RL78 Family

Sound Playback/Compression System (Original ADPCM Codec)

M3S-S2-Tiny: Introduction Guide

Introduction

This document explains M3S-S2-Tiny for the RL78 Family (hereafter referred to as "S2 library").

The S2 library for the Renesas Microcomputer is written in optimized assembler.

Please refer to the User's Manual to understand how to use the software library. User's Manual is in this application note.

Target Device

RL78 Family

When using this application note with other Renesas MCUs, careful evaluation is recommended after making modifications to comply with the alternate MCU.

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1. Structure of M3S-S2-Tiny

Table 1 S2 library product files

name	Description
r20an0122ej0201_rl78_s2.pdf	Introduction Guide (this document)
workspace	
Document(doc)	
English(en)	
r20uw0079ej0100_s2.pdf	S2 library User's Manual
r20an0122ej0201_rl78_s2.pdf	Introduction Guide (this document)
r21an0002ej0100_adpcm_tool.pdf	ADPCM_TOOL Instruction Manual
Japanese(ja)	
r20uw0079jj0100_s2.pdf	S2 library User's Manual
r20an0122jj0201_rl78_s2.pdf	Introduction Guide
r21an0002jj0100_adpcm_tool.pdf	ADPCM_TOOL Instruction Manual
libsrc <DIR>	
s2 <DIR>	
src <DIR>	
adpcm_decoder.c adpcm_encoder.c adpcm_table.c	S2 library source file
r_s2_version.c	S2 common source file
include <DIR>	
r_adpcm.h r_adpcm_define.h r_mw_version.h r_stdint.h	S2 library header file
Tool(tool)	
ADPCM_TOOL	ADPCM Convert program for Windows PC

2. Library specification

Library specification can be seen in user's manual included in installer. Installer can be downloaded in Renesas Electronics Web site.

3. CC-RL (C compiler)

3.1 Development Environment

Please use the same or a later version of the toolchain listed below:

-Integrated Development Environment

CS+ for CC V8.05.00
e^2 studio 2021-04 (21.4.0)

-C compiler

CC-RL V1.10.00

-Code Generator tool

(CS+) : Renesas Smart Configurator for RL78 V1.00.00.04

(e^2 studio) : Renesas Smart Configurator for RL78 21.4.0.v20210315-0928

3.2 S2 Library ROM / RAM / stack size

[ROM/RAM size]

— S2 library for the RL78 Family.
ROM : about 813 byte
RAM : 0 byte (Upper layer program needs about 30byte for work area.)
Stack size : 64 byte

3.3 Notes

・ Please specify the "near" symbol to pointer argument in all memory models.

4. IAR C/C++ Compiler for Renesas RL78

4.1 Development Environment

Please use the same or a later version of the toolchain listed below:

-Integrated Development Environment and C compiler

IAR Embedded Workbench for Renesas RL78 version 4.21.1

-C compiler

IAR C/C++ Compiler for RL78 version : 4.20.1.2260 (4.20.1.2260)

-Code Generator tool

Renesas Smart Configurator for RL78 Version: 1.0.1

4.2 S2 Library ROM / RAM / stack size

[ROM/RAM size]

— S2 library for the RL78 Family.

ROM : about 1042 byte
RAM : 0 byte (Upper layer program needs about 30byte for work area.)
Stack size : 70 byte

4.3 Notes

4.3.1 For about argument of pointer

Please specify the "near" symbol to pointer argument in all memory models.

5. LLVM (C compiler)

5.1 Development Environment

Please use the same or a later version of the toolchain listed below:

-Integrated Development Environment

e^2 studio 2022-07 (22.7.0)

-C compiler

LLVM for Renesas RL78 10.0.0.202207

-Code Generator tool

(e^2 studio) : Renesas Smart Configurator for RL78 22.7.0.v20220620-0602

5.2 S2 Library ROM / RAM / stack size

[ROM/RAM size]

— S2 library for the RL78 Family.
ROM : about 1117 byte
RAM : 0 byte (Upper layer program needs about 30byte for work area.)
Stack size : 20 byte

5.3 Notes

・ Please specify the "near" symbol to pointer argument in all memory models.

6. Library version information

Ver	change
3.06	Supported LLVM.
3.05	Changed the library provision form from Lib. Format to C source
3.04	Supported CS+ for CC.
3.01	Supported IAR Embedded Workbench.
3.00	first release

Website and Support

Renesas Electronics Website
http://www.renesas.com/

Inquiries
http://www.renesas.com/contact/

Revision History

		Description	
Rev.	**Date**	**Page**	**Summary**
2.01	Sep.16.2022	—	Supported LLVM.
2.00	May.13.2021	—	Changed the library provision form from Lib. Format to C source. Delete CS + for CA
1.02	Oct.01.2015	—	Changed CubeSuite+ to CS+ for CA,CX Supported CS+ for CC. Deleted sample program.
1.01	Sep.01.2014	—	Release with V.3.01 Release 00
1.00	Nov.25.2011	—	First edition issued

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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