

RZ/V Verified Linux Package

Version 3.0.6-update4

R01US0565EJ0108
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Release Note

Introduction

This release note describes the contents, building procedures and important points of the RZ/V Verified Linux Package (hereinafter referred to as “VLP/V”).

Please refer to the following documents for building instructions specific to each target device:

- r01us0617ej0103-rz-v(Linux Start-up Guide RZV2L).pdf
- r01us0527ej0141-rz-v(StartUp_Guide_V2M).pdf
- r01us0578ej0121-rz-v(StartUp_Guide_V2MA).pdf

Contents

1. Release Items	2
2. Components	5
3. Changes	6
4. Restrictions	8
5. Notes	9
5.1 Notes	9
5.2 Memory Map	15
5.2.1 RZ/V2L	15
5.2.2 RZ/V2M	16
5.2.3 RZ/V2MA	18
6. Appendix.....	19
7. Revision History	20

1. Release Items

- **Name and version**

RZ/V Verified Linux Package

Version 3.0.6-update4 (hereinafter referred to as “VLP/V v3.0.6-update4”)

- **Distribution method**

Please visit the site below and create an account to download the packages. This site is for the entire RZ Family which includes the RZ/V series. Basic packages of VLP/V v3.0.6-update4 which are listed in Table 2 can be downloaded.

RZ/V2L product page:

<http://www.renesas.com/RZV2L>

RZ/V2M product page:

<http://www.renesas.com/RZV2M>

RZ/V2MA product page:

<http://www.renesas.com/RZV2MA>

RZ/V Verified Linux Package [5.10-CIP]:

<https://www.renesas.com/us/en/software-tool/rzv-verified-linux-package-510-cip>

- **Target board**

-

Table 1. Target board

Device	Evaluation Board
RZ/V2L	RZ/V2L Evaluation Board Kit. This kit includes the below boards: <ul style="list-style-type: none"> - RZ/V2L SMARC Module Board - 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.
RZ/V2M	RZ/V2M Evaluation Board Kit. This kit includes the below boards: <ul style="list-style-type: none"> - RZ/V2M EVK - RZ SMARC Series Carrier Board
RZ/V2MA	RZ/V2MA Evaluation Board Kit. This kit includes the below boards: <ul style="list-style-type: none"> - RZ/V2MA EVK - RZ SMARC Series Carrier Board

- **Build Environment**

Linux Host PC

OS: Ubuntu 20.04 LTS (64 bit OS must be used.)

20.04 inside a docker container also OK.

200GB free space on HDD or SSD is necessary.

- **Verified functions**

Linux BSP

- Linux Kernel
- Linux Drivers
- Graphics Libraries
- Codec Libraries

GUI Framework

- Qt (LGPL version)

- **File contents**

VLP/V is delivered by the files listed in the below table.

Table 2 RZ/V Verified Linux Package

Basic packages

File	Description
RTK0EF0045Z0024AZJ-v3.0.6-update4.zip (*1)	Verified Linux Package. This file includes the Yocto recipe packages and the necessary documents.
rzv_vlp_v3.0.6.tar.gz (*1)	Yocto recipe packages
vlpv306-to-vlpv306update4.patch	Patch file to update VLP/Vv3.0.6 to VLP/Vv3.0.6-update4. See the “5. Notes” section. This file is optional.
r01us0565ej0108-rz-v(Release Note).pdf	This document
r01us0617ej0103-rz-v(Linux Start-up Guide RZV2L).pdf	Documents describing booting method and the required settings of bootloader for RZ/V2L .
r01us0527ej0150-rz-v(StartUp_Guide_V2M).pdf	Documents describing booting method and the required settings of bootloader for RZ/V2M .
r01us0578ej0130-rz-v(StartUp_Guide_V2MA).pdf	Documents describing booting method and the required settings of bootloader for RZ/V2MA .
oss_pkg_rzv_v3.0.6-update4.7z (2.7GB) (1*)	Open source software packages See the Note below before download

(*1) Yocto recipe and Open source software packages are 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.

Note) Open source software packages contain all source codes of OSSs except for Linux kernel. These are the same versions of OSSs used when VLP/V was verified.
If you are just evaluating VLP/V and RZ/V series, open source software packages are not mandatory to use.
 Usually, all the software can be built without using these files if your build machine is connected to the Internet.

Open source software packages are required for an “offline” environment. The word “offline” means an isolated environment which does not connect to any network. VLP/V can always build images in this “offline” environment by using these packages without affected from changes of original repositories of OSSs. Also, this “offline” environment always reproduces the same images as the images which were verified by Renesas. Note that if you build without using open source software packages, there are possibilities to use different source codes than Renesas used due to the implicit changes of the repositories of OSSs.

