RZ/Five Board Support Package
Version 1.0

R01US0561EJ0100
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Release Note

Introduction

This release note describes the contents, building procedures and important points of the RZ/Five Board Support Package (hereinafter referred to as "BSP").

Contents

1.   Release Items

- **Name and version**
  RZ/Five Board Support Package
  Version 1.0 (hereinafter referred to as "BSP v1.0")

- **Distribution method**
  Please visit the site below and create an account to download the packages. Basic packages of BSP v1.0 which are listed in **Table 1** can be downloaded.

  RZ/Five:
  https://www.renesas.com/us/en/products/microcontrollers-microprocessors/rz-mpus/rzfive-risc-v-general-purpose-microprocessors-risc-v-cpu-core-andes-ax45mp-single-10-ghz-2ch-gigabit-ethernet

- **Target board**
  RZ/Five reference board

    - RZ/Five Evaluation board Kit (smarc-rzfive) (*)
        o RZ/Five SMARC Module Board (P/N: RTK9743F01C01000BE)
        o RZ SMARC Series Carrier Board (P/N: RTK97X4XXXB00000BE)

  (*)   "RZ/Five Evaluation board Kit" includes the RZ/Five SMARC Module Board and the RZ SMARC Series Carrier Board.
        The "Evaluation board Kit for RZ/Five MPU" will be called "RZ/Five Evaluation Kit" in the next section.

- **Functions**
  Linux BSP
    -   Linux Kernel
    -   Linux Drivers

- **File contents**
  BSP is delivered by the files listed in **Table 1**.

Table 1. RZ/Five Board Support Package

Basic packages

File	Description
RTK0EF0126Z0000AZJ-v1.0.zip	RZ/Five Board Support Package. This file includes the **Yocto recipe packages** and the necessary documents.
rzfive_bsp_v1.0.tar.gz	**Yocto recipe packages**
r01us0561ej0100-rz-five.pdf	This document
r01us0562ej0100-rz-five.pdf	Component list
r01us0556ej0100-rz-g.pdf	Documents describing booting method and the required settings of bootloader for RZ/G2L, RZ/G2LC, RZ/G2UL, and **RZ/Five**.

2. Build environment

The environment for building the BSP is listed in Table 2. Please refer to the below documents for details about setting up the environment:

SMARC EVK of RZ/G2L, RZ/G2LC, RZ/G2UL, RZ/V2L, and RZ/Five Start-up Guide

A Linux PC is required for building the software.

A Windows PC can be used as the serial terminal interface with software such as TeraTerm.

Table 2. Equipment and Software Necessary for Developing Environments of RZ/Five Linux Platform

Equipment		Description
Linux Host PC		Used as build/debug environment 100GB free space on HDD is necessary
	OS	Ubuntu 20.04 LTS 64 bit OS must be used.
Windows Host PC		Used as debug environment, controlling with terminal software
	OS	Windows 10
	Terminal software	Used for controling serial console of the target board Tera Term (latest version) is recommended Available at https://ttssh2.osdn.jp/index.html.en
	VCP Driver	Virtual COM Port driver which enables to communicate Windows Host PC and the target board via USB which is virtually used as serial port. Available at: • http://www.ftdichip.com/Drivers/VCP.htm

3. Building Instructions of a BSP

3.1 Building images to run on the board

This section describes the instructions to build the Board Support Package (hereinafter referred to as "BSP"). Before starting the build, run the command below on the Linux Host PC to install packages used for building the BSP.

```
$ sudo apt-get update
$ sudo apt-get install gawk wget git-core diffstat unzip texinfo gcc-multilib \
build-essential chrpath socat cpio python python3 python3-pip python3-pexpect \
xz-utils debianutils iputils-ping libsdl1.2-dev xterm p7zip-full
```

Please refer to the URL below for detailed information:

- https://docs.yoctoproject.org/3.1.5/brief-yoctoprojectqs/brief-yoctoprojectqs.html

Run the commands below and set the user name and email address before starting the build procedure. **Without this setting, an error occurs when building procedure runs git command to apply patches.**

```
$ git config --global user.email "you@example.com"
$ git config --global user.name "Your Name"
```

Copy all files obtained from Renesas into your home directory prior to the steps below.

