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# RZ/V2L ISP Support Package Release Note Version 1.10

## Release Note

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### Introduction

This release note describes the contents of the ISP Support Package Release Note and how to construct its operating environments.

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## 1. Release Items

The release items in the ISP Support Package Release Note are as following.

- **Name and Version**

ISP Support Package Release Note Version.1.10

- **Target Evaluation Board**

RZ/V2L SMARC Board

Note: For the settings of RZ/V2L Evaluation Board, please refer to the RZ/G2L Group and RZ/V2L SMARC EVK Start-up Guide (R01TU0338EJ0105). Refer to “3.1 Preparation” for necessary equipment other than the RZ/V2L Evaluation 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.

- **File Contents**

Table 1-1 shows the list of contents in r11an0561ej0110-rzv2l-isp-sp.zip. Table 1-2 shows the list of contents in rzv2l\_isp\_meta-isp\_ver1.10.tar.gz.

**Table 1-1 File Contents**

Folder / Filename	Explanation
r11an0561ej0110-rzv2l-isp-sp.zip	ISP support package
r11an0561ej0110-rzv2l-isp-sp.pdf	This document.
rzv2l_isp-sample-application_ver1.10.tar.gz	Sample source codes of RZ/V2L Simple ISP Sample Application.
rzv2l_meta-isp_ver1.10.tar.gz	Recipe to add ISP support to Linux Package.
r11an0563ej0110-rzv2l-simple-isp.pdf	RZ/V2L Simple ISP Sample Application.
r11uz0105ej0110-rzv2l-simple-isp.pdf	RZ/V2L Simple ISP User's manual.

**Table 1-2 Contents of rzv2l\_isp\_meta-isp\_ver1.10.tar.gz**

Directory
meta-isp/ conf/
recipes-linux/
rzv2l-isp-conf.patch

- **Features**

Major updates:

- It is fixed that an application stops when running AI and Simple ISP at the same time in rare cases.
- Newly available for USB camera connection.
- Newly available for RGB output
- Remove Tinyolov2 sample code from this package (move to DRP-AI support package)

- **Related Packages**

1. RZ/V2L Linux Package Version.1.0.1
2. RZ/V2L DRP-AI Support Package Version.7.00

- **Related Documents**

1. RZ/V2L Linux Package Release Note (R01AN6318EJ0100)
2. RZ/G2L Group and RZ/V2L SMARC EVK Start-up Guide (R01TU0338EJ0105)
3. RZ/V2L DRP-AI Support Package Release Note (R11AN0549EJ0700)
4. RZ/V2L DRP-AI Sample Application Note (R11AN0573EJ0700)

- **Restrictions**

None.

## 2. Build

This chapter will explain how to build the RZ/V2L ISP Support Package. The following packages are required to build this package.

1. RZ/V2L Linux Package
2. RZ/V2L DRP-AI Support Package

Note: Before executing bitbake commands, apply all recipes in above packages.

### 2.1 Preparation

Refer to the “RZ/V2L DRP-AI Support Package Release Note” and follow the steps described in the “3. Build” chapter.

### 2.2 Add the Environmental Variable

As in the “RZ/V2L DRP-AI Support Package Release Note”, set the working directory as the environmental variable.

```
$ export WORK=/home/user/user_work
```

Note: Specify the working directory in red above according to your machine. The example above uses “user/user\_work”.

### 2.3 Unzip the ISP Support Package Recipe

Place the rzv2l\_meta-isp\_ver1.10.tar.gz to the working directory and run the following command.

```
$ cd $WORK
$ tar -zxvf ./rzv2l_meta-isp_ver1.10.tar.gz
```

After executed the command, meta-isp directory and rzv2l-isp-conf.patch file will be shown in the working directory.

```
WORK
├── build
├── meta-drpai
├── meta-isp
├── meta-gplv2
├── meta-openembedded
├── meta-rz-features
├── meta-rzv
├── poky
├── rzv2l_meta-drpai_ver7.00.tar.gz
├── rzv2l_meta-isp_ver1.10.tar.gz
├── rzv2l-drpai-conf.patch
└── rzv2l-isp-conf.patch
```

## 2.4 Set the build environment variables

Run the following command to set the environment variable for the build.

