

# RZ/V2M Linux Package

## Version 1.3.0-update1

### Release Note

R01AN5971EJ0131  
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#### Introduction

This release note describes the contents and usage of the RZ/V2M Linux Package.

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## 1. Release items

RZ/V2M Linux Package provides the following items:

- **Name and version**  
RZ/V2M Linux Package version 1.3.0-update1
- **Target board**  
RZ/V2M Evaluation Board Kit
- **File contents**  
This package provides the following file contents listed in Table 1-1.

Note: The contents of this release are the same as the RZ/V2M Linux Package v1.3.0 except for the patch file(0101-improved-uart-response-speed.patch) and this document (r01an5971ej0130-rzv2m-linux.pdf) in red below.

**\*Notice for the RZ/V2M Linux PKG previous version users:**

**For the Linux kernel Image file, use Image-rzv2m.bin from this version. Use "Image-rzv2m.bin" when using the latest bootloader/U-Boot provided in this version. Otherwise, you may not be able to boot the kernel if you try to boot the kernel with the file "Image".**

**Table 1-1. RZ/V2M Linux package file contents**

Contents		File	Explanation
Software	Yocto recipe packages	rzv2m_bsp_eva_v130.tar.gz	The Yocto version is 3.1.14.
Patch	Additional patch file for the yocto recipe packages	0101-improved-uart-response-speed.patch	This patch is for the UART driver to improve the echo back response.  Please refer to 8.Appendix for how to apply this patch.
Option	Flash writer	B2_intSW.bin	Writing loader binaries to the eMMC on the RZ/V2M Evaluation Board Kit via your PC.
Documentation	Release note	r01an5971ej0130-rzv2m-linux.pdf	This document.
	Software manual	r01us0512ej0130-rzv2m-linux-software-manual.pdf	Software manual for the RZ/V2M Linux system. English and Japanese version are available.
		r01us0512jj0130-rzv2m-linux-software-manual.pdf	
	Component list	r01tu0360ej0130-rzv2m-linux-component-list.pdf	RZ/V2M Linux package component list. (Hereafter, component list)
	Start-up guide	r01us0527ej0130-rzv2m-linux-startup-guide.pdf	Brief usage instructions for RZ/V2M Linux package. (Hereafter, start-up guide)
	Device driver User's manual	r01us0516ej0130-rzv2m-linux-csi.pdf	Usage of CSI device driver on RZ/V2M.
r01us0517ej0130-rzv2m-linux-gether.pdf		Usage of Gigabit Ether device driver on RZ/V2M.	
r01us0518ej0130-rzv2m-linux-i2c.pdf		Usage of I2C device driver on RZ/V2M.	
r01us0519ej0130-rzv2m-linux-pfc.pdf		Usage of PFC device driver on RZ/V2M.	
	r01us0520ej0130-rzv2m-linux-pwm.pdf	Usage of PWM device driver on RZ/V2M.	

	r01us0521ej0130-rzv2m-linux-sd-emmc.pdf	Usage of SD/eMMC device driver on RZ/V2M.
	r01us0522ej0130-rzv2m-linux-timer.pdf	Usage of Timer device driver on RZ/V2M.
	r01us0523ej0130-rzv2m-linux-uart.pdf	Usage of UART device driver on RZ/V2M.
	r01us0524ej0130-rzv2m-linux-usbh.pdf	Usage of USB Host device driver on RZ/V2M.
	r01us0525ej0130-rzv2m-linux-usbp.pdf	Usage of USB Peripheral device driver on RZ/V2M.
	r01us0526ej0130-rzv2m-linux-wdt.pdf	Usage of Watchdog timer device driver on RZ/V2M.
	r01us0541ej0130-rzv2m-linux-pcie.pdf	Usage of PCI Express device driver on RZ/V2M.

The following package provides separately as an option for the RZ/V2M Linux package. Get them from Renesas website if you require them.

**Table 1-2. Optional package**

Contents	File	Explanation
RZ/V2M Open Source Packages	r01tu0361ej0130-rzv2m_oss_pkg_v130.7z	Use this package to build this BSP offline.