Optional packages (*1)

File ("XX" is replaced by "EN" or "JP".)	Description
RTK0EF0045Z13001ZJ-v1.2.2_XX.zip (Evaluation version) RTK0EF0045Z14001ZJ-v1.2.2_rzv_XX.zip (Unrestricted version)	RZ MPU Graphics Library for RZ/G2L, RZ/G2LC and RZ/V2L . This provides graphics function compliant with the OpenGL ES standard. These libraries are tested with VLP/V v3.0.6.
RTK0EF0045Z15001ZJ-v1.2.2_XX.zip (Evaluation version) RTK0EF0045Z16001ZJ-v1.2.2_rzv_XX.zip (Unrestricted version)	RZ MPU Video Codec Library for RZ/G2L, RZ/V2L . These libraries are tested with VLP/V v3.0.6.
RTK0EF0045Z89001ZJ-v1.0.1.zip	RZ/V2M Bootloader Packages. This package provides the required recipes for RZ/V2M boot loaders.
RTK0EF0045Z90001ZJ-v1.0.1.zip	RZ/V2MA Bootloader Packages. This package provides the required recipes for RZ/V2MA boot loaders.

(*1) Evaluation vs Unrestricted Version

There are two release versions: Evaluation and Unrestricted. Please note that both of these packages have the same exact functionality. The only difference is that when you execute an application that uses the evaluation version of the libraries, operation will automatically be stopped after a few hours. The unrestricted version does not have this time limitation. To acquire the unrestricted version, please contact Renesas to start the formal process of acquiring those releases.

Additional packages

File	Description
RTK0EF0045Z9006AZJ-v3.0.6.zip	BSP Manual Set for RZ/V2L.
RTK0EF0112Z9000AZJ-v1.4.1.zip	BSP Manual Set for RZ/V2M and RZ/V2MA.

Note) Detailed information regarding the configuration (Device tree) and usage of the device drivers contained in this VLP can be downloaded from Renesas.com. Please download the "BSP Manual Set".

For RZ/V2L

<https://www.renesas.com/document/oth/rzg2l-group-and-rzv2l-group-bsp-manual-set>

For RZ/V2M and RZ/V2MA

<https://www.renesas.com/document/mah/rzv2m-linux-bsp-manual-set>

2. Components

The components which are commonly used in this release are listed in Table 3. Please also refer to the manifest file for details.

Please refer to:

`$WORK/build/tmp/deploy/images/smarc-rzv2l/core-image-<image-name>-smarc-rzv2l.manifest`

Note: [<image-name>](#)

RZ/V2L :minimal, bsp, weston, qt
RZ/V2M,MA :minimal, bsp

Table 3 Versions of commonly used components

Components	VLP/V v3.0.5-update3	VLP/V v3.0.6	VLP/V v3.0.6-update4
Linux kernel	5.10.184-cip36	5.10.201-cip41	5.10.201-cip41
GCC	8.3.0 (Arm GCC 8.3-2019.03)	8.3.0 (Arm GCC 8.3-2019.03)	8.3.0 (Arm GCC 8.3-2019.03)
Glibc	2.28	2.28	2.28
Busybox	1.30.1	1.30.1	1.30.1
openssl	1.1.1n	1.1.1n	1.1.1n
gstreamer1.0	1.16.3	1.16.3	1.16.3
wayland	1.18.0	1.18.0	1.18.0
weston	8.0.0	8.0.0	8.0.0
Python3	3.8.13	3.8.18	3.8.18
Qt (LGPL version)	5.6.3	5.6.3	5.6.3
Docker	19.03.8-ce	19.03.8-ce	19.03.8-ce

3. Changes

This section describes the changes in this release from VLP/V v3.0.6, including new features and defect fixes.

