Startup Manual

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ADSP Framework
RCG3AHFWN0203ZDP

Startup Manual

RCG3AHFWN0203ZDPE

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How to Use This Manual

1. Purpose and Target Reader

This manual is designed to provide the user with an understanding of the interface specifications of the Software product. It is intended for users designing application systems incorporating the Software product. Please refer to the related documents with this product.

Use this Software after carefully reading the precautions. The precautions are stated in the main text of each section, at the end of each section, and in the usage precaution section.

The revision history summarizes major corrections and additions to the previous version. It does not cover all the changes. For details, refer to this manual.

2. Restrictions on the Use of this Middleware

Any customer who wishes to use this Software must obtain a software license from Renesas Electronics.

3. Related Manuals

4. Technical Terms and Abbreviation

ADSP Framework

Startup Manual

RCG3AHFWN0203ZDP
Rev.1.00
May 24, 2019

Overview

This document explain how to setup the ADSP Framework.

Target Device

R-Car Series, 3rd Generation

Requirements

Xtensa Xplorer 7.0.4(RG-2016.4)

Contents

1. Introduction

1.1 Overview

This document explain how to setup the ADSP Framework.

1.2 Folder Structure

Table 1 The list of files

Folder name	File name	Description
	Contents.txt	Contents Summary
Document	StartupManual.pdf	Startup Manual(This document)
	ReleaseNote.txt	Release note(English)
	RCG3AHFWN0203ZDPE.pdf	User's Manual(English)
Reference	adsp_framework.xws	ADSP Framework project workspace
	hifi2_rcar_rg20164c_linux_redist.tgz	Redistribution package for Linux
	hifi2_rcar_rg20164c_win32_redist.tgz	Redistribution package for Windows
Software	RCG3AHFWN0203ZDP.tar.gz	Pre-built firmware

1.3 Related documents

Table 2 shows related documents and references.

Table 2 Ralated documents

No.	Name	Published by
[1]	Xtensa Software Development Toolkit User's Guide	Cadence Design Systems, Inc.
[2]	ADSP Framework User's Manual	Renesas Electronics Corporation

2. Setup the environments

2.1 Install the Redistribution Package to Xtensa Xplorer

Please see the Section 2.2 of "Xtensa Software Development Toolkit User's Guide" (sw_dev_toolkit_ug.pdf).

2.2 Import the Xtensa Project Workspace to Xtensa Xplorer

(1) "File"->"Import".

(2) Select

Select "Xtensa Xplorer"->"Import Xtensa Xplorer Workspace".

(3) Select Workspace File (.xws)

Select "adsp_framework.xws"

(4) Select Projects to be Imported

"Select All"

(5) Select memory Maps and Custom LSPs to be Imported

"Select All"

3. Using the ADSP Framework

3.1 About Build Target

Table 3 The list of files

Target	Description
Debug	This Build target is for ISS Debug. This target link the “adsp_command” project.
Release	This Build target is for create the ADSP Firmware. This target NOT link the “adsp_command” project.

3.2 Create the ADSP Firmware

(1) Select Build Target to “Release”.

(2) Build

(3) After successfully build, “xf-rcar.fw” is appeared at “adsp_framework” project root.
(If you cannot see the file, press “F5” key to refresh)

3.3 Using the ADSP Firmware

(1) Copy the “xf-rcar.fw” to the target board file system.
The firmware file must be located on “/lib/firmware/xf-rcar.fw”.

(2) Boot-up target board.

Load the firmware automatically in boot-up sequence.

(3) Login as root.

(4) Run the applications.

ADSP Interface Reference programs can help you for testing ADSP Framework.

4. How to add the Plugins

4.1 Import the Xtensa Project Workspace of Plugins to Xtensa Xplorer

(1) "File"->"Import".

(2) Select

Select "Xtensa Xplorer"->"Import Xtensa Xplorer Workspace".

(3) Select Workspace File (.xws) of Plugins

Select "adsp_renderer.xws" (e.g.)