## 2. Components in RZ/V2M Linux Package

RZ/V2M Linux package mainly uses the following components. Refer to the component list for other components and details.

**Table 2-1. Components of RZ/V2M Linux Package**

Software	Version
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

### 3. How to use this package

Refer to the start-up guide to use this Linux package.

The start-up guide gives the following instructions.

- ✓ Building the RZ/V2M Linux package (bitbake)
- ✓ Preparation for use (Board, SD card, and others setting)
- ✓ Boot loader and U-Boot
- ✓ Run on the board
- ✓ Make software development kit (SDK)

**Note:** If you use the previous version RZ/V2M Linux Package, you should rewrite the boot loader and U-Boot to the eMMC. Refer to “RZ/V2M Linux Package Start-Up Guide” for how to write bootloader in detail.

## 4. Application Development Procedure

This chapter explains how to make and run an application for RZ/V2M with this package.

### 4.1 Make Application

Here is an example of how to make an application running on RZ/V2M. The following steps will generate the “Hello World” sample application.

*Note that you must build (bitbake) a core image for the target and prepare SDK before making an application. Refer to the start-up guide on how to make SDK.*

Step 1. Make a work directory for the application.

```
$ mkdir ~/hello_apl
$ cd ~/hello_apl
```

Step 2. Make the following three files (an application file, Makefile, and configure file) in the directory for the application. Here, the application is made by automake and autoconf.

- hello.c

```
#include <stdio.h>

main()
{
    printf("Hello, world!\n");
}
```

- Makefile.am

```
bin_PROGRAMS = hello
hello_SOURCES = hello.c
```

- configure.ac

```
AC_INIT(hello.c)
AM_INIT_AUTOMAKE(hello,0.1)
AC_PROG_CC
AC_PROG_INSTALL
AC_OUTPUT(Makefile)
```

Step 3. Generate the configuration scripts, files needed by GNU coding standards, and the configure files. After that, cross-compile the application.

```
$ aclocal
$ autoconf
$ touch NEWS README AUTHORS ChangeLog
$ automake -a
$ ./configure ${CONFIGURE_FLAGS}
```

Step 4. Make the application by the generated makefile.

```
$ make
```

After making, confirm that the execute application (the sample file name is “hello”) is generated in the hello\_apl folder. Also, this application must be cross-compiled for AArch64.

## 4.2 Store the Sample Application

The sample application could be written by the following procedure.

The application should be stored in the ext3 partition.

```
$ sudo mount /dev/sdb2 /media/  
$ cd /media/usr/bin  
$ sudo cp <hello_application_stored_path>/hello .  
$ sudo chmod +x hello
```

Notes: 1. "sdb2" (above in red) may depend on using system.  
2. <hello\_application\_stored\_path> is an optional directory name to store the application.

## 4.3 Run the Sample Application

Power on the RZ/V2M Evaluation Board Kit and start the system.

After booting, run the sample application with the following command.

```
root@rzv2m:~# hello  
Hello, world!
```

Note: Refer to the start-up guide for the method how to boot the board and system.

## 5. Notes

### 5.1 Memory map

Figure 5-1 shows the DDR memory map in the RZ/V2M.

Note that the memory map for RZ/V2M Linux is set and fixed by U-Boot. Linux should use the area from 0x1\_8000\_0000h to 0x1F\_FFFF\_FFFF.

