

RZ/V2L AI Software Development Kit Version 2.00

R11AN0752EJ0200
Version.2.00
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Release Note

Introduction

AI Software Development Kit (AI SDK) is an AI application development environment for RZ/V2L Evaluation Board Kit. This release note describes the contents of the AI SDK.

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1. Release Items

The release items in the AI SDK are as follows.

- **Name and Version**

RZ/V2L AI Software Development Kit Version 2.00

- **Target Board**

RZ/V2L Evaluation Board Kit

Note: 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.

- **Features**

This package provides standard components necessary to develop AI applications.

1. Bootloader

These are necessary files to boot RZ/V2L Evaluation Board Kit.

2. Linux Kernel Files

These are pre-build binary files of Yocto environment, which are Linux Kernel Image and Linux Device Tree files.

3. Root filesystem

This is filesystem for the RZ/V2L Evaluation Board Kit.

4. Cross Compiler

This is a compiler for Linux application, which runs on RZ/V2L Evaluation Board Kit.

5. AI SDK Installer

This is an installer for AI application development environment, which runs on Docker.

It includes DRP-AI Translator v1.82 installer.

- **Major updates**

- Operation time limit due to Graphics Library Evaluation Version/Video Codec Library Evaluation Version is extended from 3hours to 10hours.
- Added support for eSD Bootloader in addition to eMMC Bootloader. eSD Bootloader does not require Windows PC to write bootloader, which is recommended procedure. For more details on eSD/eMMC Bootloader, please refer to Getting Started (https://renesas-rz.github.io/rzv_ai_sdk/2.00/getting_started.html).

- **Related Software**

DRP-AI TVM v1.1.1

https://github.com/renesas-rz/rzv_drp-ai_tvm

- **File Contents**

Table 1-1 shows the list of contents in this package.

These files are the following pre-built binary files.

- RZ/V2L DRP-AI Support Package v7.40
- RZ/V2L Linux Package v3.0.4
- RZ/V2L Graphics Library Evaluation Version v1.1.0
- RZ/V2L Video Codec Library Evaluation Version v1.1.0
- Tesseract v3.5.1 (tesseract, tesseract-lang)

Table 1-1 Contents list

Contents	Explanation
 r11an0752ej0200-rzv2l-ai-sdk.pdf	This document
 board_setup	Files required for booting the board.
 eSD.zip	Bootloader for eSD
 bootloader	Bootloader files for eSD
 bl2_bp_esd-smarc-rzv2l_pmic.bin	
 bl2-smarc-rzv2l_pmic.bin	
 fip-smarc-rzv2l_pmic.bin	
 Image-smarc-rzv2l.bin	Linux Kernel Image for eSD (The boot program)
 Image-r9a07g054l2-smarc.dtb	Linux Device Tree File for eSD (The configuration file for booting)
 core-image-weston-smarc-rzv2l.tar.bz2	Linux root filesystem for eSD
 eMMC.zip	Bootloader for eMMC
 bootloader	Bootloader files for eMMC
 Flash_Writer_SCIF_RZV2L_SMARC_PMIC_DDR4_2GB_1PCS.mot	
 bl2_bp-smarc-rzv2l_pmic.srec	
 fip-smarc-rzv2l_pmic.srec	
 Image-smarc-rzv2l.bin	Linux Kernel Image for eMMC (The boot program)
 Image-r9a07g054l2-smarc.dtb	Linux Device Tree File for eMMC (The configuration file for booting)
 core-image-weston-smarc-rzv2l.tar.bz2	Linux root filesystem for eMMC
 ai_sdk_setup	Files required for installing AI SDK on Ubuntu PC.
 poky-glibc-x86_64-core-image-weston-aarch64-smarc-rzv2l-toolchain-3.1.21.sh	Application cross compiler installer.
 Dockerfile	Dockerfile for installing AI SDK
 DRP-AI_Translator-v1.82-Linux-x86_64-Install	DRP-AI Translator installer
 references	Reference information
 oss_pkg_rzv_v2.00.7z	Source code of Open Source Software packages used when building the Linux files and application cross compiler installer.
 linux_licenses.zip	Linux license information. Referred by Linux License List.
 core-image-weston-smarc-rzv2l.manifest	Manifest file that contains software component information.
 documents	Related documents
 r01us0595ej0201-rzv-linux-drpai.pdf	DRP-AI Driver User's Manual (Document only for DRP-AI Translator user)
 r20ut5010ej0250-drp-ai-translator.pdf	DRP-AI Translator User's Manual (Document only for DRP-AI Translator user)
 r11an0752ej0200-rzv2l-ai-sdk(Linux License List).pdf	List of license information included in Linux files and application cross compiler. Copyright information is not included. Please refer to Open Source Software packages to see copyright information.

- **Component**

Table 1-2 Component list

Component	Version	Explanation
OpenCV	4.1.0	
OpenCL	1.1, 1.2, 2.0 Full Profile.	
	3.0 Full Profile	This is not guaranteed to be backwards compatible with the previous versions of OpenCL.
OpenGL ES	1.1, 2.0, 3.0, 3.1 and 3.2	
OpenMAX IL	1.1	This is used for H.264 decoding and encoding.

Other components installed to the root filesystem are listed in the below manifest file.

Please refer to “references/core-image-weston-smarc-rzv2l.manifest”

2. How to install and use AI SDK

Please see the RZ/V AI SDK GitHub pages (https://renesas-rz.github.io/rzv_ai_sdk/2.00/).

Version History

Ver.	Date	Description	
		Page	Summary
1.00	21 Apr, 2023	-	Issued.
2.00	31 Aug, 2023	All	Updated 1.00 to 2.00
		P4	Updated RZ/V2L DRP-AI Support Package to v7.40 Updated RZ/V2L Linux Package to v3.0.4 Updated RZ/V2L Graphics Library to v1.1.0 Updated RZ/V2L Video Codec Library to v1.1.0
		P5	Updated version of Poky to v3.1.21 Added manifest file instead of providing Component list.
		P6	Added reference to manifest file instead of Component list. Deleted Vulkan from Table 1-2 Component list due to clerical error.

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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