(4) Select Projects to be Imported

"Select All"

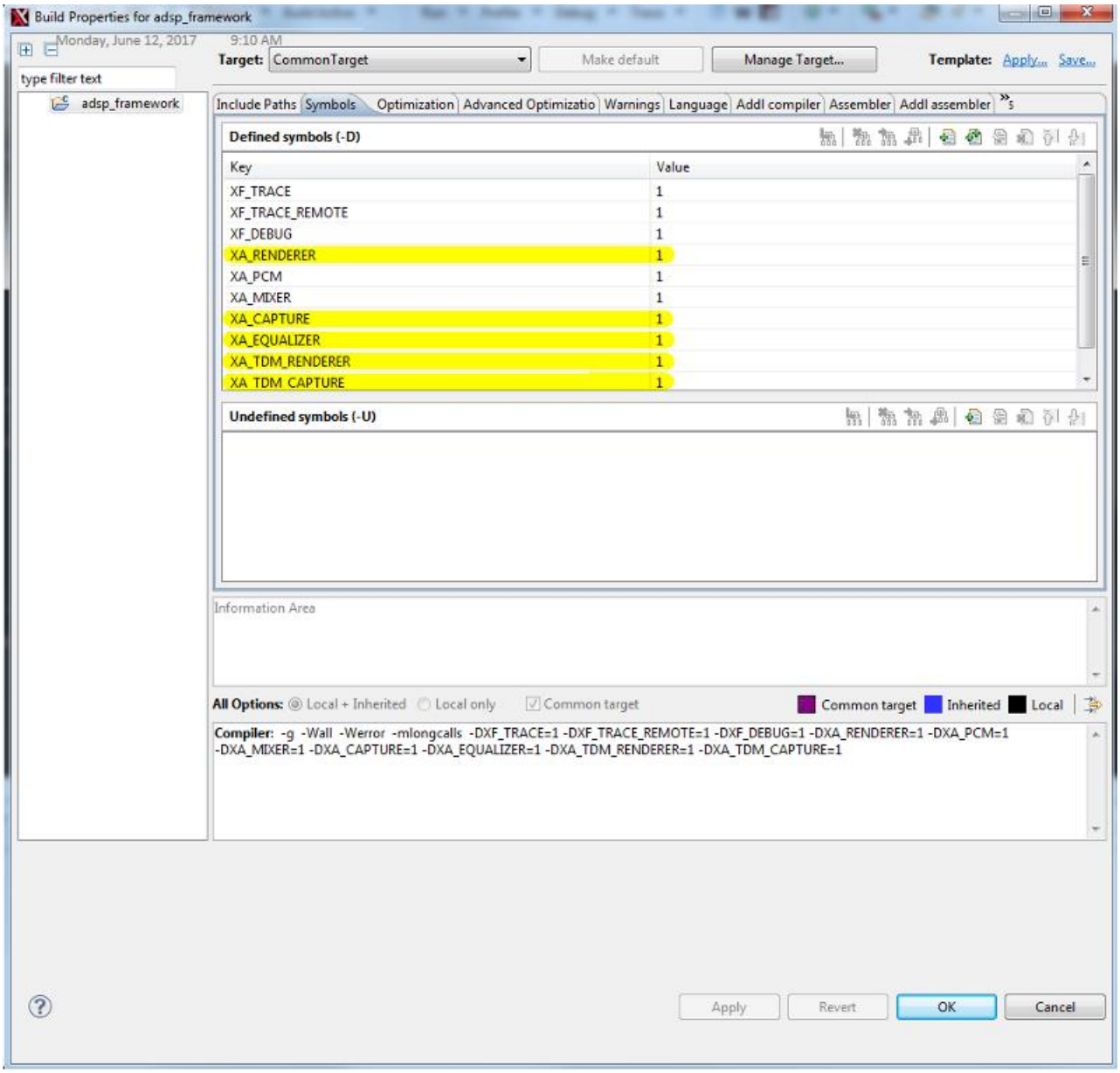
(5) Select memory Maps and Custom LSPs to be Imported

"Select All"

(6) Similarly repeat the above steps (1 to 5) for adsp_equalizer.xws and adsp_tdm.xws to import Equalizer and TDM workspaces.

