

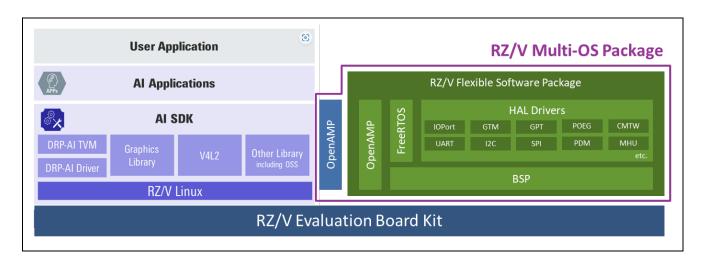
RZ/V2H

Quick Start Guide for RZ/V Multi-OS Package

Introduction

This document outlines the procedure for integrating the RZ/V Multi-OS Package into RZ/V2H AI SDK. By integrating the Multi-OS Package, users can efficiently establish a Multi-OS environment wherein Linux operates on the Cortex®-A55 and FreeRTOS/BareMetal runs on the Cortex-M33 and/or Cortex-R8 with support for Inter-Processor Communication between these CPU cores.

This package requires the RZ/V Flexible Software Package (FSP) for an RTOS/BareMetal environment. The figure below illustrates the software stack of the RZ/V Multi-OS Package with the RZ/V2H:



Here are brief descriptions of each component related to RZ/V Multi-OS Package:

RZ/V FSP

This software package consists of production ready peripheral drivers, FreeRTOS and portable middleware stacks and best in-case HAL drivers with low memory footprint.

OpenAMP

The framework includes the software components required for Asymmetric Multiprocessing (AMP) systems, such as Inter-Processor Communication.

Target Device

RZ/V2H



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1. Specifications

Table 1-1 lists the on-chip peripheral modules to be used in this package.

Table 1-1 Peripheral modules to be used in this package

Peripheral module	Usage
Message Handling Unit (MHU)	Configure Inter-Processor Interrupt.
Serial Communications Interface with FIFO (SCIFA)	Perform standard serial communications sending and receiving console messages.
Interrupt controller (INTC)	 Handle the following types of interrupts as shown below for example: Processors should receive interrupts during buffered serial communications. MHU module fires Inter-Processor Interrupt.
General Purpose Input Output (GPIO)	Configure I/O lines used by serial communications.
General Timer (GTM)	Configure the tick for FreeRTOS.

2. Verified Operation Conditions

Table 2-1 shows the verified operation conditions.

Table 2-1 Verified Operation Conditions

Item	Contents
Integrated Development Environment	e ² studio 2025-01
Toolchain	GNU Arm Toolchain 13.3.Rel1 AArch32 bare-metal target (arm-none-eabi)
Dependent Software	 RZ/V Flexible Software Package (FSP) v3.1.0 RZ/V2H AI Software Development Kit (SDK) v5.20

3. Sample Program Setup

3.1 Flexible Software Package Setup

Multi-OS Package expects RZ/V Flexible Software Package (FSP) to be installed in advance. For details on the installation, please refer to <u>Getting Started with RZ/V Flexible Software Package</u>.

3.2 Integration of Multi-OS Package related stuff

This section describes how to integrate OpenAMP related stuff into **RZ/V2H AI Software Development Kit** (hereinafter referred to as **RZ/V2H AI SDK**).

- 1. Carry out Step 1, Step 2 and 1-8 of Step 3 stated in How to build RZ/V2H AI SDK Source Code showcased at <u>AI Applications and AI SDK of RZ/V series</u>.
- 2. Download Multi-OS Package (r01an7254ej0311-rzv-multi-os-pkg.zip) to a working directory and run the commands stated below:

```
$ cd ${YOCTO_WORK}
```

```
$ unzip <Multi-OS Dir>/r01an7254ej0311-rzv-multi-os-pkg.zip
```

```
$ tar zxvf r01an7254ej0311-rzv-multi-os-pkg/meta-rz-features_multi-os_v3.1.1.tar.gz
```

Here, <Multi-OS Dir> indicates the path to the directory where Multi-OS Package is placed.

3. Add the layer for Multi-OS Package.

```
$ cd build
$ bitbake-layers add-layer ../meta-rz-features/meta-rz-multi-os/meta-rzv2h
```



(Optional for remoteproc support)

4. Apply the modification stated below to **meta-rz-features/meta-rz-multi-os/meta-rzv2h/recipeskernel/linux/linux-renesas_5.10.bbappend** for enabling remoteproc support:

```
$ FILESEXTRAPATHS_prepend := "${THISDIR}/${PN}:"
$ ENABLE REMOTEPROC = "1"
```

(Optional for CM33 and CR8 invocation from u-boot)

5. Uncomment the following 2nd line stated in **meta-rz-features/meta-rz-multi-os/metarzv2h/conf/layer.conf**. For details on CM33 and CR8 invocation from u-boot, please see 4.4.2.

```
#MACHINE_FEATURES_append = " RZV2H_CM33_BOOT"
MACHINE_FEATURES_append = " SRAM_REGION_ACCESS"
#MACHINE_FEATURES_append = " CM33_FIRMWARE_LOAD"
#MACHINE_FEATURES_append = " CA55_CPU_CLOCKUP"
```

6. Continue to carry out the remaining procedures stated in **Step 3** of **How to build RZ/V2H AI SDK Source Code**.

3.3 Note for integration

The peripherals which are NOT enabled enter Module Standby Mode after Linux kernel is booted up. That means the peripherals used on CM33 side might stop working at that time. To avoid such a situation, Multi-OS Package incorporates the patch below:

