RZ/V2L AI Software Development Kit Version 2.10

Release Note

R11AN0752EJ0210
Version.2.10
10 Nov, 2023

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.

Contents

1. Release Items

The release items in the AI SDK are as follows.

1.1 Name and Version

RZ/V2L AI Software Development Kit Version 2.10

1.2 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.

1.3 Features

This package provides standard components necessary to develop AI applications.

1. AI SDK

   Provided as RTK0EF0160F02100SJ.zip.

- Bootloader

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

- Linux Kernel Files

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

- Root filesystem

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

- Cross Compiler

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

- AI SDK Installer

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

  It includes DRP-AI Translator v1.82 installer.

2. AI SDK Source Code

   Provided as RTK0EF0160F02100SJ_linux-src.zip.

- Yocto Linux Recipe

  This is the Linux source code of AI SDK.

- OSS Source Code

  This is the source code of Open Source Software packages used to build AI Development Software.

1.4 Major updates

- Provided AI SDK Source Code.
  - ➢ Users can customize Linux environment.

1.5 Related Software

DRP-AI TVM v1.1.1

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

1.6 File Contents

Files contained in AI Software Development Kit is based on following software.

- 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)

1.6.1 AI SDK

Table 1-1 AI SDK Contents list shows the file contents of RTK0EF0160F02100SJ.zip.

Table 1-1 AI SDK Contents list

Contents	Explanation
r11an0752ej0210-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
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)
r11an0752ej0210-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 included in AI SDK Source Code to see copyright information.

1.6.2 AI SDK Source Code

To see the file contents of RTK0EF0160F02100SJ_linux-src.zip, please refer to README.txt included in the package.

For more information on AI SDK Source Code, please refer to following web page.

https://renesas-rz.github.io/rzv_ai_sdk/2.10/howto_build_aisdk.html

Note: The size of RTK0EF0160F02100SJ_linux-src.zip file is around 2.5GB.

1.7 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.
OpenGLES	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/2.10/).

Version History

Ver.	Date	Description	
		Page	Summary
1.00	21 Apr, 2023	-	Issued.
2.00	31 Aug, 2023	-	Updated following software package version used in AI SDK. • RZ/V2L DRP-AI Support Package to v7.40. • RZ/V2L Linux Package to v3.0.4. • RZ/V2L Graphics Library to v1.1.0. • RZ/V2L Video Codec Library to v1.1.0. Updated version of Poky to v3.1.21. Added manifest file instead of providing Component list.
		P6	Deleted Vulkan from Table 1-2 Component list due to clerical error.
2.10	10 Nov, 2023	-	Added AI SDK Source Code in release item. Separated zip file into two files and rearranged file contents. (OSS package is moved to AI SDK Source Code.)

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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