Table 4. Basic Changes from VLP/Vv3.0.5 to VLP/Vv3.0.6

Features	Description
Yocto recipes	<ul style="list-style-type: none"> - Poky: update to dunfell v23.0.31 (previous version is v23.0.26). - meta-openembedded: update to the latest commit. - Correct the typo in the name of the WIC image file for eSD boot. - Apply bug fix for kernel-module-mmngr: fix user memory access error when flushing cache.
Yocto recipes Optee	Remove all source code related Optee from meta-renesas and prepare the Optee recipes (optee-os, optee-client, optee-test) as meta-rz-features/meta-rz-security. If you need Optee and the detail information, check the renesas web site to download the security package including it.
Kernel	Update the kernel version to v5.10.201-cip41 and v5.10.201-cip41-rt17.
MTU3 Driver	Add the bellow features: <ul style="list-style-type: none"> - PWM mode 1 - PWM complementary mode - Counting function - Clock source support (Add timer usage)
USB Function Driver	Fix the drive to use 10 pipes for USBF of RZ/V2L.
Ethernet Driver	Add TX/RX checksum offload support to improve Ethernet performance. TOE (TCP Offload Engine) provides hardware support for calculating IP header and TCP/UDP/ICMP checksums for both IPv4 and IPv6.
SCIF Driver	Use modulation extended mode for baud-rate higher than 115200 to make the clock more precise.
GPIO	Add set_config function for gpio controller to set pin configuration setting such as pull up and pull down.
glibc	Update glibc from v2.28-10+deb10u2 to v2.28-10+deb10u3 because v2.28-10+deb10u2 is removed from the network by the developer. The build fails without this fix.
Audio	The current audio master clock (MCLK) utilizes a fixed frequency of 11.2896 MHz, which is a multiple of the commonly used 44.1 kHz sampling rate. Replace the current fixed clock with the programmable Versa3 clock. This will enable support for both 44.1 kHz sampling rate (using an 11.2896 MHz clock) and 48 kHz sampling rate (using a 12.2880 MHz clock), based on the audio sampling rate required for playback and recording.
RZ MPU Graphics Library (Only RZ/V2L)	Some bug fixes are included.
RZ MPU Graphics Video Codec Library (Only RZ/V2L)	Some bug fixes are included.

Table 5. Basic Changes from VLP/Vv3.0.6 to VLP/Vv3.0.6-update4

Features	Description
Yocto recipes	- RZ/V2M: Update to fix conflict when applying support outside 32-bit memory patch for ethernet.
Kernel	- Fix kernel warnings for some drivers such as edac, spi, eth...
sh_cmt	Address race condition for clock events.
rz-dmac	Fix lockdep assert warning.
SDHI	use GPIO regulator to control VMMC line.
GPIO	Add set_config function for gpio controller to set pin configuration settings such as pull up and pull down.
RIIC	add atomic xfer support.
RZ/V2M CPG	add some RZ/V2M clocks to critical clocks.
glibc	Update glibc from v2.28-10+deb10u3 to v2.28-10+deb10u4 because v2.28-10+deb10u3 is removed from the network by the developer. The building fails without this fix.

[Additional Information of RZ/V2M, MA] Changes from VLP/V v3.0.4 to VLP/V v3.0.6 (*)

Features	Description
Yocto recipes	<ul style="list-style-type: none"> - meta-renesas/meta-rzv2m/ : Add patches to support outside 32 bit memory for RZ/V2M XHCI and Ethernet. - Poky: update to dunfell v23.0.31 (previous version is v23.0.21). - meta-openembedded: update to the latest commit. - Correct the typo in the name of the WIC image file for eSD boot. - Apply bug fix for kernel-module-mmng: fix user memory access error when flushing cache.
Kernel	Update the kernel version to v5.10.201-cip41
CPG	<ul style="list-style-type: none"> - Add DMA_ACLK in cric_mod_clks to enable CLK used by other OS. - Remove CPERI_GRP_A and CPERI_GRP_D in cric_mod_clks to avoid conflict with other OS on realtime domain. - Correct the order of WDT clock based on offset ascendant - Correct WDT reset status bit
GIC	- Add new GIC driver for RZ/V2M based on ARM GIC driver
SDHI/eMMC	- Set 64-bit mask DMA address to support outside 32 bit memory for RZ/V2M SDHI/eMMC
USB3	<ul style="list-style-type: none"> - Set 64-bit mask DMA address to support outside 32 bit memory for RZ/V2M USB3 - Create new struct renesas_usb3_priv_rzv2ma for RZ/V2MA
PFC	- Some ext irq is used by other OS and be removed in device tree. So add error code checking condition to avoid error when not find these ext irq in device tree
Device tree	<ul style="list-style-type: none"> - Remove memory@58000000 node from RZ/V2M device tree because it 's used by other OS. - Update GIC compatible in RZ/V2M device tree to use new RZ/V2M GIC driver. - Remove some external irqs in RZ/V2M device tree. - Disable ethernet and xhci for RZ/V2M: RZ/V2M Ethernet and xhci driver still not be extend to use memory outside 32 bit. So disable in device tree to avoid panic error (null pointer) for xhci and ethernet

(*) RZ/V2M and RZ/V2MA are supported in VLP/Vv3.0.4 and VLP/Vv3.0.6, not VLP/Vv3.0.5. Please note that the changes of “Basic Changes from VLP/Vv3.0.5 to VLP/Vv3.0.6” also apply to RZ/V2M and RZ/V2MA.

4. Restrictions

None.

5. Notes

5.1 Notes

Check the following patches, select, and apply to your build environment if needed. After that, build in the “online” environment. This step is required before executing the bitbake command. Refer to the section below in the “Linux Start-up Guide” for more information.