• 0003-Set-OSTM-for-MCPU-and-RCPU.patch

This patch prevents GTM used in RPMsg demo program from entering Module Standby Mode. If you have any other peripherals which you would like to stop entering Module Standby implicitly, please update the patch as shown below:

```
diff --git a/drivers/clk/renesas/r9a09g057-cpg.c b/drivers/clk/renesas/r9a09g057-cpg.c
index f32a9e41ae47..abcef788f966 100644
--- a/drivers/clk/renesas/r9a09g057-cpg.c
+++ b/drivers/clk/renesas/r9a09g057-cpg.c
00 -930,6 +930,13 00 static const unsigned int r9a09g057 crit mod clks[] initconst = {
   MOD CLK BASE + R9A09G057 ACPU DMAC 1 ACLK,
   MOD CLK BASE + R9A09G057 RCPU DMAC 0 ACLK,
   MOD CLK BASE + R9A09G057 RCPU DMAC 1 ACLK,
   MOD CLK BASE + R9A09G057 MCPU_OSTM0_PCLK,
+
   MOD_CLK_BASE + R9A09G057_MCPU_OSTM1_PCLK,
+
  MOD CLK BASE + R9A09G057 RCPU OSTMO PCLK,
  MOD CLK BASE + R9A09G057 RCPU OSTM1 PCLK,
  MOD CLK BASE + R9A09G057 RCPU OSTM2 PCLK,
  MOD_CLK_BASE + R9A09G057_RCPU_OSTM3_PCLK,
   MOD CLK BASE + R9A09G057 xxxx,
 };
static struct clk mon r9a09g057 clk mon[] = {
```

With respect to the allowable value for xxxx above, please refer to the source code below:



 <u>https://github.com/renesas-rz/rz_linux-</u> cip/blob/6375044a6e84009499405326a8d32634a0b88095/drivers/clk/renesas/r9a09g057-cpg.c#L325-L806</u>

3.4 Deployment of RZ/V2H AI SDK

With respect to the deployment of Linux kernel, device tree and root filesystem for RZ/V2H, please refer to <u>https://renesas-rz.github.io/rzv_ai_sdk/5.10/</u>.

4. Sample Program Invocation on RZ/V2H

4.1 Hardware Setup

Connect J-Link to RZ/V2H EVK. For details, please refer to <u>Getting Started with RZ/V Flexible Software</u> <u>Package</u>.

4.2 CM33/CR8 Sample Program Setup

Here are the procedures for setting up the sample program running on CM33 and CR8:

- 1. Extract r01an7254ej0311-rzv-multi-os-pkg.zip on your development PC.
- 2. Extract either of **rzv2h_cm33_rpmsg_linux-rtos_demo.zip** or **rzv2h_cr8_rpmsg_linux-rtos_emo.zip** included in **r01an7254ej0311-rzv-multi-os-pkg**.
- 3. Open e² studio 2025-01 and click **File > Import**.
- 4. Double-click **General** and select **Existing Projects into Workspace** as shown in Figure 4-1:

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hyper liker text D. Archive Flat D. Dreve

Figure 4-1. Import sample project (1)

5. Input the path to the directory of sample project you would like to import to **Select root directory**, press **Enter** key and click **Finish** button.

S import – – × Select	
Create new projects from an archive file or directory.	
Archive File Conception Archive File Conception Concep	
(2) < Back Beet> Einich Cancel	

Figure 4-2. Import sample project (2)



(Optional)

6. By default, RPMsg channel 0 and 1 are configured to be used on CM33 and CR8, respectively. If you would like to change the channel, you need to open the property of MainTask#0 on FSP Smart Configurator, specify the channel number you would like to use for Thread Control and push Generate Project Content button. If Generate Project Content pop-up is shown, click Proceed to reflect the changes to source code.

			Generate Project Content	
hreads	🕢 New Thread 🙀 Remove 📋	MainTask#0 Stacks	New Stack > 🐣 Extend Stack > 🎪 Remove	
 ♥ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ Blin 	U/Common g.popt U/D Port Driver on r_joport FreeRIOS Port (m_freetos_port) Heap 4 g.nhu, pod Message Handling Unit Driver (NonSecut g.nhu 2004 Driver on r_scif_uart OpenAMP g.c.antido CANFD Driver on r_canfd himBikRB0	Add stacks to the selected thread by c	sing the 'New Stack' toolbar button (above), or by pasting here from the clipboard.	
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Figure 4-3. RPMsg Channel Setting

- 7. Build the project from Choose Project > Build Project.
- 8. If building project is successfully completed, build artifacts as listed below should be generated in **Debug** or **Release** directory of the project you imported in accordance with the active Build Configuration.
 - rzv2h_<cpu>_rpmsg_linux-rtos_demo.elf
 - rzv2h_<cpu>_rpmsg_linux-rtos_demo.bin

<cpu> stands for either cm33 or cr8 hereafter in this document.

4.3 Note for CR8 Sample Project

 CR8 sample project expects that CM33 and CR8 sample project are imported to the same e² studio workspace. Otherwise, FSP Smart Configurator won't work for CR8 sample project.

4.4 CM33/CR8 Sample Program Invocation for communicating with Linux

4.4.1 CM33/CR8 Sample Program Invocation using Segger J-Link

Carry out the procedure shown below for invoking CM33 and/or CR8 sample program using J-Link.

1. Click **Debug** button as shown below:



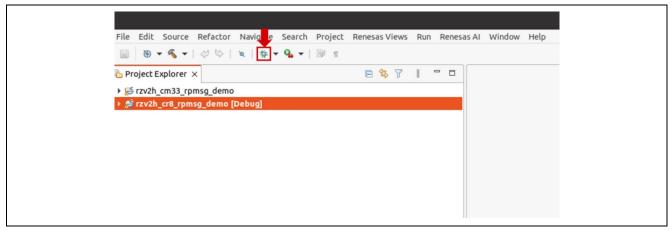


Figure 4-4. Debug Perspective Launch (1)

2. If the following **Select Configuration** window is shown, choose rzv2h_<cpu>_rpmsg_demo_Debug_Flat or rzv2h_<cpu>_rpmsg_demo_Release_Flat in accordance with the build configuration you are using and click **OK**.

