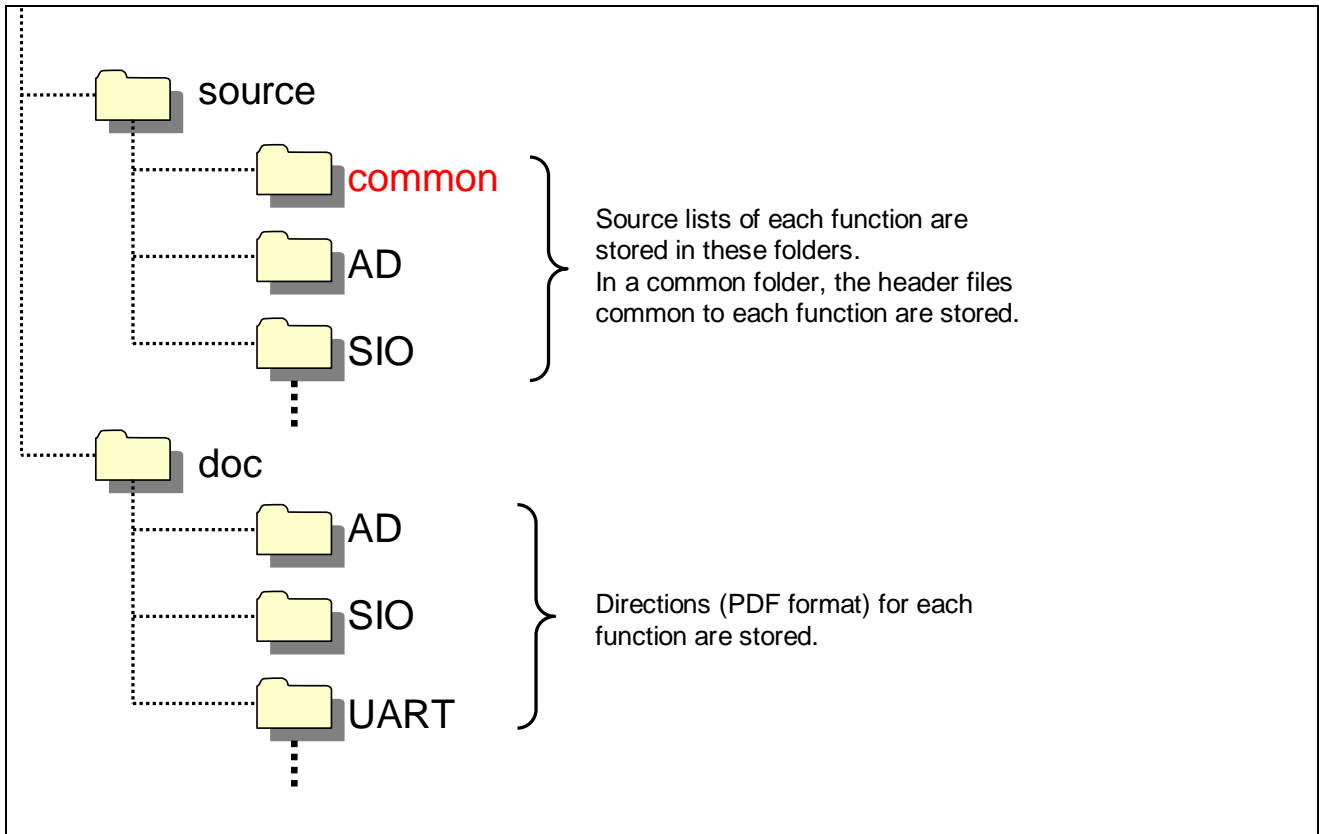


Figure 1 File Composition

## 2. Lists of Sample Driver Software

- The tables below show the lists of sample driver software described in this document.