2.1 Building images to run on the board:

- “Decompress OSS files to “build” directory (Optional)”
- “Start a build”

First, apply the patch to create the patches for VLP/V v3.0.6-update4 in the “~/rzg_vlp_<package version>/extra” directory as follows.

```
$ cd ~/rzg_vlp_<package version>
$ patch -p1 < ./RTK0EF0045Z0024AZJ-v3.0.6-update4/vlvp306-to-vlvp306update4.patch
```

Once the patches are generated in the “extra” directory, select and apply them to your building environment. The following steps outline how to apply the patches.

(1) For update gstreamer plugin gst-plugins-bad

This patch fixes a build error occurs when building gstreamer-plugins-bad without the meta-rz-features/meta-rz-graphics layer. This error is caused by the bayer2raw recipe, which lacks the EGL/eglEXT_REL.h header file. To resolve this issue, add a judgement to check whether the meta-rz-graphics layer is included or not. If it is not included, exclude the bayer2raw, bayerconver and bayersink. Apply this patch as following.

```
$ cd ~/rzg_vlp_<package version>/meta-renesas
$ patch -p1 < ../extra/0002-rz-common-gst-plugins-bad-Depending-bayer2raw-if-lay.\
patch
```

(2) For update glibc to v2.28-10+deb10u4 (All product)

This patch upgrades glibc from v2.28-10+deb10u2 to v2.28-10+deb10u4 as the former version has been removed from the network by its developer. Building without the Open-source software packages (oss_pkg_rzg_v3.0.6.7z) results in a build failure. To successfully build without these packages, apply a patch as the following.

```
$ cd ~/rzg_vlp_<package version>/meta-renesas
$ patch -p1 < ../extra/0005-rz-common-recipes-debian-buster-glibc-update-to-v2.2.\
patch
```

(3) For update wks default file for RZ/G2L series and RZ/V2L

This patch adds a condition to choose the default wks file for all RZ/G2L Series and RZ/V2L. PMIC bootloader image is preferred to use as default file. Apply this patch as the following.

```
$ cd ~/rzg_vlp_<package version>/meta-renesas
$ patch -p1 < ../extra/0008-rz-common-update-wks-default-file-for-RZ-G2L-Series-.\
patch
```

(4) Update for Linux kernel

Belows are patches for Linux kernel. All of them are for bug fix or functionality improvement. And organized to put under directory extra/kernel. Please check the details of each patch and decide whether to apply or not with your own responsibility.

Patch Name	Outline	Note
0001-net-ravb-Count-packets-instead-of-descriptors-in-GbE.patch 0002-ravb-Make-it-clear-the-information-relates-to-maximu.patch 0003-ravb-Create-helper-to-allocate-skB-and-align-it.patch 0004-ravb-Use-the-max-frame-size-from-hardware-info-for-R.patch 0005-ravb-Move-maximum-Rx-descriptor-data-usage-to-info-s.patch 0006-ravb-Group-descriptor-types-used-in-Rx-ring.patch 0007-net-ravb-Let-IP-specific-receive-function-to-interro.patch 0008-ravb-Unify-Rx-ring-maintenance-code-paths.patch 0009-ravb-Correct-buffer-size-to-map-for-R-Car-Rx.patch 0010-net-ravb-Always-process-TX-descriptor-ring.patch 0011-net-ravb-Always-update-error-counters.patch 0012-net-ravb-Count-packets-instead-of-descriptors-in-R-C.patch 0013-net-ravb-Allow-RX-loop-to-move-past-DMA-mapping-erro.patch 0014-net-ravb-Fix-GbEth-jumbo-packet-RX-checksum-handling.patch 0015-net-ravb-Fix-RX-byte-accounting-for-jumbo-packets.patch 0016-net-ravb-Simplify-poll-receive-functions.patch 0017-net-ravb-Consider-busypolling-status-when-re-enablin.patch 0018-net-ravb-Refactor-RX-ring-refill.patch 0019-net-ravb-Refactor-GbEth-RX-code-path.patch 0020-net-ravb_main-Stop-TX-RX-function-of-TOE-in-ndo_clos.patch	Patches to improve the ethernet performance.	(*1, *2)
0021-dma-rz-dmac-do-not-suspend-DMA-when-using-serial-for.patch	There is a HW limitation for RZ/G2L Series that serial RX cannot work correctly if DMAC's reset, and clock turn off. So, add a workaround that does not turn off clock and reset of DMAC if serial is used as a wake-up source.	(*1)
0022-Revert-tty-serial-sh-sci-Fix-end-of-transmission-on-.patch	Fix end of transmission on SCI	(*1)
0024-media-rzg2l-cru-add-AXI-burst-max-length-setting.patch	Add AXI burst max length setting with recommended value to improve the transfer performance.	(*1)
0025-i2c-i2c-riic-update-clock-setting-for-lower-speed-tr.patch	Fix i2c clock for lower 100kHz.	(*1)