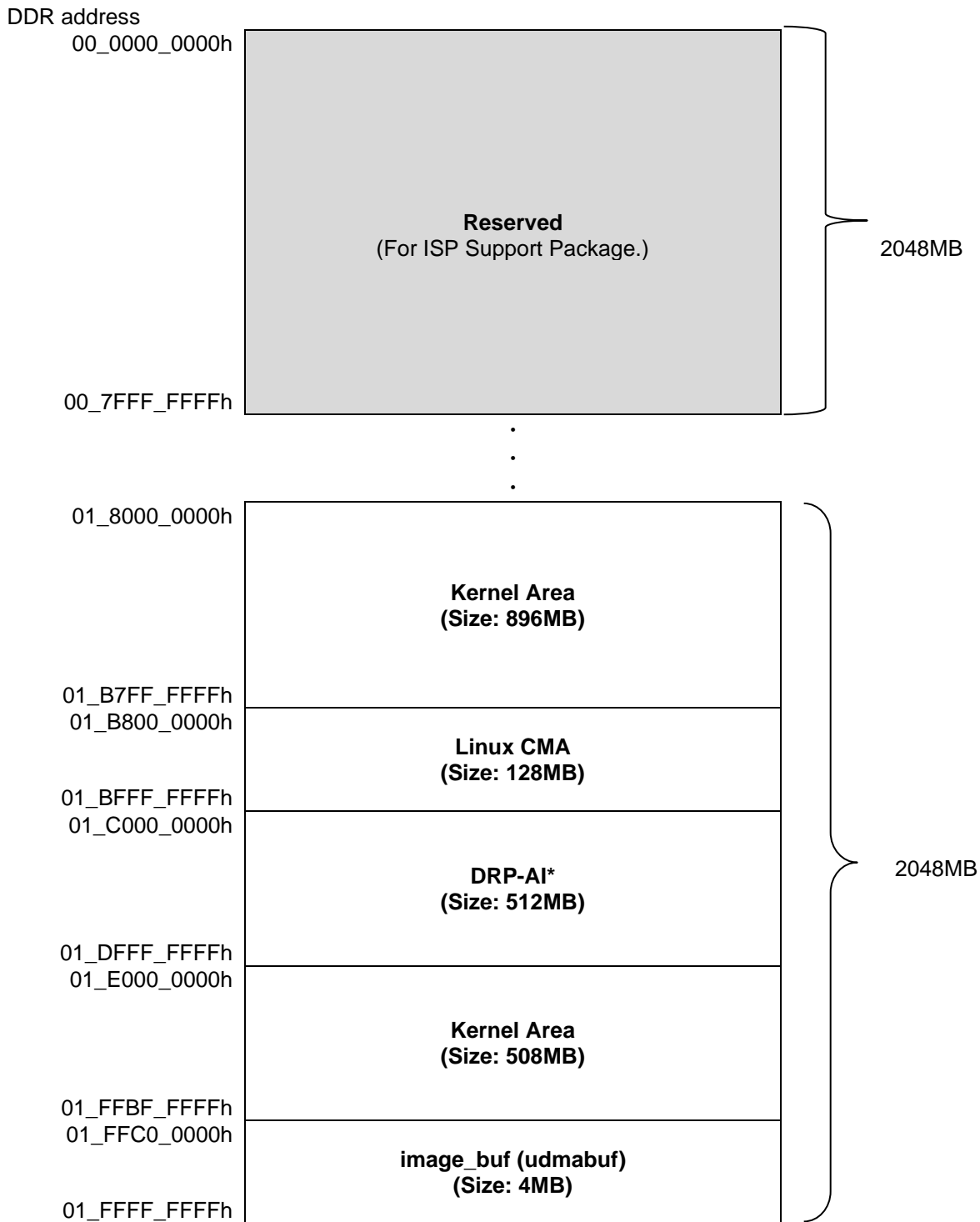


Figure 5-1. Memory map



**Note**

If you use the data (e.g. images) created by RZ/V2M ISP Support Package on a specific IP (\*1), you should copy the data to the Linux area by CPU. When using DRP-AI, you should copy the data and refer to RZ/V2M DRP-AI Sample Application Note about this process. The copy process with the IPs except for DRP-AI will be executed in the system, and you do not need this process own.

\*1: DRP-AI, SD, eMMC, Ethernet, USB, PCI Express

Refer to RZ/V2M User's Manual: Hardware for details.

## 6. Changes

The following table lists the changes from the previous version.

