RZ/V2L Linux Package V1.0.1

Release Note

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Introduction

This release note describes the contents, building procedures and important points of the RZ/V2L Linux Package.

Target Device

RZ/V2L Group

Contents

1. Release Items

- **Name and version**
  RZ/V2L Linux Package
  Version 1.0.1

- **Distribution Method**
  Please visit the site below and create an account to download the packages. Basic packages of Linux Package v1.0.1 which are listed in **Table 1** can be downloaded.

  RZ/V2L product page:
  http:/www.renesas.com/RZV2L

  RZ/V2L Linux Package:
  https://www.renesas.com/products/microcontrollers-microprocessors/rz-arm-based-high-end-32-64-bit-mpus/rzv2l-linux-package

- **Target board**
  RZ/V2L Evaluation Board Kit PMIC version (*):
  - RZV2L SMARC Module Board v2.1
  - RZ SMARC Series Carrier Board v4.0

(*) "RZ/V2L Evaluation Board Kit PMIC version" include the RZV2L SMARC Module Board and the RZ SMARC Series Carrier Board.
The CMOS sensor (OV5645) in the Coral camera is no longer available and should not be used for mass production. Any software support provided is for evaluation purposes only.

- **Functions**
  Linux Package
  - Linux Kernel (rzv2l-cip41)
  - Device Drivers

- **File contents**
  Linux Package Version 1.0.1 includes the files listed in **Table 1**.

Table 1. RZ/V2L Linux Package

Basic packages

File	Description
rzv2l_bsp_v101.tar.gz	Yocto recipe packages
r01an6318ej0100-rzv2l-linux.pdf	This document
r01an6319ej0100-rzv2l-linux-component-list.pdf	Component list
r01tu0338ej0105-rz-g.pdf	Documents describing booting method and the required settings of bootloader
RTK0EF0045Z13001ZJ-v0.8_JP.zip RTK0EF0045Z13001ZJ-v0.8_EN.zip	RZ/G2L and RZ/V2L Mali Graphic Library Evaluation Version V0.8. This is the graphic package which corresponds to RZ/V2L Linux Package V1.0.1.
RTK0EF0045Z15001ZJ-v0.53_JP.zip RTK0EF0045Z15001ZJ-v0.53_EN.zip	RZ/G2L and RZ/V2L Codec Library Evaluation Version V0.53. This is the codec package which corresponds to RZ/V2L Linux Package V1.0.1.

Linux Package is provided "AS IS" with no warranty and the license which is described in the source code. Please check the contents of the license, then consider the applicability to the product carefully.

2. Build environment

Figure 1 shows the recommended environment of Linux Package. This environment uses the equipment and the software listed in **Table 2**.