0028-memory-renesas-rpc-if-Use-Hi-Z-state-as-the-default-.patch	Use Hi-Z state as the default setting for IOVF pins for flash.	(*1)
0029-arm64-dts-renesas-rz-g2l-g2lc-g2ul-smarc-som-Update-.patch	rz{g2l,g2lc,g2ul}-smarc-som: Update partition table for spi-nor flash	(*1)
0031-reset-rzg2l-usbphy-ctrl-Move-reset-controller-regist.patch	fix the issue that the reset is not re-asserted in case devm_reset_controller_register() fails and also use goto statements to simplify the error path in probe().	(*1)
0032-regulator-core-Add-helper-for-allow-HW-access-to-ena.patch	The use-case for RZ/G2L SoC is to enable VBUS selection register based on vbus detection that happens in interrupt context.	(*1)
0033-regulator-Add-Renesas-RZ-G2L-USB-VBUS-regulator-driv.patch 0034-dt-bindings-reset-renesas-rzg2l-usbphy-ctrl-Document.patch 0035-reset-renesas-Add-USB-VBUS-regulator-device-as-child.patch	Add Renesas RZ/G2L USB VBUS regulator driver.	(*1)
0036-phy-renesas-phy-rcar-gen3-usb2-Control-VBUS-for-RZ-G.patch	Use regulator_hardware_enable() for controlling VBUS enable for RZ/G2L like SoCs in interrupt context.	(*2)
0037-arm64-dts-renesas-rz-smarc-Replace-fixed-regulator-f.patch	Replace the fixed regulator for USB VBUS and use the proper one that controls regulator based on VBUS detection.	(*1)
0038-arm64-dts-renesas-rz-g2l-g2lc-g2ul-Update-to-use-reg.patch 0039-riscv-dts-renesas-rzfive-smarc-Update-to-use-regulat.patc 0048-arm64-dts-renesas-rzg2l-Remove-GPIO-SD0-power-enable.patch	Changed to use regulator for VMMC SDHI (enable/disable by GPIO) instead of using hard definition for GPIO output high, apply this we won't meet the issue (error -110 whilst initialising SD card) when plug-in/out uSD/SD card continuously.	(*1)
0049-i2c-i2c-riic-add-xfer-atomic-support.patch	Add xfer atomic support for RIIC.	(*1)
0050-regulator-raa215300-add-reset-output-to-MPIO-lines.patch	Add reset output to MPIO lines. RAA215300 supports reset output to MPIO lines by setting Warm reset from Software Reset register.	(*1)
0051-dts-renesas-rzg2lc-smarc-som-Add-PMIC-warm-reset-sup.patch 0052-dts-renesas-rzg2l-smarc-som-Add-PMIC-warm-reset-sup.patch	Add PMIC warm reset support. Since RZ/G2LC PMIC RAA215300 can support warm reset via reset output from MPIO lines.	(*1)

0053-clk-renesas-r9a09g011-cpg-Add-some-RZ-V2M-clocks-as-.patch	Add some RZ/V2M clocks as critical clock. Since RZ/V2M supports another OS that runs parallel to Linux, some clocks always need to be enabled.	(*2)
0054-clk-renesas-r9a09g011-cpg-Change-RZ-V2M-PWM_GRPE-res.patch	Change RZ/V2M PWM_GRPE reset mon bit.	(*2)
0058-ethernet-ravb-only-disable-HW-checksum-if-HW-support.patch	HW checksum is only supported for RZ/G2L Series. Only disable HW checksum when closing ethernet if only its HW features support.	(*1, *2)
0059-usb-xhci-add-code-to-extend-memory-access-to-over-32.patch	Add code to extend memory access to over 32 bits memory region for RZ/V2M	Important (*2)
0060-net-ethernet-renesas-ravb-add-code-to-access-over-32.patch	renesas: ravb: add code to access over 32 bits memory region for RZ/V2M	Important (*2)
0061-arm64-boot-dts-renesas-r9a09g011-v2mevk2-enable-ethe.patch	Enable RZ/V2M ethernet and xhci in device tree. Also add property for extended address in xHCI and ethernet device node.	Important (*2)

Note) When you want to know the details, please check the contents of the patches. "Important" patches are strongly recommend to apply.

(*1) Patches for RZ/V2L.

(*2) Patches for RZ/V2M and RZ/V2MA.