Select a configuration to launch: rzv2h_cr8_rpmsg_demo Debug_Flat rzv2h_cr8_rpmsg_demo Release_Flat

Figure 4-5. Debug Perspective Launch (2)

If the following **Confirm Perspective Switch** window appears, press **Switch** to go ahead.

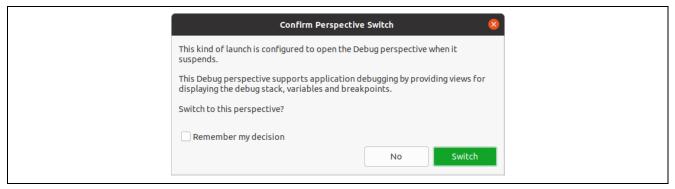


Figure 4-6. Debug Perspective Launch (3)

 When Debug Perspective is opened, Program Counter (PC) should be located at the top of Entry_Function_S and Reset_Handler for CM33 and CR8 sample project, respectively. Then, press the button shown in Figure 4-7.



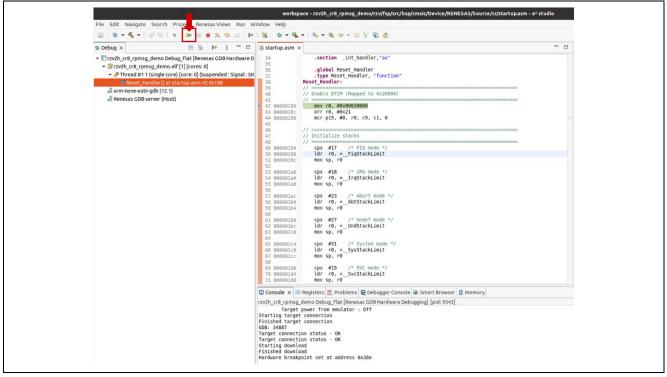


Figure 4-7. How to start to debug Sample Project (1)

4. PC should be stopped at the top of **main** function. Then, click the same button in the previous step to continue.

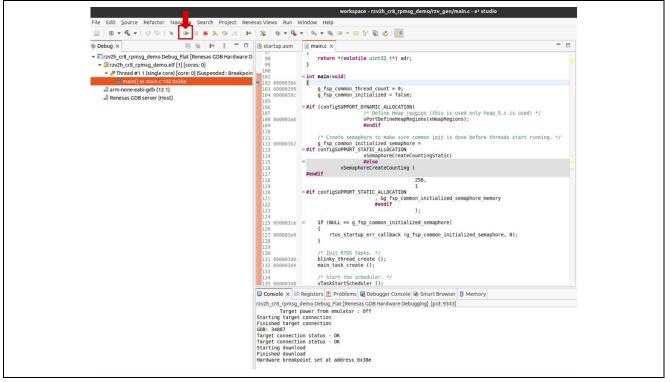


Figure 4-8. How to start to debug Sample Project (2)

5. CM33/CR8 Sample Project starts to work and wait for the launch of CA55 RPMsg Sample Program.



4.4.2 CM33/CR8 Sample Program invocation from u-boot

Here is the example of procedure for invoking CM33/CR8 sample program from u-boot:

- 1. Place rzv2h_<cpu>_rpmsg_demo.bin in SD card where Linux kernel and Device Tree Blob are stored.
- 2. Insert the SD card into SD1 of RZ/V2H EVK.
- Turn on RZ/V2H EVK. Then, you should see the following message on the console associated with CN12 of RZ/V2H EVK.

```
U-Boot 2021.10 (Jun 14 2024 - 18:14:19 +0000)
CPU: Renesas Electronics CPU rev 1.0
Model: Renesas EVK Version 1 based on r9a09g057h4
DRAM: 15.9 GiB
MMC: mmc@15c00000: 0, mmc@15c10000: 1
(snip)
Net: eth0: ethernet@15c30000, eth1: ethernet@15c40000
Hit any key to stop autoboot: 3
```

- 4. Hit any key within 3 sec. to stop autoboot.
- 5. Carry out the following setup of u-boot to kick CM33 and/or CR8:

• For CM33

```
=> setenv cm33start 'dcache off; mw.l 0x10420D2C 0x02000000; mw.l 0x1043080c
0x08003000; mw.l 0x10430810 0x18003000; mw.l 0x10420604 0x00040004; mw.l
0x10420C1C 0x00003100; mw.l 0x10420C0C 0x00000001; mw.l 0x10420904 0x00380008;
mw.l 0x10420904 0x00380038; ext4load mmc 0:2 0x08001e00
boot/rzv2h_cm33_rpmsg_demo_linux-rtos.bin; mw.l 0x10420C0C 0x00000000; dcache on'
=> saveenv
=> run cm33start
```

• For CR8_Core0

=> setenv cr80start 'dcache off; mw.l 0x10420D24 0x04000000; mw.l 0x10420600 0xE000E000; mw.l 0x10420604 0x00030003; mw.l 0x10420908 0x1FFF0000; mw.l 0x10420C44 0x003F0000; mw.l 0x10420C14 0x00000000; mw.l 0x10420908 0x10001000; mw.l 0x10420C48 0x00000020; mw.l 0x10420908 0x1FFF1FFF; mw.l 0x10420C48 0x00000000; ext4load mmc 0:2 0x12040000 boot/rzv2h_cr8_core0_rpmsg_linux-rtos_demo_itcm.bin; ext4load mmc 0:2 0x08180000 boot/rzv2h_cr8_core0_rpmsg_linux-rtos_demo_sram.bin; ext4load mmc 0:2 0x40800000 boot/rzv2h_cr8_core0_rpmsg_linux-rtos_demo_sdram.bin; mw.l 0x10420C14 0x00000003; dcache on;' => saveenv