**Table 2-1 A List of Sample Driver Software (1)**

| Types of Drivers                           |  | Process Summary                                | ROM<br>(byte)                    | RAM<br>(byte)               | Function Name                 | Source file                  |
|--|--|--|----------------------------------|-----------------------------|-------------------------------|------------------------------|
| Voltage Monitor 1 Interrupt                |  | Voltage Monitor 1 Interrupt Setting            | 145                              | 0                           | R.VDET1_Create                | r.vdet1_create.c             |
| KEY ON WAKE UP (K10-K13)                   |  | K10-K13 Key Input Interrupt Setting            | 205                              | 0                           | R.KWAKE_Create                | r.kwake_create.c             |
| Clock Synchronous Serial 0 Transmission    |  | SI/O0 Setting for Transmission                 | 308                              | 8                           | R.SIO0_Create_Transmit        | r.sio0_create_transmit.c     |
|  |  | SI/O0 Transmit Execution                       | 118                              | 0                           | R.SIO0_Control_Transmit       | r.sio0_control_transmit.c    |
| Clock Synchronous Serial 0 Reception       |  | SI/O0 Setting for Reception                    | 300                              | 8                           | R.SIO0_Create_Receive         | r.sio0_create_receive.c      |
|  |  | SI/O0 Receive Execution                        | 128                              | 0                           | R.SIO0_Control_Receive        | r.sio0_control_receive.c     |
| UART0 Transmission                         |  | UART0 Setting for Transmission                 | 341                              | 16                          | R.UART0_Create_Transmit       | r.uart0_create_transmit.c    |
|  |  | UART0 Transmit Execution                       | 148                              | 0                           | R.UART0_Control_Transmit      | r.uart0_control_transmit.c   |
| UART0 Reception                            |  | UART0 Setting for Reception                    | 325                              | 20                          | R.UART0_Create_Receive        | r.uart0_create_receive.c     |
|  |  | UART0 Receive Execution                        | 193                              | 0                           | R.UART0_Control_Receive       | r.uart0_control_receive.c    |
| Timer RJ (2)                               | Timer Mode   | Timer Mode Setting                             | 72                               | 0                           | R.TMR_RJ2_Create_Timer        | r.tmr_rj2_create_timer.c     |
|  |  | Starting and Stopping Timer                    | 71                               | 0                           | R.TMR_RJ2_Control_Timer       | r.tmr_rj2_control_timer.c    |
|  | Event Counter Mode                                 | Event Counter Mode Setting                     | 320                              | 0                           | R.TMR_RJ2_Create_ECnt         | r.tmr_rj2_create_ecnt.c      |
|  |  | Starting and Stopping Event Counter Mode       | 76                               | 0                           | R.TMR_RJ2_Control_ECnt        | r.tmr_rj2_control_ecnt.c     |
|  | Pulse Width Measurement Mode                       | Pulse Width Measurement Mode Setting           | 209                              | 0                           | R.TMR_RJ2_Create_PWidth       | r.tmr_rj2_create_pwidth.c    |
|  |  | Starting and Stopping Pulse Width Measurement  | 71                               | 0                           | R.TMR_RJ2_Control_PWidth      | r.tmr_rj2_control_pwidth.c   |
|  | Pulse Period Measurement Mode                      | Pulse Period Measurement Mode Setting          | 209                              | 0                           | R.TMR_RJ2_Create_PPeriod      | r.tmr_rj2_create_pperiod.c   |
|  |  | Starting and Stopping Pulse Period Measurement | 71                               | 0                           | R.TMR_RJ2_Control_PPeriod     | r.tmr_rj2_control_pperiod.c  |
|  | Pulse Output Mode                                  | Pulse Output Mode Setting                      | 173                              | 0                           | R.TMR_RJ2_Create_POutput      | r.tmr_rj2_create_poutput.c   |
|  |  | Pulse Output Process                           | 96                               | 0                           | R.TMR_RJ2_Control_POutput     | r.tmr_rj2_control_poutput.c  |
| Timer RB (2)                               | Timer Mode   | Timer Mode Setting                             | 91                               | 0                           | R.TMR_RB2_Create_Timer        | r.tmr_rb2_create_timer.c     |
|  |  | Starting and Stopping Timer                    | 92                               | 0                           | R.TMR_RB2_Control_Timer       | r.tmr_rb2_control_timer.c    |
|  | Programmable Waveform Mode                         | Programmable Waveform Generation Mode Setting  | 127                              | 0                           | R.TMR_RB2_Create_PWave        | r.tmr_rb2_create_pwave.c     |
|  |  | Programmable Waveform Generation Process       | 107                              | 0                           | R.TMR_RB2_Control_PWave       | r.tmr_rb2_control_pwave.c    |
|  | Programmable One-Shot Generation Mode              | Programmable One-Shot Generation Mode Setting  | 222                              | 0                           | R.TMR_RB2_Create_POneshot     | r.tmr_rb2_create_poneshot.c  |