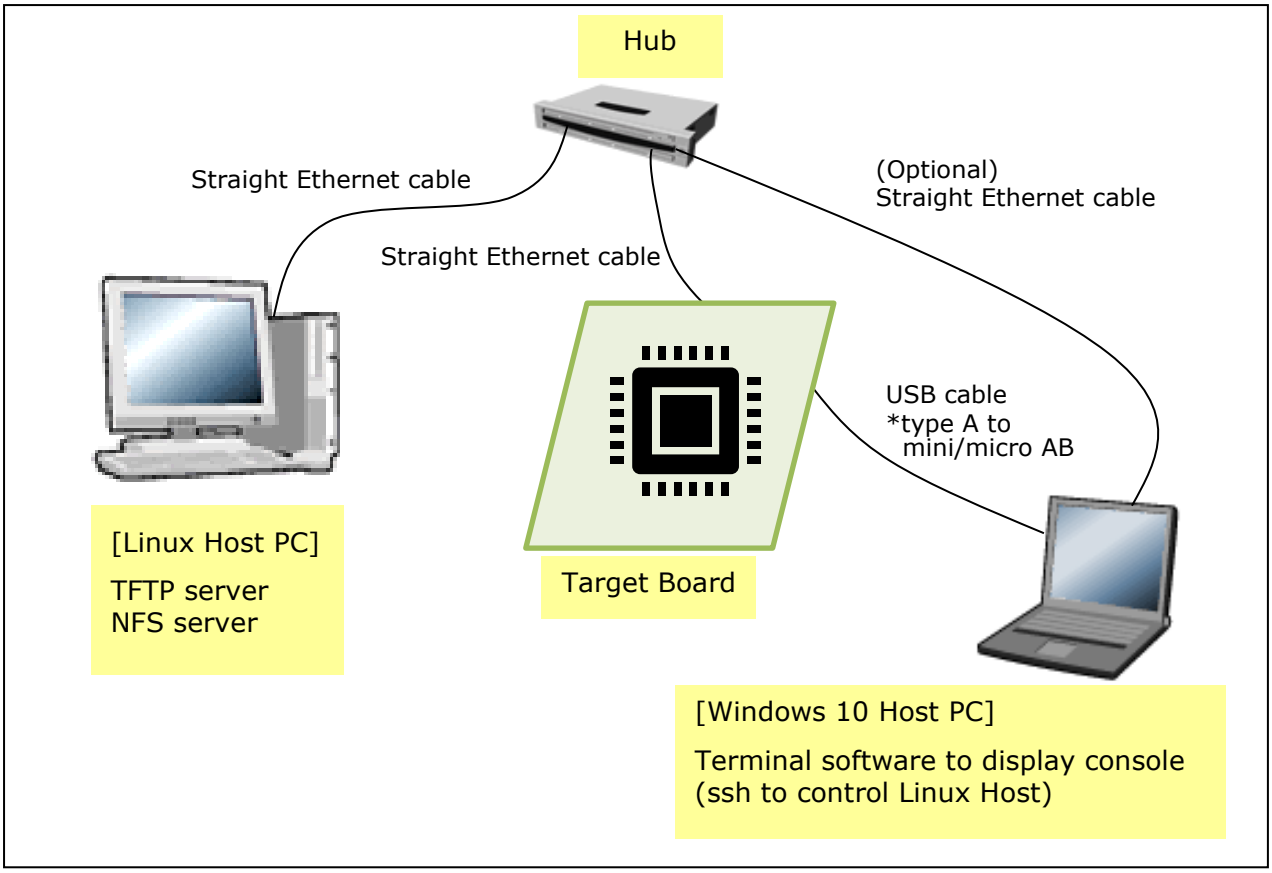


Figure 1. Recommended Environment

Table 2. Equipment and Software Necessary for Developing Environments of RZ/V2L Linux Platform

Equipment		Description
Linux Host PC		Used as build/debug environment
	OS	Ubuntu 20.04 LTS (recommended) 64 bit OS must be used.
	NFS server	Used for mounting rootfs via NFS
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 Linux Package

3.1 Building images to run on the board

This section describes the instructions to build the Linux Package. Before starting the build, run the command below on the Linux Host PC to install packages used for building the Linux Package.

```
$ sudo apt-get update
$ sudo apt-get install gawk wget git-core diffstat unzip texinfo gcc-multilib \
build-essential chrpath socat cpio python3 python3-pip python3-pexpect xz-utils \
debianutils iputils-ping python3-git python3-jinja2 libegl1-mesa libsdl1.2-dev pylint3 xterm
```

Please refer to the URL below for detailed information:

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

Run the command**s** 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"
```

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

Run the commands below. Copy the compressed Yocto recipe package files (rzv2l_bsp_v101.tar.gz) into your home directory prior to this step.

```
$ mkdir ~/rzv2l_bsp_v101
$ cd ~/rzv2l_bsp_v101
$ tar zxvf rzv2l_bsp_v101.tar.gz
```

(2) Enable GPU and Video Codec (optional)

The Linux Package can build the 2 types of the images: core-image-weston and core-image-minimal.

If you enable the GPU on RZ/V2L with core-image-weston, please copy the Graphic package (RTK0EF0045Z13001ZJ-v0.8_EN.zip or RTK0EF0045Z13001ZJ-v0.8_JP.zip) to working directory and run the commands below. If you build core-image-minimal, please ignore this step.

```
$ cd ~/rzv2l_bsp_v101
$ unzip RTK0EF0045Z13001ZJ-v0.8_EN.zip
$ tar zxvf RTK0EF0045Z13001ZJ-v0.8_EN/meta-rz-features.tar.gz
```

If you enable the video codec on RZ/V2L with core-image-weston or core-image-minimal, please copy the video codec package (RTK0EF0045Z15001ZJ-v0.53_EN.zip or RTK0EF0045Z15001ZJ-v0.53_JP.zip) to working directory and run the commands below.

```
$ cd ~/rzv2l_bsp_v101
$ unzip RTK0EF0045Z15001ZJ-v0.53_EN.zip
$ tar zxvf RTK0EF0045Z15001ZJ-v0.53_EN/meta-rz-features.tar.gz
```

Note) When you enable both of GPU and video codec, please run all commands above.
Note) The Graphic package and the video codec package are under development. These are released ASIS with no warranty

(3) Setup a build environment

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

```
$ cd ~/rzv2l_bsp_v101
$ source poky/oe-init-build-env
```

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

Run the commands below.

```
$ cd ~/rzv2l_bsp_v101/build
$ cp ../meta-rzv/docs/template/conf/smarc-rzv2l/*.conf ./conf/
```

(5) Start a build

Run the commands below to start a build. Please connect the Linux Host PC to the network when building. Building an image can take up to a few hours depending on the user's host system performance.
The BSP can build the 2 types of images like below. Please refer to the "Component list" for details about components of each image.

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

Or

```
$ bitbake core-image-weston
```

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 all succeeded.
```

All necessary files listed in **Table 3** will be generated by the bitbake command and will be located in the **~/rzv2l_bsp_v101/build/tmp/deploy/images/smarc-rzv2l** directory.