When the target patch to apply is decided, please copy the selected patch:

From `rzg_vlp_<package version>/extra/kernel/`

To `rzg_vlp_<package version>/meta-renesas/meta-rzv2m/recipes-kernel/linux/linux-renesas`. For RZ/V2M and RZ/V2MA

```
$ cd ~/rzg_vlp_<package version>/meta-renesas
$ cp ../extra/< patch-selected-by-you.patch> ./meta-rzv2m/recipes-kernel/linux/\
linux-renesas/
```

To `rzg_vlp_<package version>/meta-renesas/meta-rzv2l/recipes-kernel/linux/linux-renesas`. For RZ/V2L.

```
$ cd ~/rzg_vlp_<package version>/meta-renesas
$ cp ../extra/< patch-selected-by-you.patch> ./meta-rzv2l/recipes-kernel/linux/\
linux-renesas/
```

And edit the following files as below:

- `rzg_vlp_<package version>/meta-renesas/meta-rzv2m/recipes-kernel/linux/linux-renesas_5.10.bbappend`
- `rzg_vlp_<package version>/meta-renesas/meta-rzv2l/recipes-kernel/linux linux-renesas_5.10.bbappend`

```
SRC_URI_append= " \
    file://<patch-selected-by-you.patch> \
"
```

Note) For RZ/V2M and RZ/V2MA, if you have applied patches for ethernet performance improvement, please remove patch file:

- 0001-usb-xhci-add-code-to-extend-memory-access-to-over-32.patch
- 0002-net-ethernet-renesas-ravb-add-code-to-access-over-32.patch
- 0003-arm64-boot-dts-renesas-r9a09g011-v2mevk2-enable-ethe.patch

from `rzg_vlp_<package version>/meta-renesas/meta-rzv2m/recipes-kernel/linux linux-renesas_5.10.bbappend`. Since they are incompatible with the current Linux kernel. And instead, please apply the patch files:

- 0059-usb-xhci-add-code-to-extend-memory-access-to-over-32.patch
- 0060-net-ethernet-renesas-ravb-add-code-to-access-over-32.patch
- 0061-arm64-boot-dts-renesas-r9a09g011-v2mevk2-enable-ethe.patch

(5) Update for U-boot

Belows are patches for u-boot. All of them are for bug fix or functionality improvement. And organized to put under directory `extra/kernel`. Please check the details of each patch and decide to apply or not with your own responsibility.

Patch Nmae	Outline	Note
0001-board-renesas-rz-g2l-g2lc-v2l-dev-Disable-bit4-in-NV.patch	Disable bit4 in Nonvolatile Configuration Register to disable HOLD# from DQ3 for MT25QU512A Micron flash.	

When applying this patch, please do as below:

```
$ cd ~/rzg_vlp_<package version>/meta-renesas/meta-<rvz2m/rzv2l>/recipes-bsp/u-boot
$ mkdir u-boot
$ cp rzg_vlp_<package version>/extra/u-boot/<patch for u-boot> ./u-boot
```

And edit `rzg_vlp_<package version>/meta-renesas/meta-rzv2m/recipes-bsp/u-bootu-boot_2021.10.bbappend` to add below context:

```
FILESEXTRAPATHS_prepend := "${THISDIR}/${PN}:"
```

```
SRC_URI_append = "\
```

```
    file://0001-board-renesas-rz-g2l-g2lc-v2l-dev-Disable-bit4-in-NV.patch \
```

```
"
```

5.2 Memory Map

5.2.1 RZ/V2L

RZ/V2L SMARC board memory map is shown in Figure 1.

Physical Address	
0x00_4000_0000	Reserved Area (Size: 128MB)
0x00_47FF_FFFF 0x00_4800_0000	Kernel Area (Size: 256MB)
0x00_57FF_FFFF 0x00_5800_0000	Linux CMA (Size: 256MB)
0x00_67FF_FFFF 0x00_6800_0000	Reserved Area (Size: 128MB)
0x00_6FFF_FFFF 0x00_7000_0000	Kernel Area (Size: 256MB)
0x00_7FFF_FFFF 0x00_8000_0000	DRP-AI (*) (Size: 512MB)
0x00_9FFF_FFFF 0x00_A000_0000	Kernel Area (Size: 256MB)
0x00_AFFF_FFFF 0x00_B000_0000	udmabuf (Size: 64MB)
0x00_B3FF_FFFF 0x00_B400_0000	Simple ISP (Size: 48MB)
0x00_B6FF_FFFF 0x00_B700_0000	Kernel Area (Size: 144MB)
0x00_C000_0000	

Figure 1. Memory Map

Table 1. *: The area to store DRP-AI Object files. This area must be set to an address of 8bytes or less.

5.2.2 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.