(1) Create a working directory at your home directory, and decompress Yocto recipe package

Run the commands below. The name and the place of the working directory can be changed as necessary. Copy the compressed Yocto recipe package file (rzfive_bsp_v1.0.tar.gz) into your home directory prior to this step.

```
$ mkdir ~/rzfive_bsp_v1.0
$ cd ~/rzfive_bsp_v1.0
$ unzip ~/RTK0EF0126Z0000AZJ-v1.0.zip
$ tar zxvf ./RTK0EF0126Z0000AZJ-v1.0/rzfive_bsp_v1.0.tar.gz
```

Note)   If you want to use the Smart Configurator for RZ/Five, please refer to the 6. Note (1) and apply a patch.

(2) Setup a build environment

Run the commands below. The environment to build is set by the source command.

```
$ cd ~/rzfive_bsp_v1.0
$ source openembedded-core/oe-init-build-env
```

(3) Prepare the default configuration files for the target board

Run the commands below.

```
$ cd ~/rzfive_bsp_v1.0/build
$ cp ../meta-rzfive/docs/template/conf/smarc-rzfive/*.conf  ./conf/
```

(4) Start a build

Run the commands below to start a build. Building an image can take up to a few hours depending on the user's host system performance.

```
$ bitbake core-image-minimal
```

After the build is successfully completed, a similar output will be seen, and the command prompt will return.

```
NOTE: Tasks Summary: Attempted 7427 tasks of which 16 didn't need to be rerun and al
l succeeded.
```

All necessary files listed in **Table 3** will be generated by the bitbake command and will be located in the **build/tmp-glibc/deploy/images** directory.

Table 3. Image files for RZ/Five

RZ/Five	Linux kernel	Image-smarc-rzfive.bin
	Device tree file	Image-r9a07g043f01-smarc.dtb
	root filesystem	core-image-minimal-smarc-rzfive.tar.bz2
	Boot loader	• fit-smarc-rzfive.srec
		• spl-smarc-rzfive.srec
	Flash Writer	Flash_Writer_SCIF_RZFIVE_SMARC.mot

3.2   Building SDK

To build Software Development Kit (SDK), run the commands below after the steps (1) – (4) of section **3.1** are finished.

The SDK allows you to build custom applications outside of the Yocto environment, even on a completely different PC. The results of the commands below are 'installer' that you will use to install the SDK on the same PC, or a completely different PC.

For building general applications:

```
$ cd ~/rzfive_bsp_v1.0/build
$ bitbake core-image-minimal -c populate_sdk
```

The resulting SDK installer will be located in **build/tmp-glibc/deploy/sdk/**

The SDK installer will have the extension .sh
To run the installer, you would execute the following command:

```
$ sudo sh oecore-x86_64-riscv64-toolchain-nodistro.0.sh
```

4. Components

The components which are commonly used in this release are listed in Table 4. Please also refer to the "Component list" for details.

Table 4. Versions of commonly used components

Components	BSP v1.0
Linux kernel	5.10.83-cip1
GCC	8.3.0 (Arm GCC 8.3-2019.03)
glibc	2.28
busybox	1.31.1
openssl	1.1.1d

5. Restrictions

(1) U-Boot

Ethernet function cannot work properly, so TFTP commands to load kernel from ethernet interface cannot be used in this release.

(2) USB Kernel module

Some USB Function kernel modules (libcomposite.ko...etc) are failed to be loaded with the "insmod" command, so USB functions are not fully tested.

6. Note

(1) Smart Configurator

When you use the Smart Configurator for RZ/Five, please run the commands below to apply the patch file after the step (1) in the section 3.1.

```
$ cd ~/rzg_vlp_v3.0.0/meta-rzfive
$ patch -p1 < ../extra/0001-SmartConfigurator-support.patch
```

Website and Support

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

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

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