RZ/T1 Group

CMSIS-RTOS RTX for Cortex-R4 Sample Programs V1.10 Release Note

Introduction

This application note describes the package of “RZ/T1 Group CMSIS-RTOS RTX for Cortex-R4 Sample Programs V1.10” (hereinafter “RZ/T1_RTX”)

Contents

1. Package Contents

This package contains the following items:

1.1 Software

- Source codes

No.	Name	File Name
1	RZ/T1 Group CMSIS-RTOS RTX for Cortex-R4 Sample Programs V1.10	RZT1_CMSIS_RTOS_RTX_V110_SRC.zip

1.2 Documents

- Release Note and Application Note

No.	Title	Rev	File Name
1	RZ/T1 Group CMSIS-RTOS RTX for Cortex-R4 Sample Programs V1.10 Release Note	1.10	r01an3541ej0110-rzt1-cr4-rtx-bsp.pdf
2	RZ/T1 Group CMSIS-RTOS RTX for Cortex-R4 RTX Sample Programs Application Note	1.10	r01an3538ej0110-rzt1-cr4-rtx-sample-programs.pdf
3	RZ/T1 Group CMSIS-RTOS RTX for Cortex-R4 CMT(W) & ELC & ADC Sample Programs Application Note	1.10	r01an3539ej0110-rzt1-cr4-rtx-cmt-elc-adc-sample.pdf
4	RZ/T1 Group CMSIS-RTOS RTX for Cortex-R4 MTU3a Sample Program Application Note	1.10	r01an3540ej0110-rzt1-cr4-rtx-mtu3a-sample.pdf

1.3 Driver for USB Serial Conversion IC

- This driver is a driver for PC. It is used to connect PC and RZ/T1 Evaluation board(J8) with USB serial cable.

2. Folder Structure

Below is the folder structure for this package and details about its contents.

```
Top
  ├──RZT1_CMSIS_RTOS_RTX_V110_DOC.zip      : Application Notes ( see Section on 1.2 )
  │
  ├──RZT1_CMSIS_RTOS_RTX_V110_SRC.zip      : A set of programs ( see Section on 1.1 )
  │
  ├──USB_serial_driver.zip                  : Driver for USB Serial Conversion IC
  │
  ├──r01an3541ej0110-rzt1-cr4-rtx-bsp.pdf   : Release note of  this package ( English )
  │
  ├──r01an3541jj0110-rzt1-cr4-rtx-bsp.pdf   : Release note of  this package ( Japanese )
  │
  ├──readme_E.txt                           : Readme documentation of  this package ( English )
  │
  └──readme_J.txt                           : Readme documentation of this package ( Japanese )
```

3. Related Documents

- CMSIS-RTOS compliant Kernel Version 4.74
  This is the specification for RTOS for use in this system. The sample application uses the functions of the RTX CMSIS-RTOS. Each sample application initializes the RTX CMSIS-RTOS.

- RZ/T1 Group User's Manual: Hardware (R01UH0483)
  This document describes the hardware specifications of RZ/T1 devices.
  Download the latest version from the Renesas Electronics website.

- Application Note: RZ/T1 Group Initial Settings (R01AN2554)
  This document describes the initial settings for RZ/T1 devices.
  Download the latest version from the Renesas Electronics website.

- Technical Update and Technical News
  Download the latest version from the Renesas Electronics website.

- User's manuals related to the development environment

  The latest version of the IAR integrated development environment (IAR Embedded Workbench for ARM) is available from the IAR Systems website.

  The latest version of the DS-5 integrated development environment (ARM Development Studio 5) is available from the ARM website.

  The latest version of the Renesas Electronics software development tools (e2studio, etc.) is available from the Renesas Electronics website.

4. How to use this package

4.1 Software information

- OS

  CMSIS-RTOS compliant Kernel Version 4.74

- Drivers

  ADC, CMT, ELC, MTU3

- Samples

  FPU_ex1, mail, message RTX_CMT_ex1, RTX_ex2, RTX_MTU3_ex1, RTX_Traffic, Semaphore

4.2 Tools information

- Integrated Development Environment (One of the following)

  Manufactured by IAR Systems : Embedded Workbench® for ARM Version 8.20.2
  (hereinafter “EWARM”)

  Manufactured by RENESAS : e2studio 6.1.0 (hereinafter “e2studio”)

  Manufactured by ARM : DS-5 Version 5.26.2 (hereinafter “DS-5”)

- In-circuit Emulator

  Manufactured by IAR Systems : I-jet JTAG emulator (in case of “EWARM”)

  Manufactured by SEGGER : J-Link JTAG emulator (in case of “e2studio”)

  Manufactured by ARM : KEIL ULINK2 emulator (in case of “DS-5”)

4.3 Hardware information

- Device

  RZ/T1

- Target Board

  RZ/T1 Evaluation Board (RTK7910018C00000BE or RTK7910022C00000BR)

4.4 How to setup

About how to setup, refer to “Appendix1.Supplement on Development Environments” of “Application Note: RZ/T1 Group Initial Settings (R01AN2554)”

4.5 How to import

Unzip the complete software zip file shown in chapter 1.1 and import the project as follows:

4.5.1 In case of "EWARM"

Double-click CMSIS_RTOS_RTX_EXAMPLE.eww in the top folder of the expanded file.

4.5.2 In case of "e2studio"

1. Start e2studio and select the KPITGCC folder of the expanded file in the workspace selection dialog.
2. Select the [File] menu --> [Import (I)...].
3. In the [Select an import source] of [Import] dialog box, select [General] --> [Existing Projects into Workspace]. Then, click the [Next] button.
4. In the [Import] dialog box, check [Select root directory] and then click [Browse...].
5. In the [Reference Folder] dialog box, click [OK].
6. Check the [Search for nested projects] in the [Import] dialog box.
7. Remove the check mark from [Copy projects into workspace] in the [Import] dialog box.
8. Click [Finish] in the [Import] dialog box.

4.5.3 In case of "DS-5"

1. Start DS-5 and select the ARMCC folder of the expanded file in the workspace selection dialog.
2. Select the [File] menu --> [Import (I)...].
3. In the [Select an import source] of [Import] dialog box, select [General] --> [Existing Projects into Workspace]. Then, click the [Next] button.
4. In the [Import] dialog box, check [Select root directory] and then click [Browse...].
5. In the [Reference Folder] dialog box, click [OK].
6. Check the [Search for nested projects] in the [Import] dialog box.
7. Remove the check mark from [Copy projects into workspace] in the [Import] dialog box.
8. Click [Finish] in the [Import] dialog box.

5. Confirmation of sample program operation

About the operation of this package, refer to following application notes.

- RZ/T1 Group CMSIS-RTOS RTX for Cortex-R4 RTX Sample Programs (R01AN3538EJ)
- RZ/T1 Group CMSIS-RTOS RTX for Cortex-R4 CMT(W) & ELC & ADC Sample Programs (R01AN3539EJ)
- RZ/T1 Group CMSIS-RTOS RTX for Cortex-R4 MTU3a Sample Program (R01AN3540EJ)

6. Restrictions

No.	Type	Description
1	Multiple interrupts of SVC Handler	Do not allow multiple interrupts in SVC Handler. (The multiple interrupts are not allowed in SVC Handler at this package.)

7. Notes

No.	Type	Description
1	How to use “osThreadTermiate()” function	Do not call “osThreadTerminate()” function more than once with the same ThreadID.

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Mar.27.17	-	First Release
1.10	Dec.26.19	2	Change document revision.
		3	Change folder structure.
		5	Change version of Integrated Development Environment.
		6	Add "How to import" section.

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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