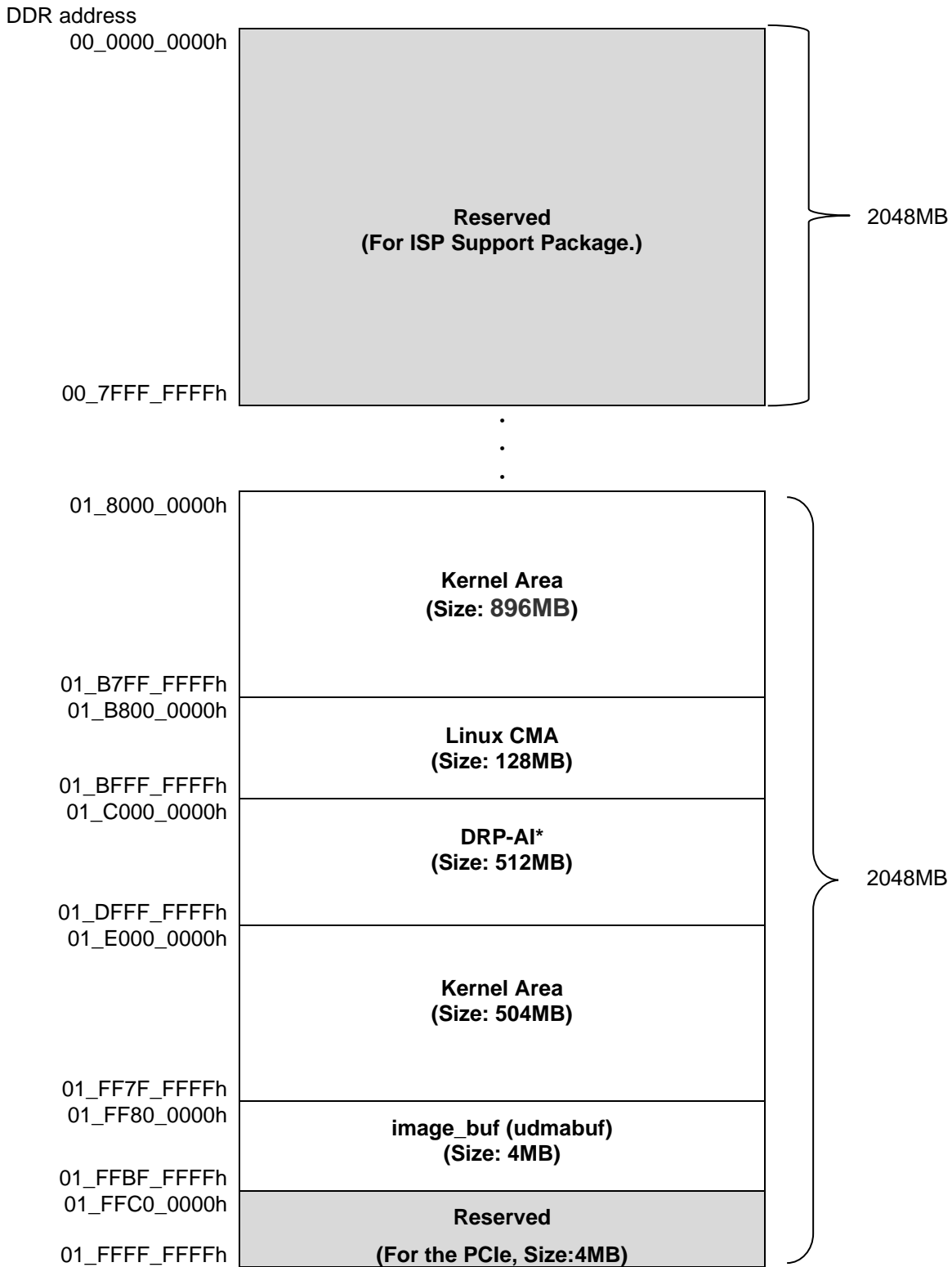


Figure 2. Memory Map

Note

If you use the data (e.g. images) created by RZ/V2M ISP Support Package on a specific IP (*1), you need to copy the data to the Linux area by CPU. If you use DRP-AI, you should copy the data to the appropriate memory area yourself. See the RZ/V2M DRP-AI Sample Application Note for this process. The copy process with IPs other than DRP-AI is performed automatically, so there is no need to do it. Refer to RZ/V2M User Guide: Hardware for details.

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

5.2.3 RZ/V2MA

The following figure shows the DDR memory map in the RZ/V2MA.