|  |  | Programmable One-Shot Generation Process       | 38                               | 0                           | R.TMR_RB2_Control_POneshot    | r.tmr_rb2_control_poneshot.c |
| Programmable Wait One-Shot Generation Mode | Programmable Wait One-Shot Generation Mode Setting | 214  | 0                                | R.TMR_RB2_Create_PWOneshot  | r.tmr_rb2_create_pwoneshot.c  |                              |
|  | Programmable Wait One-Shot Generation Process      | 65   | 0                                | R.TMR_RB2_Control_PWOneshot | r.tmr_rb2_control_pwoneshot.c |                              |
| Timer RC                                   | Common for All Modes                               | Common Setting for All Modes                   | 344                              | 0                           | R.TMR_RC_Create               | r.tmr_rc_create.c            |
|  |  | Shared Register Setting Process                | 59                               | 0                           | R.TMR_RC_Create_Reg           | r.tmr_rc_create_reg.c        |
|  | Timer RC Execution Process                         | Timer RC Count Start Process                   | 152                              | 0                           | R.TMR_RC_Control              | r.tmr_rc_control.c           |
|  | Timer Mode (Input Capture)                         | Timer Mode (Input Capture) Setting             | 454                              | 0                           | R.TMR_RC_Create_ICap          | r.tmr_rc_create_icap.c       |
|  | Timer Mode (Output Compare)                        | Timer Mode (Output Compare) Setting            | 486                              | 0                           | R.TMR_RC_Create_OCmp          | r.tmr_rc_create_ocmp.c       |
|  | PWM Mode   | PWM Mode Setting                               | 250                              | 0                           | R.TMR_RC_Create_Pwm           | r.tmr_rc_create_pwm.c        |
|  | PWM2 Mode  | PWM2 Mode Setting                              | 199                              | 0                           | R.TMR_RC_Create_Pwm2          | r.tmr_rc_create_pwm2.c       |
|  | AD Conversion                                      | Basic Setting                                  | AD Conversion Setting            | 128                         | 0                             | R.ADC_Create                 |
| One-Shot Mode                              |  |  | Conversion Start Process         | 168                         | 0                             | R.ADC_Control_Oneshot        |
| Repeat Mode                                |  | Conversion Start Process                       | 171                              | 0                           | R.ADC_Control_Repeat          | r.adc_control_repeat.c       |
|  |  | Conversion Start Process                       | 153                              | 0                           | R.ADC_Control_SSweep          | r.adc_control_ssweep.c       |
| Repeat Sweep Mode                          |  | Conversion Start Process                       | 153                              | 0                           | R.ADC_Control_RSweep          | r.adc_control_rsweep.c       |
|  |  | A/D Data Read Process                          | A/D Conversion Data Read Process | 43                          | 4                             | R.ADC_Read                   |
| Comparator B1 Interrupt                    |  | Comparator B1 Setting                          | 167                              | 0                           | R.CMP_B1_Create               | r.cmp_b1_create.c            |
|  |  | Comparator B1 Control                          | 40                               | 0                           | R.CMP_B1_Control              | r.cmp_b1_control.c           |
| Comparator B3 Interrupt                    |  | Comparator B3 Setting                          | 141                              | 0                           | R.CMP_B3_Create               | r.cmp_b3_create.c            |
|  |  | Comparator B3 Control                          | 40                               | 0                           | R.CMP_B3_Control              | r.cmp_b3_control.c           |
| INT0 Interrupt                             |  | INT0 Setting                                   | 75                               | 0                           | R.INT0_Create                 | r.int0_create.c              |
|  |  | INT0 Control                                   | 64                               | 0                           | R.INT0_Control                | r.int0_control.c             |
| INT1 Interrupt                             |  | INT1 Setting                                   | 75                               | 0                           | R.INT1_Create                 | r.int1_create.c              |
|  |  | INT1 Control                                   | 64                               | 0                           | R.INT1_Control                | r.int1_control.c             |
| INT2 Interrupt                             |  | INT2 Setting                                   | 71                               | 0                           | R.INT2_Create                 | r.int2_create.c              |
|  |  | INT2 Control                                   | 64                               | 0                           | R.INT2_Control                | r.int2_control.c             |
| INT3 Interrupt                             |  | INT3 Setting                                   | 48                               | 0                           | R.INT3_Create                 | r.int3_create.c              |
|  |  | INT3 Control                                   | 64                               | 0                           | R.INT3_Control                | r.int3_control.c             |