4.2 Change the ADSP Framework Project for using the imported Plugins

Change the build properties for adsp_framework (Target: CommonTarget).

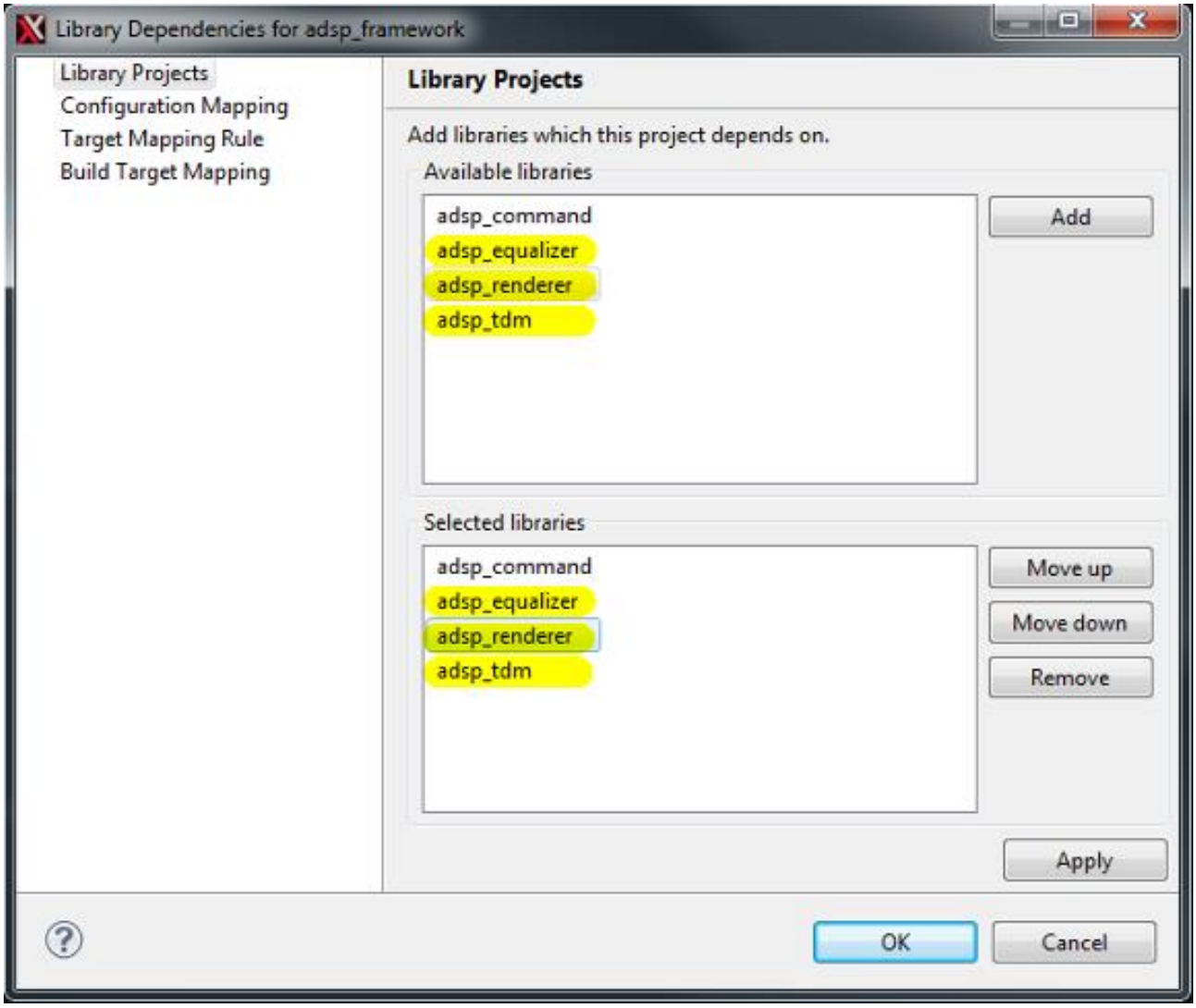


e.g.)

Yellow marked: the value is set "1", use the plugins.

