

# RZ/A1H Group

## Contrast Automatic Correction Add-on Release Note

### Introduction

This software package is an add-on for Human Machine Interface (hereinafter referred to as HMI) software development kit for RZ/A1 call as SDK for Camera, and supports camera input, LCD output, and image adjustment. This package enables following functions using “Dynamic Range Compression” (hereafter referred to as DRC) which is installed in RZ/A1H and RZ/A1M:

- Adjustment of dark part or light part of an image.
- Getting histogram.

In the case of the dark part correction, even if an image is backlighting, DRC can emphasize the contrast of target. The corrected image will be stored into memory. Therefor you can use the corrected image for the image processing such as face recognition. Figure below shows the example of the dark part correction.

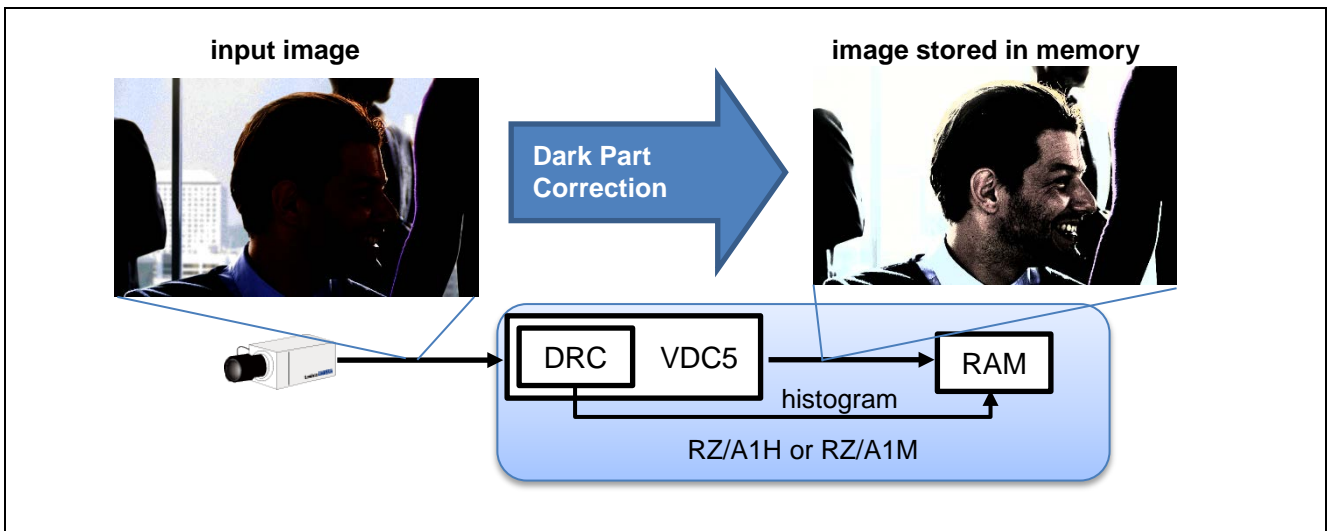
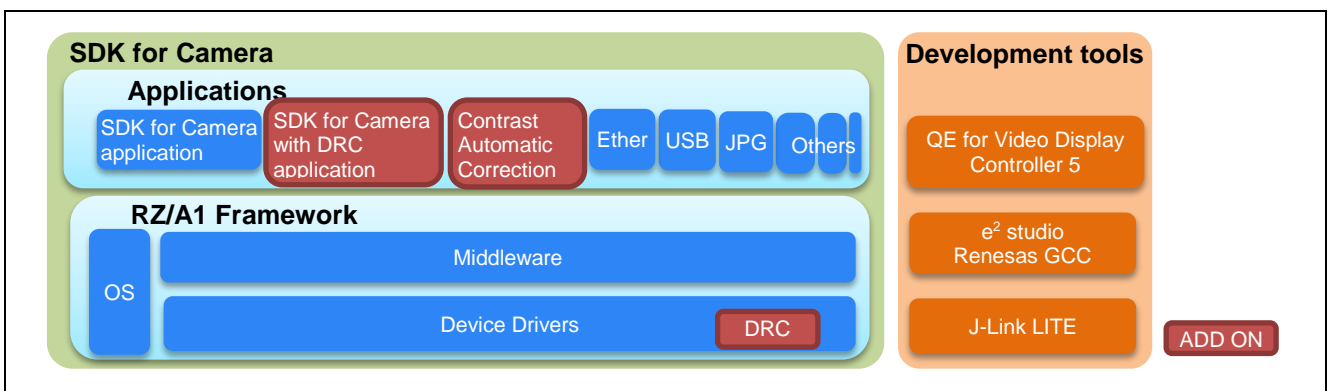


Figure below shows the position of this add-on on the software diagram of “SDK for Camera”.