=> run cr80start

For CR8_Core1

=> setenv cr81start 'dcache off; mw.l 0x10420D24 0x04000000; mw.l 0x10420600 0xE000E000; mw.l 0x10420604 0x00030003; mw.l 0x10420908 0x1FFF0000; mw.l 0x10420C44 0x003F0000; mw.l 0x10420C14 0x00000000; mw.l 0x10420908 0x10001000; mw.l 0x10420C48 0x00000020; mw.l 0x10420908 0x1FFF1FFF; mw.l 0x10420C48 0x00000000; ext4load mmc 0:2 0x12080000 boot/rzv2h_cr8_core1_rpmsg_linux-rtos_demo_itcm.bin; ext4load mmc 0:2 0x081C0000 boot/rzv2h_cr8_core1_rpmsg_linux-rtos_demo_sram.bin; ext4load mmc 0:2 0x41800000 boot/rzv2h_cr8_core1_rpmsg_linux-rtos_demo_sdram.bin; mw.l 0x10420C14 0x00000003; dcache on;' => saveenv => run cr81start



RENESAS

4.4.3 CM33 Sample Program Invocation from remoteproc

Here is the procedure for invoking CM33 Sample Program with remoteproc:

- 1. Booting up Linux by following RZ/V2H EVK Getting Started.
- 2. Invoke the command stated below to specify the sample program to be loaded:

root@rzv2h-evk-ver1:~# echo rzv2h_<cpu>_rpmsg_linux-rtos_demo.elf >
/sys/class/remoteproc/remoteproc0/firmware

3. Kick CM33 or CR8 by invoking the command below:

root@rzv2h-evk-ver1:~# echo start > /sys/class/remoteproc/remoteproc0/state

If CM33 or CR8 Sample Program starts to work successfully, the following message should be shown on Linux console:

root@rzv2h-evk-ver1:~# echo start > /sys/class/remoteproc/remoteproc0/state
[737.289773] remoteprocremoteproc0: powering up cm33
[737.348226] remoteprocremoteproc0: Booting fwimage rzv2h_cm33_rpmsg_linux-rtox_demo.elf, size 1347660
[737.356732] remoteprocremoteproc0: unsupported resource 4
[737.366255] remoteproc0#vdev0buffer: assigned reserved memory node vdev0buffer@0x43200000
[737.374784] remoteproc0#vdev0buffer: registered virtio0 (type 7)
[737.380989] remoteprocremoteproc0: remote processor cm33 is now up

4.5 CA55 Sample Program Invocation

This section describes how to invoke RPMsg sample program running on CA55 side.

1. Boot up Linux by executing the following command on u-boot for example:

```
=> run bootcmd
```

2. Login as root.

```
rzv2h-evk-ver1 login: root
```

3. Invoke RPMsg sample program as shown below:

```
root@rzv2h-evk-ver1:~# rpmsg_sample_client
```

4. If the sample program started to work successfully, you can see the following message on Linux console:



```
[xxx] proc id:0 rsc id:0 mbx id:1
metal: info: metal uio dev open: No IRQ for device 10480000.mbox-uio.
[xxx] Successfully probed IPI device
metal: info: metal uio dev open: No IRQ for device 42f00000.rsctbl.
[xxx] Successfully open uio device: 42f00000.rsctbl.
[xxx] Successfully added memory device 42f00000.rsctbl.
metal: info: metal_uio_dev_open: No IRQ for device 43000000.vring-ctl0.
[xxx] Successfully open uio device: 43000000.vring-ctl0.
[xxx] Successfully added memory device 43000000.vring-ctl0.
metal: info: metal_uio_dev_open: No IRQ for device 43200000.vring-shm0.
[xxx] Successfully open uio device: 43200000.vring-shm0.
[xxx] Successfully added memory device 43200000.vring-shm0.
metal: info: metal uio dev open: No IRQ for device 43100000.vring-ctl1.
[xxx] Successfully open uio device: 43100000.vring-ctl1.
[xxx] Successfully added memory device 43100000.vring-ctl1.
metal: info:
             metal uio dev open: No IRQ for device 43500000.vring-shm1.
[xxx] Successfully open uio device: 43500000.vring-shm1.
[xxx] Successfully added memory device 43500000.vring-shm1.
metal: info:
               metal_uio_dev_open: No IRQ for device 42f01000.mhu-shm.
[xxx] Successfully open uio device: 42f01000.mhu-shm.
[xxx] Successfully added memory device 42f01000.mhu-shm.
[xxx] Initialize remoteproc successfully.
[xxx] proc id:1 rsc id:1 mbx id:1
[xxx] Initialize remoteproc successfully.
[xxx] proc_id:0 rsc_id:0 mbx_id:2
[xxx] Initialize remoteproc successfully.
[xxx] proc id:1 rsc id:1 mbx id:2
[xxx] Initialize remoteproc successfully.
[xxx] proc_id:0 rsc_id:0 mbx_id:3
[xxx] Initialize remoteproc successfully.
[xxx] proc id:1 rsc id:1 mbx id:3
[xxx] Initialize remoteproc successfully.
rpmsg communication sample program
1. communicate with CM33
                           ch0
2. communicate with CM33
                            ch1
3. communicate with CR8 core0 ch0
4. communicate with CR8 core0 ch1
5. communicate with CR8 corel ch0
6. communicate with CR8 core1 ch1
7. communicate with CM33 ch0 and CR8 core0 ch1
8. communicate with CM33 ch0 and CR8 core1 ch1
9. communicate with CR8 core0 ch0 and CR8 core1 ch1
e. exit
please input
```

- 5. By typing either of **1** to **9** corresponding to the communication you would like to try, the sample program starts to work.
- 6. By typing e, the sample program should be terminated with the message shown below:



```
please input
> e
[xxx] 42f00000.rsctbl closed
[xxx] 43000000.vring-ctl0 closed
[xxx] 43200000.vring-shm0 closed
[xxx] 43100000.vring-ctl1 closed
[xxx] 43500000.vring-shm1 closed
[xxx] 42f01000.bhu-shm closed
```

4.6 Overview of Sample Program's behavior

This section describes the overview of sample program's behavior.