4.3 Add the Library Dependencies for using the imported Plugins

Change the Library Dependencies for adsp_framework.



e.g.)

Yellow marked: set the dependencies of plugins to ADSP Framework.

4.4 Re-Create the ADSP Firmware and using the firmware

See the section 3.2 and 3.3.

5. How to change the Memory Map

5.1 Device tree change point

The device tree files is located in as following: for example

```
${KernelSources}/arch/arm64/boot/dts/renesas/r8a7795-salvator-x.dts (for R-Car H3)
${KernelSources}/arch/arm64/boot/dts/renesas/r8a7796-salvator-x.dts (for R-Car M3)
${KernelSources}/arch/arm64/boot/dts/renesas/r8a77965-salvator-x.dts (for R-Car M3N)
${KernelSources}/arch/arm64/boot/dts/renesas/r8a77990-ebisu.dts (for R-Car E3)
```

The memory map is defined as following:

```
/* For Audio DSP */
adsp_reserved: linux,adsp {
    compatible = "shared-dma-pool";
    reusable;
    reg = <0x00000000 0x57000000 0x0 0x01000000>;
};
```

Yellow marked: top address of ADSP memory.

Blue marked: size of ADSP memory.

See the section "1.4. Memory specification" of ADSP Framework User's Manual for more detail

5.2 ADSP Driver change point

The define file is located in as following:

${ADSPDriverSource}/include/sys/xt-shmem/xf-config.h

The memory map is defined as following:

```
#define XF_CFG_MESSAGE_POOL_SIZE        256
#define XF_CFG_REMOTE_IPC_POOL_SIZE     (256 << 10)
#define XF_PROXY_DATA_ADDRESS(core)     (0x57400000)
#define XF_PROXY_DATA_SIZE(core)        (0x00C00000)
```

Purple marked: the number of communication control area

Green marked: valid size of shared memory

Yellow marked: top address of shared memory

Blue marked: all size of shared memory

See the section "1.4. Memory specification" and "2.2. Memory structure" of ADSP Framework User's Manual for more detail

5.3 ADSP Framework change point

There are three change points. The one is sources, the second one is memory map editor, and the third one is create firmware scripts.

5.3.1 ADSP Framework Source Code

The define file is located in as following:

```
${ADSPFrameworkSource}/include/sys/xt-shmem/board-rcar/xf-memory.h
```

The memory map is defined as following:

```
#define XF_CFG_SHMEM_ADDRESS(core)      ((void *)0x57400000)
#define XF_CFG_TRACE_START(core)        ((void *)0x57000000)
#define XF_CFG_TRACE_END(core)          ((void *)0x57100000)
```

Yellow marked: top address of ADSP shared area

Blue marked: top address of ADSP debug area

Purple marked: end address of ADSP debug area

See the section "1.4. Memory specification" of ADSP Framework User's Manual for more detail

The define file is located in as following:

```
${ADSPFrameworkSource}/include/sys/xt-shmem/xf-config.h
```

The memory map is defined as following:

```
#define XF_CFG_MESSAGE_POOL_SIZE        256
#define XF_CFG_REMOTE_IPC_POOL_SIZE     (256 << 10)
```