Table 3. Image files

Linux kernel	Image-smarc-rzv2l.bin
Device tree file	r9a07g054l2-smarc.dtb
Root filesystem	*<image name>*-smarc-rzv2l.tar.bz2
Boot loader	bl2_bp-smarc-rzv2l_pmic.srec fip-smarc-rzv2l_pmic.srec
Flash Writer	Flash_Writer_SCIF_RZV2L_SMARC_PMIC_DDR4_2GB_1PCS.mot

<image name> will be the name used in the step (5).

For the booting method and the required settings, please refer to the "RZ/V2L SMARC EVK Start-up Guide".

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 with core-image-minimal:

```
$ cd ~/rzv2l_bsp_v101/build
$ bitbake core-image-minimal -c populate_sdk
```

For building general applications with core-image-weston:

```
$ cd ~/rzv2l_bsp_v101/build
$ bitbake core-image-weston -c populate_sdk
```

The resulting SDK installer will be generated in **~/rzv2l_bsp_v101/build/tmp/deploy/sdk/**

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

For core-image-minimal SDK:

```
$ cd ~/rzv2l_bsp_v101/build/tmp/deploy/sdk
$ sudo sh poky-glibc-x86_64-core-image-minimal-aarch64-smarc-rzv2l-toolchain-3.1.5.sh
```

For core-image-weston SDK:

```
$ cd ~/rzv2l_bsp_v101/build/tmp/deploy/sdk
$ sudo sh poky-glibc-x86_64-core-image-weston-aarch64-smarc-rzv2l-toolchain-3.1.5.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	Linux Package Version 1.0.1
Linux kernel	4.19.165-cip41
GCC	8.3.0 (Arm GCC 8.3-2019.03)
glibc	2.28
busybox	1.31.1
openssl	1.1.1d

5. Restrictions

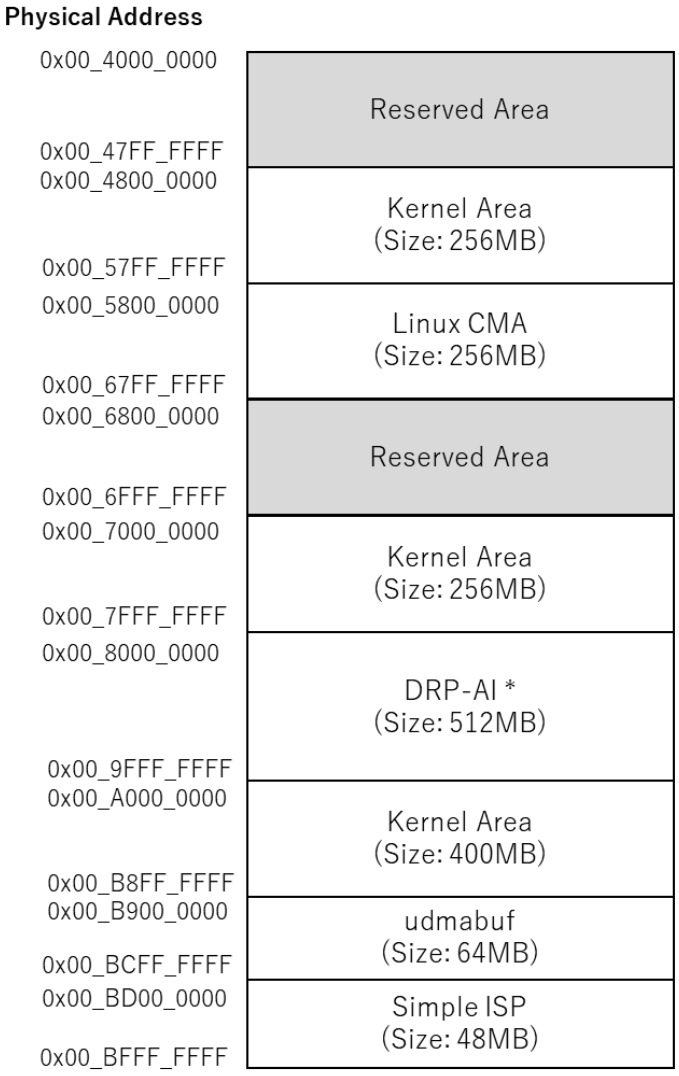
In this release, the below drivers can be used but are not fully tested.

- CPG
- GPIO
- MIPI DSI
- Interrupt Controller
- Direct Memory Access Controller
- MTU3a
- GTM
- WDT
- SPI
- SPI Multi I/O Bus Controller
- I²C
- A/D Converter
- USB
- LCDC

6. Notes

6.1 Memory Map

RZ/V2L SMARC board memory map is shown in Figure 2.



*: The area to store DRP-AI Object files. This area must be set to an address of 8 bytes or less.

Figure 2. Memory map

Website and Support

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

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

Revision History

Rev.	Date	Description	
		Page	Summary
1.01	Apr. 28, 2022	-	First edition issued.

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

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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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