- 1. When the CA55 sample program is successfully executed, the communication channel among CA55, CM33 and CR8 is established.
- 2. The CA55 sample program starts to send the message to CM33 and/or CR8 with incrementing the message size from the minimum value 17 to the maximum value 488. During the communication, the message as shown below is displayed on your console:

```
[xxx] Sending payload number 148 of size 165
```

- 3. When CM33 and/or CR8 sample program receives the message sent from CA55, the echo reply is sent back to CA55 sample program.
- 4. When CA55 receives the echo reply, the message below should be displayed on your console:

[xxx] received payload number 148 of size 165

5. After the 488-byte sized payload is sent from CA55 to CM33/CR8 and CM33/CR8 sends back the echo reply, the message indicating the termination of the communication channel is sent from CA55 to CM33/CR8. Then, the CA55 sample program outputs the following log messages to your console:



4.7 Notes for Sample Program

When trying 7. Communication with CM33 ch0 and CR8 core 0 ch1, be sure to invoke CM33 RPMsg sample program first followed by CR8 sample program beforehand. If the sample program works as expected, the communications between CA55 and CM33 and between CA55 and CR8 work concurrently as shown in the log below:

```
[XXX] thread start
[CR8 ] creating remoteproc virtio
[XXX] thread start
[CR8 ] initializing rpmsg shared buffer pool
[CR8 ] initializing rpmsg vdev
[CR8 ] 1 - Send data to remote core, retrieve the echo and validate its
integrity ..
[CM33] creating remoteproc virtio
[CR8 ] Remote proc init.
[XXX] cond signal 1 sync:0
[CM33] initializing rpmsg shared buffer pool
[CM33] initializing rpmsg vdev
[CM33] 1 - Send data to remote core, retrieve the echo and validate its
integrity ..
[CM33] Remote proc init.
[CR8 ] RPMSG endpoint has created. rp ept:0xffffa4c67870
[CR8 ] register sig:2 succeeded.
[CR8 ] register sig:15 succeeded.
[CM33] RPMSG endpoint has created. rp ept:0xffffa5468870
[CR8 ] RPMSG service has created.
[CR8 ] sending payload number 0 of size 17
[XXX] cond signal 0 sync:0
[CM33] RPMSG service has created.
[CM33] sending payload number 0 of size 17
[XXX] cond signal 1 sync:0
[CR8 ] received payload number 0 of size 17
[XXX] cond signal 0 sync:0
[CM33] received payload number 0 of size 17
(snip)
[CR8 ] received payload number 469 of size 486
[CR8 ] sending payload number 470 of size 487
[331] cond signal 1 sync:0
[CR8 ] received payload number 470 of size 487
[CR8 ] sending payload number 471 of size 488
[XXX] cond signal 1 sync:0
[CR8 ] received payload number 471 of size 488
[CR8 ] Test Results: Error count = 0
[XXX] cond signal 1 sync:0
[CM33] Quitting application .. Echo test end
[CM33] Stopping application...
[CR8 ] Quitting application .. Echo test end
[CR8 ] Stopping application...
```



5. CA55 1.8GHz configuration support at CA55 cold boot mode

This chapter describes how to configure 1.8GHz as operational frequence of CA55 at CA55 cold boot.

5.1 Setup of CA55 related stuff

1. Uncomment the following lines in meta-rz-features/meta-rz-multi-os/meta-rzv2h/conf/layer.conf

```
#MACHINE_FEATURES_append = " RZV2H_CM33_BOOT"
#MACHINE_FEATURES_append = " SRAM_REGION_ACCESS"
MACHINE_FEATURES_append = " CM33_FIRMWARE_LOAD"
MACHINE_FEATURES_append = " CA55_CPU_CLOCKUP"
```

Be sure NOT to uncomment the 1st line for CM33 cold boot support.

2. Rebuild TrustedFirmware-A as shown below:

```
MACHINE=rzv2h-evk-ver1 bitbake trusted-firmware-a -c cleansstate
MACHINE=rzv2h-evk-ver1 bitbake firmware-pack -c cleansstate
MACHINE=rzv2h-evk-ver1 bitbake core-image-weston
```

3. Deploy build artifacts to SD card by following <u>Renesas RZ/V AI | The best solution for starting your AI applications.</u>

5.2 Setup of CM33 related stuff

- 1. Import or create RZ/V FSP project for CM33.
- 2. Open **configurator.xml** in the project and choose **BSP** tab.
- Configure Clock up for CA55 properties as Enable. Also, enabled Launch CA55(core0) if you would like to configure operational at CM33 cold boot mode.
- 4. Click Generate Project Content to reflect the changes to your project.



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V2H Evaluation Kit ings Property V R9A09G057H44GBG part_number rom_size_bytes	Browser Console	Summary BSP	Clocks Pins Interrupts Event Links	Value R9A09G057H44 0 131072	J. J.	1 8
V2H Evaluation Kit Property V R9A09G057H44GBG part_number rom_size_bytes ram_size_bytes package_style	Browser Console	Summary BSP	Clocks Pins Interrupts Event Links	Value R9A09G057H44 0 131072 LFBGA	J. J.	8
V2H Evaluation Kit Property V R9A09G057H44GBG part_number rom_size_bytes ram_size_bytes package_style package_pins		Summary BSP	Clocks Pins Interrupts Event Links	Value R9A09G057H44 0 131072 LFBGA	J. J.	1 8
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V2H Evaluation Kit Property * R9A09G057H44GBG part_number rom_size_bytes ram_size_bytes package_style package_pins * RZ Common Secure stack size (bytes) Main stack size (bytes) MGU Vcc (mV) Parameter checking Assert failures Error Log PFS Protect C Runtime Initialization Early BSP Initialization * RZV2H series Launch CA55(core0))	Summary BSP	Clocks Pins Interrupts Event Links	Value R9A09G057H44 0 131072 LFBGA 1368 0x1000 0x1000 0x4000 3300 Disabled Return FSP_ERR No Error Log Enabled Enabled Enabled Enabled Disabled	IGBG	
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Figure 5-1. CM33 project setting for CA55 1.8GHz support (CA55 coldboot)

6. Build the project from **<u>Project</u> > Build Project**.



🗐 2025-01 - ca55_clockup_support/configuration.xml - e [‡] studio <u>File E</u> dit <u>N</u> avigate Se <u>a</u> rch <u>P</u> roject Renesas <u>V</u> iews <u>R</u> un <u>W</u> indow <u>H</u> elp					
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Figure 5-2. Build CM33 project for CA55 1.8GHz support

5.3 Deployment of Build Artifacts to RZ/V2H EVK

This section describes the procedure to program the build artifacts to RZ/V2H EVK.