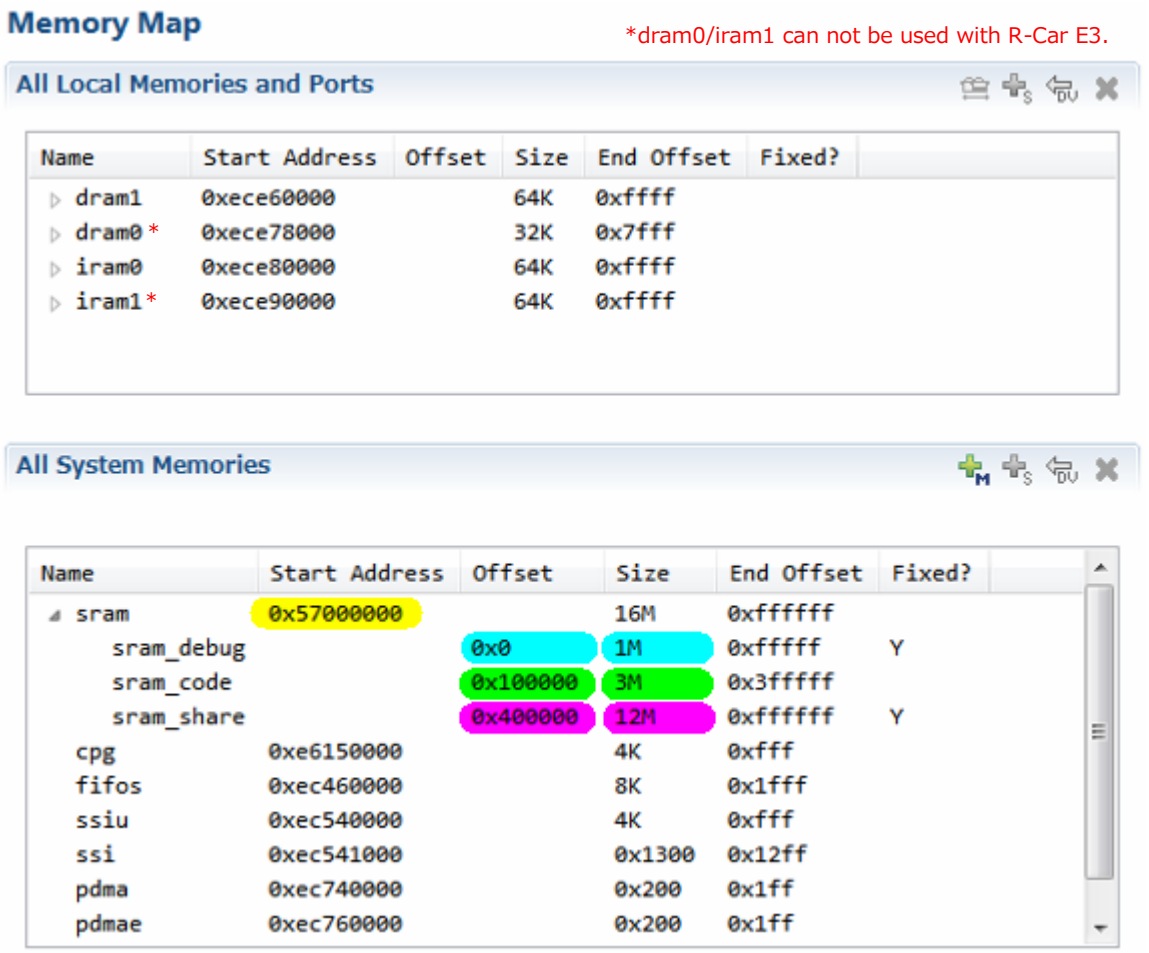
Purple marked: the number of communication control area

Green marked: valid size of shared memory

See the section "2.2. Memory structure" of ADSP Framework User's Manual for more detail

5.3.2 ADSP Framework Memory Map

Please see the section "Memory Map Editor" of Xtensa Xplorer Help files.



Yellow marked: top address of ADSP total memory area

Blue marked: offset and size of ADSP debug area

Green marked: offset and size of ADSP code area

Purple marked: offset and size of ADSP shared area

See the section "1.4. Memory specification" of ADSP Framework User's Manual for more detail

5.3.3 ADSP Framework Create Firmware scripts

The define file is located in as following:

```
${ADSPFrameworkSource}/sections.py
```

The memory map is defined as following:

```
    # ...main memory
    ('-j .sram.rodata ' +
     '-j .rodata ' +
     '-j .sram.literal ' +
     '-j .literal ' +
     '-j .sram.text ' +
     '-j .text ' +
     '-j .sram.data ' +
     '-j .data ' +
     '-j .sram.bss ' +
     '-j .bss',
     0x57100000),
```

Yellow marked: top address of ADSP code area

See the section "1.4. Memory specification" of ADSP Framework User's Manual for more detail

Revision History	ADSP Framework Startup Manual

Rev.	Date	Description	
		Page	Summary
1.00	May. 24, 2019	-	New Create

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