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 V.3.04 Release 00 (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.

And, we prepared Sound Playback/Compression demonstration software for the YRDKRL78G14 as sample application
program for S2 library.
Please refer to the following URL for details.
http://www.renesas.com/products/tools/middleware_and_drivers/tiny_soft/adpcm/m3s_s2_tiny/app_notes.jsp
(Document No.: R20AN0194)

Target Device

RL78 Family
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## 1. Structure of M3S-S2-Tiny

### Table 1  
**S2 library product files**

<table>
<thead>
<tr>
<th>name</th>
<th>Description</th>
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<tbody>
<tr>
<td>r20an0122ej0102_rl78_s2.pdf</td>
<td>Introduction Guide (this document)</td>
</tr>
<tr>
<td>workspace</td>
<td></td>
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<tr>
<td>Document(doc)</td>
<td></td>
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<tr>
<td>English(en)</td>
<td></td>
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<tr>
<td>r20uw0079ej0100_s2.pdf</td>
<td>S2 library User's Manual</td>
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<td>r20an0122ej0102_rl78_s2.pdf</td>
<td>Introduction Guide (this document)</td>
</tr>
<tr>
<td>r21an0002ej0100_adpcm_tool.pdf</td>
<td>ADPCM_TOOL Instruction Manual</td>
</tr>
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<td>Japanese(ja)</td>
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<tr>
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<td>ADPCM_TOOL Instruction Manual</td>
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<td>IAR (IAR)</td>
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<td>S2 library for RL78 Family assembler tuning ver.</td>
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<td>Library source file</td>
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<td>r_s2_version.c</td>
<td>S2 common source file</td>
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<td>r_adpcm.h</td>
<td>S2 library header file</td>
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<td>r_stdint.h</td>
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<td>ADPCM_TOOL</td>
<td>ADPCM Convert program for Windows PC</td>
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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. For CS+ for CA, CX

3.1 Development Environment

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

[Software]
- Integrated Development Environment
  CS+ for CA,CX V3.00.01
- C compiler
  CA78K0R V1.71
- Code Generator tool
  CS+ for CA,CX Code Generator for RL78 V2.07

3.2 S2 Library ROM / RAM / stack size

[ROM/RAM size]
— S2 library for the RL78 Family assembler tuning version.
  ROM : about 900 byte
  RAM : 0 byte (Upper layer program needs about 30byte for work area.)
  Stack size : 20 byte

3.3 Notes

・ Please specify the "near" symbol to pointer argument in all memory models.
4. For CS+ for CC

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

[Software]
- Integrated Development Environment
  CS+ for CC V3.01.00
- C compiler
  CC-RL V1.01
- Code Generator tool
  CS+ for CC Code Generator for RL78 V2.07

4.2 S2 Library ROM / RAM / stack size

[ROM/RAM size]
  — S2 library for the RL78 Family assembler tuning version.
  ROM  : about 900 byte
  RAM  : 0 byte (Upper layer program needs about 30byte for work area.)
  Stack size : 22 byte

4.3 Notes
- Please specify the "near" symbol to pointer argument in all memory models.
5. For IAR Embedded Workbench

5.1 Development Environment

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

[Software]
- Integrated Development Environment and C compiler
  IAR Embedded Workbench for Renesas RL78 version 2.10.1
- Code Generator tool
  Applilet3 for RL78 V1.09.00

[board]

The sample program that uses S2-IAR version is in the following Application note.

Document title: Sound Playback/Record demonstration software for RL78/G14 CPU board
  (Document number: R20AN0194)

Please download the sample code clicking following URL.

http://www.renesas.com/products/tools/middleware_and_drivers/tiny_soft/adpcm/m3s_s2_tiny/app_notes.jsp

5.2 S2 Library ROM / RAM / stack size

[ROM/RAM size]

--- S2 library for the RL78 Family assembler tuning version.
  ROM : about 900 byte
  RAM : 0 byte (Upper layer program needs about 30 byte for work area.)
  Stack size : 22 byte
5.3 Notes

5.3.1 For about argument of pointer
Please specify the "near" symbol to pointer argument in all memory models.

5.3.2 For about tentative measure for IAR compile bug
The compiler used in the development setting in this library is reported some bugs from IAR.
Please refer to the following IAR website that shows details.
IAR systems: New versions and product updates

And, Renesas issues technical update for about IAR compiler.
Renesas: IDEs and Project Managers

Document title: Operating Precautions IAR Embedded Workbench for RL78 V2.xx
Document No.: R20UT3407

This library is applied tentative measure for this issue.

- Some instructions that have one operand of type imm[BC] can in some cases generate wrong offsets to BC if the offset is a constant (not a label). [EW25763]

This tentative measure has effective for user used compiler version.

- User uses V2.10.1
  Needed tentative measure. Please use this library in “no change”.

- User uses version other than the above
  There is a possibility that a compiler is fixed.
  Not needed tentative measure. Please delete the tentative measure code.
  Please update library code like following.
adpcm_encoder_rl78.s87 :line 131-162

_R_adpcm_initEnc:

    push bc
    push de

    movw bc, ax
    clrw ax

;    movw 0800H[bc], ax ;Source code for IARRL78 V2.10.1
    movw 0008H[bc], ax ;Source code for IARRL78 V2.1x or Later versions

;    mov a, #2 ;Source code for IARRL78 V2.10.1
;    mov 0A00H[bc], a ;Source code for IARRL78 V2.10.1
    mov 000AH[bc], #2 ;Source code for IARRL78 V2.1x or Later versions

movw ax, #2*2
addw ax, #LWRD(adpcm_stepsizeTable)
movw de, ax
movw [de]

;    movw 0C00H[bc], ax ;Source code for IARRL78 V2.10.1
    movw 000CH[bc], ax ;Source code for IARRL78 V2.1x or Later versions

pop de
pop bc
ret
### 6. Library version information

<table>
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<th>Ver</th>
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<td>3.01</td>
<td>Supported IAR Embedded Workbench.</td>
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<td>3.00</td>
<td>first release</td>
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Renesas Electronics Website
http://www.renesas.com/

Inquiries
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## Revision History

<table>
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<th>Date</th>
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<tr>
<td>1.02</td>
<td>Oct. 01, 2015</td>
<td>—</td>
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<td>Changed CubeSuite+ to CS+ for CA, CX</td>
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<td>Deleted sample program.</td>
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<td>1.01</td>
<td>Sep. 01, 2014</td>
<td>—</td>
<td>—</td>
<td>Release with V.3.01 Release 00</td>
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<tr>
<td>1.00</td>
<td>Nov. 25, 2011</td>
<td>—</td>
<td>—</td>
<td>First edition issued</td>
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General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

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1. 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 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.
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   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.

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