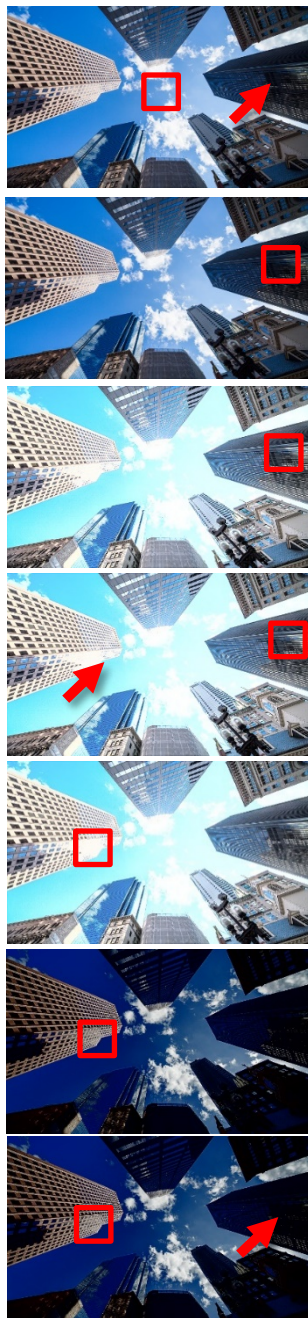


Note: This software package is available upon non-disclosure agreement. For details, contact your local sales representatives or access <https://www.renesas.com/en-hq/support/contact.html>.

### Target Board

Renesas Starter Kit+ for RZ/A1H

An example of operation of Contrast Automatic Correction sample program.



- 1) Touch dark part of display.
- 2) Sample program displays a frame that shows the area to obtain histogram. And histogram in the frame will be obtained.
- 3) After this sample program analyze obtained histogram, whole screen will be brightened to emphasize the contrast of bright part. By this, the visibility in the frame will be improved.
- 4) Touch the light part (clipped white).
- 5) Sample program displays a frame that shows the area to obtain histogram will be moved. And histogram in the frame will be obtained.
- 6) After this sample program analyze obtained histogram, whole screen will be darkened to emphasize the contrast of dark part. By this, the visibility in the frame will be improved.
- 7) Touch a part of the screen which is wanted to improve the visibility. Continue these sequences.

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## 1. Package Contents

### 1.1 Software

This package contains the following software.

**Table 1-1 Software of this package**

No	Name	Folder	Explanation
1	RZ/A1H Group Contrast Automatic Correction Add-on (Package)	Software	DRC sample program and a set of drivers that run on SDK for Camera

### 1.2 Sample program

This package contains the following sample program.

**Table 1-2 Sample program of this package**

No	Name	Folder	Explanation
1	Contrast Automatic Correction Sample program	Software\App\application_sample\ ContrastAutomaticCorrection\ sample1	This program displays the image which contrast of whole area is corrected automatically to emphasize dark part and light part of selected area using histogram of the selected area.
2	SDK for Camera with DRC Sample program	Software\App\application_sample\ SDKforCamera\sampl2	This program changes the various settings of VDC 5 / DRC according to the command input from the terminal application and performs image quality adjustment, contrast correction, and getting histogram.

### 1.3 Documents

This package contains the following documents.

**Table 1-3 Documents of this package**

No	Type	Title	Rev	File Name Path
1	Release Note	RZ/A1H Group Contrast Automatic Correction Add-on Release Note	2.02	(Japanese) r01an3897jj0202-rza1h-fwp.pdf (English) r01an3897ej0202-rza1h-fwp.pdf (This document) Document\ReleaseNote
2	Application Note	RZ/A1H Group Contrast Automatic Correction Sample Program Application Note	1.00	(Japanese) r01an4003jj0100-rza1h.pdf (English) r01an4003ej0100-rza1h.pdf Document\Specifications\App\application_sample\ContrastAutomaticCorrection
3	Application Note	RZ/A1H Group SDK for Camera with DRC Sample Program Application Note	1.00	(Japanese) r01an3867jj0100-rza1h.pdf (English) r01an3867ej0100-rza1h.pdf Document\Specifications\App\application_sample\SDKforCamera
4	Application Note	RZ/A1H Group RZ/A1 Framework DRC Driver Application Note	1.00	(Japanese) r01an3686jj0100-rza1h.pdf (English) r01an3686ej0100-rza1h.pdf Document\Specifications\Drv\drc

## 2. Folder Structure

Folder structure of this package and outline of contents are shown as follow.