- 1. Connect CN12 of RZ/V2H EVK with Host PC and established serial port connection.
- Configure DSW1-4 and DSW1-5 of RZ/V2H EVK as OFF and ON respectively to specify boot mode as SCIF download mode.
- 3. Turn on RZ/V2H EVK. Then, the following message is shown on your terminal:

💆 COM9 - Tera Term VT		×	
<u>F</u> ile <u>E</u> dit <u>S</u> etup C <u>o</u> ntrol <u>W</u> indow <u>H</u> elp			
- SCI Download mode (Normal SCI boot) Load Program to SRAM		^	
Load Program to SKAM			
		\checkmark	

Figure 5-3. SCIF Download mode

4. Send **Flash_Writer_SCIF_RZV2H_DEV_INTERNAL_MEMORY.mot** to RZ/V2H EVK via terminal software. If it's successfully transferred, the following message is shown on your terminal:

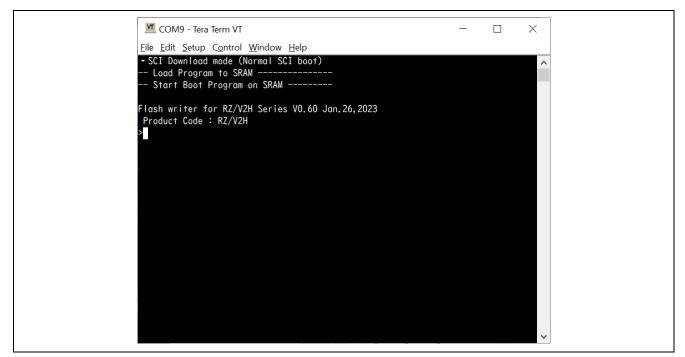


Figure 5-4. Flash Writer invocation

5. Program **bl2_bp_spi-rzv2h-evk-ver1.srec** with Flash Writer as shown below:



xls2 ===== Qspi writing of RZ/G2 Board Command ============= Load Program to Spiflash Writes to any of SPI address. Program size & Qspi Save Address ===== Please Input Program Top Address ========== Please Input : H'8101E00 ===== Please Input Qspi Save Address === Please Input : H'00000 please send ! ('.' & CR stop load) Erase SPI Flash memory... Erase Completed Write to SPI Flash memory. SpiFlashMemory Stat Address : H'00000000 SpiFlashMemory End Address : H'00037E57 _____

6. Program fip-rzv2h-evk-ver1.srec with Flash Writer as shown below:

xls2 ===== Qspi writing of RZ/G2 Board Command ============= Load Program to Spiflash Writes to any of SPI address. Program size & Qspi Save Address ===== Please Input Program Top Address ========== Please Input : H'00000 ===== Please Input Qspi Save Address === Please Input : H'60000 please send ! ('.' & CR stop load) Erase SPI Flash memory... Erase Completed Write to SPI Flash memory. SpiFlashMemory Stat Address : H'00060000 SpiFlashMemory End Address : H'0011C2BE _____



7. Program CM33 FW (S-record formatted one) with Flash Writer as shown below:

```
xls2
===== Qspi writing of RZ/G2 Board Command =============
Load Program to Spiflash
Writes to any of SPI address.
Program size & Qspi Save Address
===== Please Input Program Top Address ==========
 Please Input : H'00000
===== Please Input Qspi Save Address ===
 Please Input : H'202000
please send ! ('.' & CR stop load)
Erase SPI Flash memory...
Erase Completed
Write to SPI Flash memory.
SpiFlashMemory Stat Address : H'00202000
SpiFlashMemory End Address : H'002071F2
_____
```

6. CM33 cold boot support

This chapter describes how CA55 and CM33 related stuff should be built for CM33 cold boot.

6.1 Setup of CA55 related stuff

1. Uncomment the following lines in meta-rz-features/meta-rz-multi-os/meta-rzv2h/conf/layer.conf.

```
MACHINE_FEATURES_append = " RZV2H_CM33_BOOT"
#MACHINE_FEATURES_append = " SRAM_REGION_ACCESS"
#MACHINE_FEATURES_append = " CM33_FIRMWARE_LOAD"
#MACHINE_FEATURES_append = " CA55_CPU_CLOCKUP"
```

Be sure NOT to uncomment the above-mentioned 3rd and 4th line when CM33 cold boot support is enabled.

2. Rebuild TrustedFirmware-A as shown below:

```
MACHINE=rzv2h-evk-ver1 bitbake trusted-firmware-a -c cleansstate
MACHINE=rzv2h-evk-ver1 bitbake firmware-pack -c cleansstate
MACHINE=rzv2h-evk-ver1 bitbake core-image-weston
```

3. Deploy build artifacts to SD card by following <u>Renesas RZ/V AI | The best solution for starting your AI applications.</u>

6.2 Deployment of CA55 Build Artifacts to RZ/V2H EVK

This section describes how to deploy CA55 Build Artifacts to RZ/V2H EVK. First, please carry out the same procedure as 1 to 4 stated in **5.3 Deployment of Build Artifacts to RZ/V2H EVK**. Then, follow the steps stated below:

1. Program bl2_bp_spi-rzv2h-evk-ver1.srec with Flash Writer as shown below:



```
RZ/V2H
```

```
xls2
Load Program to Spiflash
Writes to any of SPI address.
Program size & Qspi Save Address
===== Please Input Program Top Address ==========
 Please Input : H'8101E00
===== Please Input Qspi Save Address ===
 Please Input : H'100000
please send ! ('.' & CR stop load)
Erase SPI Flash memory...
Erase Completed
Write to SPI Flash memory.
SpiFlashMemory Stat Address : H'00100000
SpiFlashMemory End Address : H'00136D17
_____
                             _____
```