Note: The environmental variable will be reset if the terminal is closed. Please run the command for each time you open the terminal.

```
$ cd $WORK
$ source poky/oe-init-build-env
```

## 2.5 Confirm the configuration

Confirm the bblayers.conf file look like below.

```
$ tail conf/bblayers.conf
${TOPDIR}/../poky/meta-poky \
${TOPDIR}/../poky/meta-yocto-bsp \
${TOPDIR}/../meta-rzv \
${TOPDIR}/../meta-openembedded/meta-oe \
${TOPDIR}/../meta-openembedded/meta-python \
${TOPDIR}/../meta-openembedded/meta-multimedia \
${@}${TOPDIR}/../meta-qt5' if '${QT_LAYER}' == 'True' else ''} \
${@}${TOPDIR}/../meta-rz-features' if '${RZ_FEATURE}' == 'True' else ''} \
${TOPDIR}/../meta-drpai \
"
```

## 2.6 Apply the patch

Apply the patch that describes the changes for this package.

```
$ cd $WORK/build
$ patch -p2 < ../rzv2l-isp-conf.patch
```

After applying the patch, confirm the bblayers.conf file look like below.

```
$ tail conf/bblayers.conf
${TOPDIR}/../poky/meta-yocto-bsp \
${TOPDIR}/../meta-rzv \
${TOPDIR}/../meta-openembedded/meta-oe \
${TOPDIR}/../meta-openembedded/meta-python \
${TOPDIR}/../meta-openembedded/meta-multimedia \
${@}${TOPDIR}/../meta-qt5' if '${QT_LAYER}' == 'True' else "" \
${@}${TOPDIR}/../meta-rz-features' if '${RZ_FEATURE}' == 'True' else "" \
${TOPDIR}/../meta-drpai \
${TOPDIR}/../meta-isp \
"
```

## 2.7 Build

Run the bitbake command to build the Linux Package.

```
$ cd $WORK/build
$ bitbake core-image-weston
```

After the Build, the following files will be generated under \$WORK/build/tmp/dep1oy/images/smarc-rzv21.

**Table 2-1 Generated Files after Build**

Filename	Name
Image-smarc-rzv21.bin	Linux Kernel Image
r9a07g05412-smarc.dtb	Linux Device Tree File
core-image-weston-smarc-rzv21.tar.bz2	A set of root filesystem
bl2_bp-smarc-rzv21_pmic.srec	S-record files for boot loader
fip-smarc-rzv21_pmic.srec	

Refer to the “RZ/V2L DRP-AI Support Package Release Note” and follow the steps described in the “6. SDK” chapter.



### 3. Boot

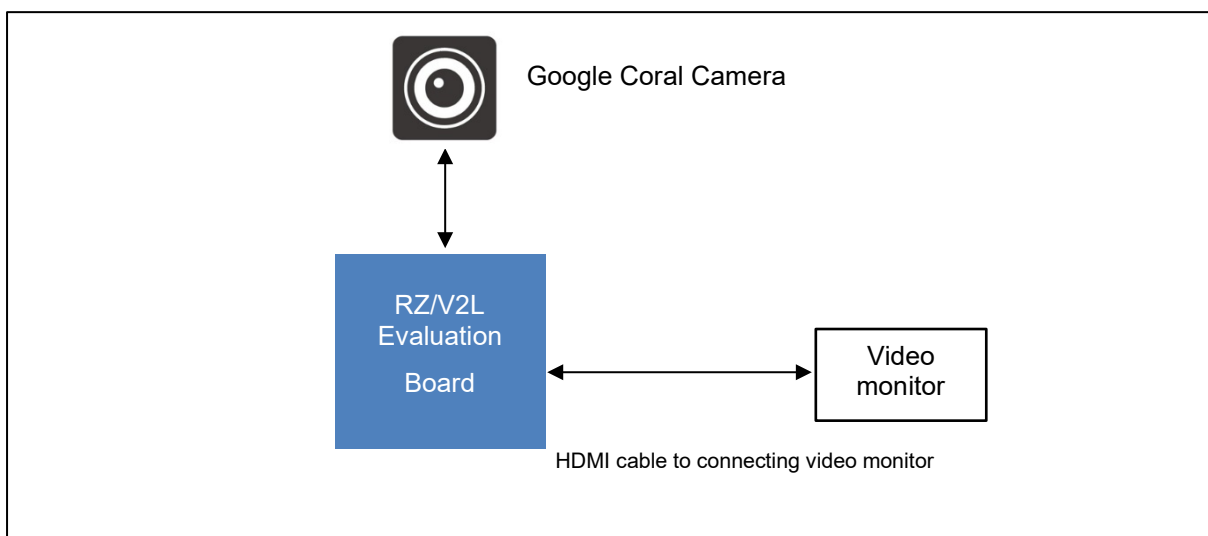
This chapter will explain how to boot the system applied by RZ/V2L ISP Support Package. There are two ways to boot. One from the network and another boot from the SD Card.