### 3. Usage Outlines of Sample Driver Software

- Source lists of each function are attached to this document.  
A source file of the function to be used can be diverted without any change.  
Header files (\*.h) required for use of each function are stored in the same folders where each function is stored.  
Common header files such as a definition file of a special function register, etc. are stored in a .source/common folder.  
For the details of how to use each function, please refer to the descriptions of each function before actual use.

## Website and Support

Renesas Electronics Website

<http://www.renesas.com/>

Inquiries

<http://www.renesas.com/inquiry>

All trademarks and registered trademarks are the property of their respective owners.

## Revision Record

| Rev. | Date         | Description |                      |
|------|--------------|-------------|----------------------|
|      |              | Page        | Summary              |
| 1.00 | Jan.31, 2011 | —           | First edition issued |

## General Precautions in the Handling of MPU/MCU Products

The following usage notes are applicable to all MPU/MCU products from Renesas. For detailed usage notes on the products covered by this manual, refer to the relevant sections of the manual. If the descriptions under General Precautions in the Handling of MPU/MCU Products and in the body of the manual differ from each other, the description in the body of the manual takes precedence.

### 1. Handling of Unused Pins

Handle unused pins in accord 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 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. Unused pins should be handled as described under Handling of Unused Pins in the manual.

### 2. Processing at Power-on

The state of the product is undefined at the moment 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 moment 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 moment 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 moment when power is supplied until the power reaches the level at which resetting has been specified.

### 3. Prohibition of Access to Reserved Addresses

Access to reserved addresses is prohibited.

- The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

### 4. Clock Signals

After applying a reset, only release the reset line after the operating clock signal has become stable.

When switching the clock signal during program execution, wait until the target clock signal has 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. Moreover, 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.

### 5. Differences between Products

Before changing from one product to another, i.e. to one with a different type number, confirm that the change will not lead to problems.

- The characteristics of MPU/MCU in the same group but having different type numbers may differ because of the differences in internal memory capacity and layout pattern. When changing to products of different type numbers, implement a system-evaluation test for each of the products.

## Notice

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 prior notice. Before purchasing or using any Renesas Electronics 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 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 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 and application examples. You are fully responsible for the incorporation of these circuits, software, 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.
5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to 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 that such 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 applications for each Renesas Electronics product depends on the 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 each Renesas Electronics product is "Standard" unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.  
"Standard": Computers; office equipment; communications equipment; 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; 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. artificial life support devices or systems), surgical implantations, or healthcare intervention (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 such specified ranges.
9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under 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 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.
10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
11. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.  
(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.



### SALES OFFICES

Renesas Electronics Corporation

<http://www.renesas.com>

Refer to "<http://www.renesas.com/>" for the latest and detailed information.

#### Renesas Electronics America Inc.

2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.  
Tel: +1-408-588-6000, Fax: +1-408-588-6130

#### Renesas Electronics Canada Limited

1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada  
Tel: +1-905-898-5441, Fax: +1-905-898-3220

#### Renesas Electronics Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.  
Tel: +44-1628-585-100, Fax: +44-1628-585-900

#### Renesas Electronics Europe GmbH

Arcadiastrasse 10, 40472 Düsseldorf, Germany  
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

#### Renesas Electronics (China) Co., Ltd.

7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China  
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

#### Renesas Electronics (Shanghai) Co., Ltd.

Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China  
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

#### Renesas Electronics Hong Kong Limited

Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong  
Tel: +852-2886-9318, Fax: +852-2886-9022/9044

#### Renesas Electronics Taiwan Co., Ltd.

7F, No. 363 Fu Shing North Road Taipei, Taiwan, R.O.C.  
Tel: +886-2-8175-9600, Fax: +886-2-8175-9670

#### Renesas Electronics Singapore Pte. Ltd.

1 HarbourFront Avenue, #06-10, Keppel Bay Tower, Singapore 098632  
Tel: +65-6213-0200, Fax: +65-6278-8001

#### Renesas Electronics Malaysia Sdn.Bhd.

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

#### Renesas Electronics Korea Co., Ltd.

11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea  
Tel: +82-2-558-3737, Fax: +82-2-558-5141