2. Program fip-rzv2h-evk-ver1.srec with Flash Writer as shown below:

```
xls2
===== Qspi writing of RZ/G2 Board Command =========
Load Program to Spiflash
Writes to any of SPI address.
Program size & Qspi Save Address
===== Please Input Program Top Address ==========
 Please Input : H'00000
===== Please Input Qspi Save Address ===
 Please Input : H'280000
please send ! ('.' & CR stop load)
Erase SPI Flash memory...
Erase Completed
Write to SPI Flash memory.
SpiFlashMemory Stat Address : H'00280000
SpiFlashMemory End Address : H'0033C2BE
_____
```

6.3 Setup of CM33 related stuff

- 1. Import or create RZ/V FSP project for CM33.
- 2. Open configurator.xml in the project and choose BSP tab.
- 3. Configure Launch CA55(core0) as Enabled. Also, enabled Clock up for CA55 if you would like to configure operational frequency of CA55 as 1.8GHz.
- 4. Click Generate Project Content to reflect the changes to your project.



RZ/V2H

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	> 😓 rzv_dg				
> >> cript		Board:	RZ/V2H Evaluation Kit 🗸 🚵	1	
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/V2H	Evaluation Kit Property V R9A096057H4468G part_number rom_size_bytes		Value R9A09 0	IG057H44GBG	
/V2H	Evaluation Kit Property V R9A096057H446B6 part_number rom_size_bytes ram_size_bytes		Value R9A09 0 13107	1G057H44GBG 2	
/V2H	Evaluation Kit Property V R9A096057H446866 part_number rom_size_bytes package_style		Value R9A09 0	1G057H44GBG 2	
Z/V2H	Evaluation Kit Property V R9A096057H446B6 part_number rom_size_bytes ram_size_bytes		Value R9A00 0 13107 LF8G/	1G057H44GBG 2	
V2H	Evaluation Kit Property V R9A096057H446B6G part_number rom_size_bytes ram_size_bytes package_style package_pins V RZ Common Secure stack size (bytes)		Value R9A09 0 13107 LFRGJ 1368 0x100	1G057H44GBG 2 4	
V2H	Evaluation Kit Property < R9A096057H44686G part_number rom_size_bytes ram_size_bytes package_style package_style package_topins < R2 Common Secure stack size (bytes) Main stack size (bytes)		Value R9A05 0 13107 LF8GJ 1368 0x100 0x100	KG057H44GBG 2 4 0 0	
Z/V2H	Evaluation Kit Property R9A096057H44686 part_number rom_size_bytes ram_size_bytes package_style package_style package_pins RZ Common Secure stack size (bytes) Main stack size (bytes) Heap size (bytes)		Value R9A00 0 13107 LF86J 1368 0×100 0×100 0×100 0×400	KG057H44GBG 2 4 0 0	
	Evaluation Kit Property > R9096057H4468G part_number rom_size_bytes ram_size_bytes package_style package_pins > RZ Common Secure stack size (bytes) Main stack size (bytes) Heap size (bytes) MCU Vec (mV)		Value R9A09 0 13107 LF86 1368 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0×100 0 0 0	IG057H44GBG 2 4 0 0 0	
V2H	Evaluation Kit Property		Value R9A09 0 13107 LFBGJ 1368 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x000 0x00 0x00 0x00 0x00 0x100 0x000 0x000 0x000 0x000 0x000 0x0	1G057H44GBG 2 4 0 0 0	
V2H	Evaluation Kit Property > R9096057H4468G part_number rom_size_bytes ram_size_bytes package_style package_pins > RZ Common Secure stack size (bytes) Main stack size (bytes) Heap size (bytes) MCU Vec (mV)		Value R9A03 0 13107 LF8G 1368 0x100 0x100 0x100 0x400 3300 Disabl Return	IG057H44GBG 2 4 0 0 0	
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/V2H	Evaluation Kit Property R9A096057H44686 padt_number rom_size_bytes ram_size_bytes package_sityle package_pins RZ Common Secure stack size (bytes) Main stack size (bytes) Meap size (bytes) MGU Vec (mV) Parameter checking Assert Failures Error Log		Value R9A09 0 13107 LF8G4 1368 0x100 0x100 0x400 3300 Disabl Retur No En	IG057H44GBG 2 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
/V2H	Evaluation Kit Property R9A096057H44686 part_number rom_size_bytes ram_size_bytes package_style package_style package_pins RZ Common Secure stack size (bytes) Main stack size (bytes) MCU Vcc (mV) Parameter checking Assert Failures Error Log PFS Protect C Runtime Initialization Early BSP Initialization Early BSP Initialization		Value R9A09 0 13107 LF8GJ 1368 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x100 0x000 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00	IGOS7H44GBG 2 A 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
/V2H	Evaluation Kit Property R9A096057H44686 part_number rom_size_bytes ram_size_bytes package_style package_pins RZ Common Secure stack size (bytes) Main stack size (bytes) Mean size (bytes) MCU Vcc (mV) Parameter checking Assert Failures Error Log PFS Protect C Runtime Initialization Early BSP Initialization v RZV2H		Value R9A09 0 13107 LF86J 1368 0x100 0x100 0x400 3300 Disabl Enabl Disabl	IGOS7H44GBG 2 A 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
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/V2H	Evaluation Kit Property R9A096057H44686 part_number rom_size_bytes ram_size_bytes package_sityle package_pins RZ Common Secure stack size (bytes) Main stack size (bytes) Mein stack size (bytes) MCU Vcc (mV) Parameter checking Assert Failures Error Log PFS Protect C Runtime Initialization Early BSP Initialization Ration Secure secure Launch CA55(core0)		Value RSA00 0 13107 LF8G 1368 0x100 0x100 0x100 0x400 3300 Disabi Return No Er Enabl Disabi Enabl Disabi	IGOS7H44GBG 2 4 0 0 0 0 1 6 0 1 5SP_ERR_ASSERTION 1 6 0 1 1 5 5 9 ERR_ASSERTION 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
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Figure 5-5. CM33 project setting for CM33 cold boot

- 5. Build the project from **<u>Project</u> > Build Project**.
- 6. Click **Run > Debug Configurations...**, expand **Renesas GDB Hardware Debugging** and choose project name> Debug_Flat.