#### 3.1 Preparation

Refer to “4.2 Preparation” or “5.2 Preparation” of “RZ/V2L DRP-AI Support Package Release Note” to prepare for booting. “4.2 Preparation” is the preparation for Network booting and “5.2 Preparation” is the preparation for SD Card booting.

In addition, prepare the sensor “Google Coral Camera\*” attached to the RZ/V2L Evaluation board with CS mount lens and video monitor connecting by HDMI (Type D) cable. Table 3-1 lists necessary equipment for network booting and Table 3-2 lists necessary equipment for SD Card booting.

The RZ/V2L Evaluation Board connected sensor and video monitor looks like below.



**Figure 3-1 Hardware Configuration**

**Table 3-1 Necessary Equipment for Network Booting**

Equipment	Details
RZ/V2L Evaluation Board	RZ/V2L Linux bootloaders and u-boot are written to eMMC*
- Google Coral Camera	Attached to the RZ/V2L Evaluation Board
Linux PC	Used as build/debug environment for RZ/V2L Linux software.
- OS	Ubuntu 20.04 LTS 64-bit OS must be used.
- TFTP server	Used for downloading the Linux kernel to board.
- NFS server	Used for mounting rootfs via NFS.
Serial to Micro USB Cable	Used for serial communication between PC and board.
Ethernet crossover cable	Used for ethernet communication between Linux PC and board.
HDMI (Type D) cable	Used for connecting video monitor.
Video monitor	Used for monitoring sensor images. Requires support for HDMI input and Full HD display.

Note: Please write the u-boot configuration to the eMMC when you boot the board for the first time.

**Table 3-2 Necessary Equipment for SD Card Booting**

Equipment	Details
RZ/V2L Evaluation Board	RZ/V2L Linux bootloaders and u-boot are written to eMMC*
- Google Coral Camera	Attached to the RZ/V2L Evaluation Board
Linux PC	Used as environment for building/debugging/creating microSD card.
- OS	Ubuntu 20.04 LTS 64-bit OS must be used.
- SD card reader	Used for creating microSD card.
Windows PC	Used for Serial communication display.
- OS	Windows 10
- Terminal software	Used for controlling serial console of the target board. Operation Environment: Tera Term
- Serial port driver	Virtual COM Port driver which enables to communicate Windows PC and the target board via USB which is virtually used as serial port.
Serial to Micro USB Cable	Used for serial communication between PC and board.
microSD card	Used for SD Card Booting. Only SDHC is supported. Operation Environment: Transcend UHS-I microSD 300S 16GB
HDMI (Type D) cable	Used for connecting video monitor.
Video monitor	Used for monitoring sensor images. Requires support for HDMI input and Full HD display.

Note: Please write the u-boot configuration to the eMMC when you boot the board for the first time.

### 3.2 Network Booting

Refer to the “RZ/V2L DRP-AI Support Package Release Note” and follow the steps described in the “4. Network Booting” chapter.

### 3.3 SD Card Booting

Refer to the “RZ/V2L DRP-AI Support Package Release Note” and follow the steps described in the “5. SD Card Booting” chapter.

**Version History**

Ver.	Date	Description	
		Page	Summary
0.50	29 Oct, 2021	-	Issued.
1.00	24 Dec 2021	ALL	<ul style="list-style-type: none"> <li>- Newly created Simple ISP User's Manual</li> <li>- Newly created Simple ISP Sample Application Note</li> <li>- Updated Linux Package v1.00</li> </ul>
1.10	28 April 2022	3          ALL	<ul style="list-style-type: none"> <li>- Added feature</li> <li>- Resolved the restriction of "Set V4L2 Streaming to off in advance when using the Reset function of AI Inference".</li> <li>- Resolved the restriction of "Need to prepare for at least 5 frame buffers for V4L2" by changing the specification.</li> <li>- Removed the restriction of " Network booting is not supported " from this package.</li> <li>- Updated Linux Package v1.0.1</li> <li>- Updated DRP-AI Package v7.0.0</li> <li>- Extension of ISP information setting command from v1.00 to v1.10 (Refer to sub-section 2.3.2 of Simple ISP User's manual)</li> </ul>

## 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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