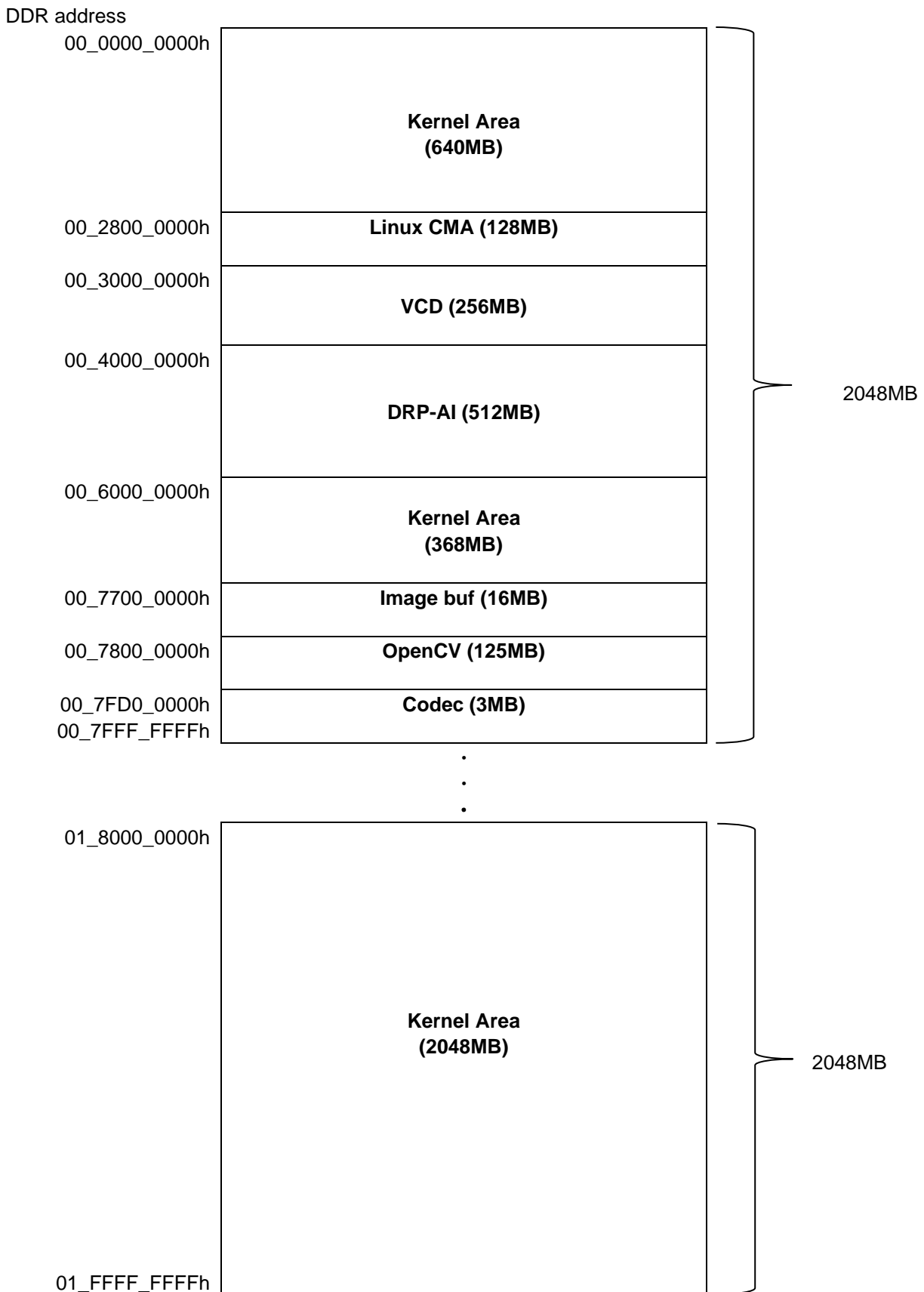


Figure 3. Memory Map

6. Appendix

None.

7. Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Jun. 30, 2022	-	First edition issued.
1.01	Jul. 6, 2022	3	Modify Optional packages to describe the information for the latest libraries of the Graphics and the Video Codec.
		6	Modify the step 3.1(2) according to the latest libraries of the Graphics and the Video Codec.
1.02	Aug. 9, 2022	15	Add the update2 information to appendix.
1.03	Dec. 27, 2022	-	Update v3.0.2 released.
		13, 14	Add Bullseye Debian 11 information
1.04	Jul. 31, 2023	-	Support for RZ/V2M, RZ/V2MA Linux as RZ/V VLP. Add the information for RZ/V2M and RZ/V2MA to this document.
		-	Move to "Linux Start-up Guide" that Build Instruction section.
		6-10	Add "Changes" section.
1.05	Dec. 27, 2023	-	Update to VLP/V v3.0.5 for RZ/V2L.
1.06	Feb. 29, 2024	-	Add the patch file of update3. (update1 and update2 do not exist in VLP/V v3.0.5.)
1.07	Jun. 28, 2024	-	Update to v3.0.6.
1.08	Dec. 13, 2024	-	Update to v3.0.6-update4.

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