**Table 2-1 Folder Structure**

an-r0an3897xx0202-rza1h-fwp	: top folder
├─readme_j.txt	: Overview of this package (Japanese)
├─readme_e.txt	: Overview of this package (English)
├─license.txt	: Software license of this package (English)
├─Document	: documents
├─ReleaseNote	: release Notes(refer to 1.2 section)
├─r01an3897jj0202-rza1h-fwp.pdf	
└─r01an3897ej0202-rza1h-fwp.pdf (This document)	
├─Specifications	: each documents(refer to 1.2 section)
├─App	
├─application_sample	
├─ContrastAutomaticCorrection	
├─r01an4003jj0100-rza1h.pdf	: Contrast Automatic Correction Sample Program Application Note(Japanese)
├─r01an4003ej0100-rza1h.pdf	: Contrast Automatic Correction Sample Program Application Note(English)
├─sample1	
└─readme.txt	: Sample program (ContrastAutomaticCorrection_smp1) Path description file to readme.
├─SDKforCamera	
├─r01an3867jj0100-rza1h.pdf	: SDK for Camera with DRC Sample Program Application Note(Japanese)
├─r01an3867ej0100-rza1h.pdf	: SDK for Camera with DRC Sample Program Application Note(English)
├─sample2	
└─readme.txt	: Sample program (SDKforCamera_smp2) Path description file to readme
├─Drv	
├─drc	
├─r01an3686jj0100-rza1h.pdf	: DRC driver application note(Japanese)
└─r01an3686ej0100-rza1h.pdf	: DRC driver application note(English)
├─Software	: programs
├─App	
├─application_sample	
├─ContrastAutomaticCorrection	
├─sample1	: Contrast Automatic Correction Sample Program
├─readme_sfboot_j.txt	: Contrast Automatic Correction Sample readme(Japanese)
└─readme_sfboot_e.txt	: Contrast Automatic Correction Sample readme(English)
├─SDKforCamera	
├─sample2	: SDK for Camera with DRC Sample Program
├─readme_sfboot_j.txt	: SDK for Camera with DRC Sample readme(Japanese)
└─readme_sfboot_e.txt	: SDK for Camera with DRC Sample readme(English)
├─CMSIS_RTOS_RTX	: base OS and driver for peripheral IP
├─RTOS	
├─RTX	
├─Boards	
├─Renesas	
├─RenesasBSP	
├─drv_src	
├─drc	
├─inc	
├─r_drc.h	: header file of DRC driver
├─r_drc_pl.h	: header file of DRC porting layer function
├─porting	
└─r_drc_pl.c	: source file of DRC porting layer function

### 3. Applying procedure

The procedure for applying this package to the "SDK for Camera", HMI software development kit for RZ/A1 is described below.

1. Download the RZ/A1 Framework(\*) and extract it.  
( \* RZ/A1 Framework URL: [https://www.renesas.com/search/keyword-search.html?q=AN\\_R01AN3638](https://www.renesas.com/search/keyword-search.html?q=AN_R01AN3638) )
2. Extract this package(an-r01an3897ej0202-rza1h-fwp.zip)
3. Overwrite the "Document" folder extracted in step 1, by same folder extracted in step 2.
4. Overwrite the "Software" folder extracted in step 1, by same folder extracted in step 2.

### 4. Confirmation of sample program operation

Regarding the operation of sample program of this package, please replace "Blinky\_smp1" with "ContrastAutomaticCorrection\_smp1" or "SDKforCamera\_smp2" for the contents of chapter 2.4 of "RZ/A1H Group, RZ/A1LU Group RZ/A1 Framework Quick Start Guide (R01AN3639)" included in RZ/A1 Framework. Please implement Chapter 3 "How to apply this package to RZ/A1 Framework" before actual operation.

## Revision History

Rev.	Date	Description			
		No	Type	Description	Remark
2.02	Jul. 19, 2019	1	Document	Added text file to describe software license.	License.txt
		2	Sample Program	Modified some comments in source file.	Modification points: main.c in following projects: SDKforCamera_smp2, ContrastAutomaticCorrection_smp1
2.01	Oct 10, 2018	1	Sample program	Fixed an issue that a section which is should be aligned by 4 bytes was not aligned in link directive file.	Modification points: *.ld of all sample project.
		2	Sample program	Fixed an issue that the "Number of Wait Cycles between ACTV Command and READ(A)/WRIT(A) Command" of SDRAM (MT48LC16M16A2P-75) which is mounted on Renesas Starter Kit+ for RZ/A1H was wrong.	Modification points: board_Init.c of all sample project.
		3	Sample Program	Added some definition reference to application, to cooperate with "QE for Camera".	Software\App\ application_sample\ SDKforCamera\sample2\ and, Software\App\ application_sample\ ContrastAutomatic Correction\sample1\  the following four files in an above folder src\graphics_sample.c src\video_init.c inc\camera\ov7670_omnivision.h inc\camera\ov7740_omnivision.h
		4	Overall	Fixed issues of the setting of "reference project" in each sample project (Missing reference of other required projects)	.project files under Software\App directory.
2.00	Jan 26, 2018	1	Overall	Updated supporting e2 studio to version 6.1.0.	Modification points: .cproject and .project of all sample project.
1.00	Aug 10, 2017	-		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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