**Table 6-1. Changes**

Item		Details of changes	
		Previous (V1.2.0)	Now (V1.3.0-update1)
Yocto		2.3.4	3.1.14
Linux kernel (Supported yocto version)		4.19.165-cip41	5.10.83-cip1
Build environment (Linux OS)		Ubuntu 18.04 LTS 64bit	Ubuntu 20.04 LTS 64bit
Boot loader	version	V1.20	V1.30
U-Boot	version	2018.09	2021.10
	Shutdown command	Run "rdk_shutdown".	Run "evk_shutdown".
Partition file format for rootfs		ext3	ext4
Shutdown process		<ul style="list-style-type: none"> <li>- Run "rdk_shutdown" when shutdown the system. The Linux "shutdown" command is unavailable.</li> <li>- The command "reboot" is unavailable.</li> </ul>	<ul style="list-style-type: none"> <li>- The Linux "shutdown" command is available.</li> <li>- The Linux "reboot" command is available.</li> </ul>
Device driver	PCI Express	Supported. Need to apply the patches for PCIe additionally when using. <i>* RZ/V2M Evaluation Board Kit does not support PCIe.</i>	Supported. Already included the PCIe driver in the package, so not need to apply the patches for PCIe. <i>* RZ/V2M Evaluation Board Kit does not support PCIe.</i>
	UART		Improved the echo back response.
Package contents		<p>The following items are included in V1.2.0.</p> <ul style="list-style-type: none"> <li>- Binary files (stored in the "bin" directory)</li> <li>- Script file (eMMC_writer_v120.ttl)</li> <li>- Board shutdown application (rdk_shutdown)</li> <li>- r01us0528ej0120-rzv2m-linuxyocto-startup-guide.pdf</li> </ul>	V1.3.0 does not provide the items on the left in the package. These files are no longer updated.

## 7. Restrictions

When booting the RZ/V2M Linux, the following message shows from the USB OTG function. But no influence on the system.

```
xhci-hcd : probe of 85060000.usb failed with error -14
```

## 8. Appendix

### 8.1 Update patch for RZ/V2M Linux Package v1.3.0

Renesas has released the RZ/V2M Linux Package v1.3.0 on October 31, 2022. This patch file "0101-improved-uart-response-speed.patch" provided by this package is released to update RZ/V2M Linux Package v1.3.0 to RZ/V2M Linux Package v1.3.0-update1.

*Note: Copy the update package file (r01an6514ej0111-rzv2ma-linux.zip) obtained from the Renesas website into your home directory prior to the steps below.*

#### 8.1.1 Instructions for use of the patch

Instead of Step 1 in 2. Building Instructions in the RZ/V2M Linux Package Start-Up Guide, follow the steps below.

Step1-1: make a working directory, unzip the package, and decompress the bsp.

```
$ mkdir rzv2m_bsp
$ export WORK=/home/user/rzv2m_bsp
$ cd $WORK
$ unzip ~/r01an5971ej0131-rzv2m-linux.zip
$ tar zxvf ./r01an5971ej0131-rzv2m-linux/bsp/rzv2m_bsp_eva_v130.tar.gz
```

Step1-2: Copy the patch "0101-improved-uart-response-speed.patch" to the following directory.

Directory path: meta-renesas/recipes-rzv2m/recipes-kernel/linux/linux-renesas/patches/rzv2m\_patch/

```
$ cp ./r01an5971ej0131-rzv2m-linux/0101-improved-uart-response-speed.patch $WORK/meta-renesas/recipes-rzv2m/recipes-kernel/linux/linux-renesas/patches/rzv2m_patch/
```

Step1-3: Modify the recipe file. Add the definition for the new patch as below in red.

Target file: meta-renesas/recipes-rzv2m/recipes-kernel/linux/linux-renesas\_5.10.bbappend

[File]

```
SRC_URI_append = " \
file://patches/rzv2m_patch/0000-Makefile-rzv2m.patch \
file://patches/rzv2m_patch/0000-headS-rzv2m.patch \
file://patches/rzv2m_patch/0000-ptrace-rzv2m.patch \
...
file://patches/rzv2m_patch/0101-improved-uart-response-speed.patch \
"
```

After that, follow the Step 2 in 2. Building Instructions in the RZ/V2M Linux Package Start-Up Guide.

**Revision History**

Rev.	Date	Description	
		Page	Summary
1.00	Oct 14, 2022	—	First edition issued.

## 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 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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TOYOSU FORESIA, 3-2-24 Toyosu,  
Koto-ku, Tokyo 135-0061, Japan  
[www.renesas.com](http://www.renesas.com)

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