🕲 • 🔦 • 🕲 🕸 • 🂁 •		Renesas Debug Tools	>	Create, manage, and run configurations
roject Explorer 🗙	0	Run	Ctrl+F11	
😸 caS5_clockup_support [Debug]	卷	Debug	F11	
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> 🧀 rzv_cfg	栫	Debug As	>	C GDB Hardware Debugging
> 🥟 script		Debug Configurations		GDB Simulator Debugging (RH850)
Ca55_clockup_support Debug_Flat.launch	-	F		🕞 Launch Group
configuration.xml	4	External Tools	,	✓ C [™] Renesas GDB Hardware Debugging

Figure 5-6. Debug Configuration Launch



7. Choose **Debugger > Connection Settings** and specify **Yes** to **Reset after download**.

Image: Provide the second state of	Name: ca55_clockup_support Debug_Flat Main ** Debugger Startup Common * Debug hardware: -Link ARM Target Device: F GDB Settings Connection Settings Debug Tool Set J-Link Serial Settings File Settings File Log File Log File Log File Log File Log File Log File	R9A09G057H44GBG tings USB (Auto) \${workspace_loc:/\${ProjName}}/\${LaunchConfigName},jiink 		
C C/C++ Application C C/C++ Remote Application EASE Script G GDB Hardware Debugging G GDB Simulator Debugging (RH850) Launch Group C Reness GDB Hardware Debugging C ca55_clockup_support Debug_Flat	Debug hardware: J-Link ARM V Target Device: F GDB Settings Connection Settings Debug Tool Set J-Link Type J-Link Serial Settings File Script File Log File	R9A09G057H44GBG tings USB (Auto) \${workspace_loc:/\${ProjName}}/\${LaunchConfigName},jiink 		
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C [®] ca55_clockup_support Debug_Flat	Settings File Script File Log File	\${workspace_loc:/\${ProjName}}/\${LaunchConfigName}.jlink		
Renesas Simulator Debugging (RX, RL78)	Script File Log File			
	Log File			
		\${workspace_loc:/\${ProjName}}/JLinkLog.log		
		No		
	✓ IP Connection			
	Connection Method	IP via LAN		
	Host Name/IP Address[:port number]			
	Identifier			
	Tunnel Server			
	Port Number			
	Password			
	✓ Interface			
	Туре	SWD	·	
	Speed (kHz)	15000		
	✓ JTAG Scan Chain			
	Multiple Devices	No		
	IRPre	0		
	DRPre	U		
	✓ Connection	No		
	Register initialization Reset at the beginning of connection	No Ves V		
	Reset at the end of connection	No		
	Reset before download	No		
	Reset after download	Yes		
	ID Code (Bytes)	FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF		
	Hold reset during connect	No		
	Set CPSR(5bit) after download	No		
	Prevent Releasing the Reset of the CM3 Core	Yes		
	Secure Vector Address	&_Secure_Vectors		
	Non-secure Vector Address			
	Hot Plug	No		
	Disconnection Mode	Continue	· •	
	L			
		Revert App	h	

Figure 5-7. Connection Settings

8. Choose Startup and change the Load type of Program Binary to Symbols only.

 Debug Configurations Create, manage, and run configurations 	
Image: Solution of the second seco	Name: Ca55_clockup_support Debug_Flat Main Debugger Startup Initialization Commands Common Reset and Delay (seconds): 3 Halt Load image and symbols
	Filename Load type Offset (hex) On connect Program Binary [ca55 Symbols only Yes

Figure 5-8. Startup Settings (1)



9. Click Add... > Workspace..., choose <project name>.srec and click OK.

								Add downlo	oad module				×
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Load image an	d sumbols							> 🗁 n					
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	Initialization Co	i symbols		Source Offset (hex)	On connect			Add downlo Specify downlo Steve Lo	nemory_regions.ld)bjects.mk ad module ad module name: pc:\ca55_clockup_sup	oport\Debug\		Aug. 14	
	Initialization Co Reset and D Halt Load image and Filename	i symbols	3 Load type		On connect Yes			Add downlo Specify downlo Steve Lo	nemory_regions.ld)bjects.mk ad module ad module name: pc:\ca55_clockup_sup	oport\Debug\		Aug. 14	tem.

Figure 5-8. Startup Settings (2)

10. Click **Debug** to launch Debug Perspective. Note that DSW1-1, 4, 5 and 7 of RZ/V2H EVK should be specified as OFF, OFF, OFF and ON, respectively before the launch. Then, CM33 program starts, loads CA55 build artifacts from QSPI Flash ROM and kick CA55.

For details on CM33 program invocation with e2studio, please see <u>Getting Started with RZ/V Flexible</u> <u>Software Package</u>.

7. Reference Documents

- R01AN6240 RZ/V2L, RZ/V2H, RZ/V2N Getting Started with Flexible Software Package
- R12UZ0147 RZ/V2H Evaluation Board Kit (Secure type) Hardware Manual



Revision History

		Description			
Rev.	Date	Page	Summary		
3.00	Mar.11.2025	-	Extract RZ/V2H related description from Release Note of RZ/V Multi-OS Package v2.1.0.		
3.10	May.22.2025	-	Updated in align with RZ/V2H AI SDK v5.2.0.		
3.11	Jun.13.2025	-	Update Multi-OS Package version to 3.1.1.		



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 is supplied until the 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 systemevaluation test for the given product.

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