RZ/A series

FSP Example Project Usage Guide

Introduction

This Flexible Software Package (FSP) Example Project Usage Guide provides steps and guidelines for operating example projects which use the RZ/A FSP.

Target Device

- RZ/A3UL

Supported Board Edition

- RZ/A3UL Evaluation Board Kit QSPI Edition.
- RZ/A3UL Evaluation Board Kit OCTAL-SPI Edition.

Contents

1. Prerequisites

1. Tool experience: It is assumed that the user has prior experience working with integrated development environments, such as e² studio and terminal emulation programs, such as Tera Term.
2. Subject knowledge: It is assumed that the user has basic knowledge about microprocessors, embedded systems, and FSP to modify the example projects. First time users are recommended to refer to *Getting Started with Flexible Software Package*, paying special attention to sections as follow.
    - Set up a SMARC EVK
    - Tutorial: Your First RZ MPU Project – Blinky
    - Importing an Existing Project into e² studio
3. The screen shots provided throughout this document are for reference. The actual screen content may differ depending on the version of software and development tools used.

2. Hardware and Software Requirements

RZ/A FSP Example projects are designed to operate using Evaluation Board Kit for RZ/A3UL MPU officially supported by Renesas.
Refer to the readme.txt file in the specific module folder of */example_projects* folder for additional hardware and software requirements for running the projects.

Note:

Some projects may require external hardware as mentioned in the respective readme.txt files.

Operating Environment

- Windows® 10 operating system
- RZ/A FSP v2.0.1
- e² studio 2023-04

3. Tool Installation

3.1 FSP and Tools Installation

Download and install the latest version of FSP and tools from FSP GitHub repository.

1. Open FSP GitHub repository: https://github.com/renesas/rza-fsp
2. Go to the ***Releases*** section of Git and navigate to latest FSP section.
3. Follow the instructions on installing and using FSP and e² studio.

4. Downloading and Running the Project

4.1 Downloading the Project

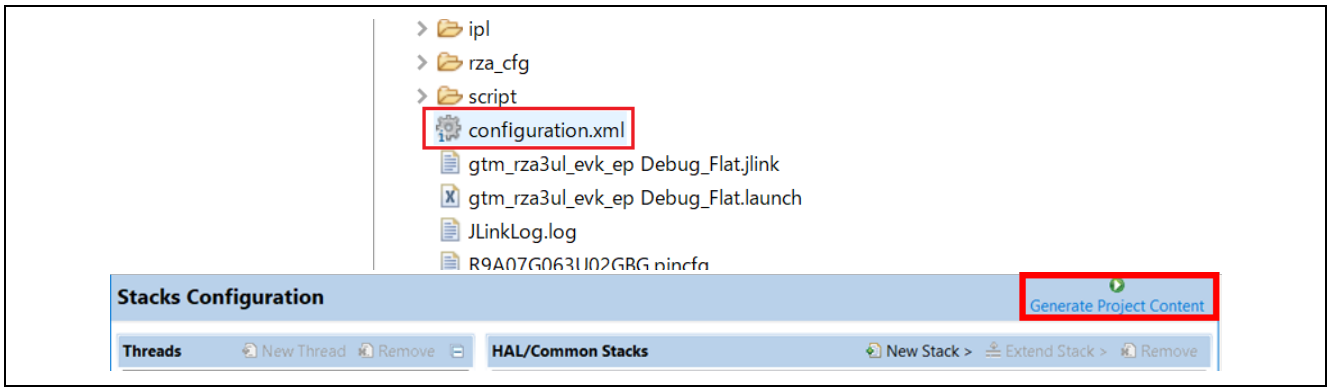
1. Download the example project which is "RZ/A3UL EVK Example Projects" from RZ/A3UL Software Package | Renesas.

4.2 Running the Project

4.2.1 Importing the Project into e2studio

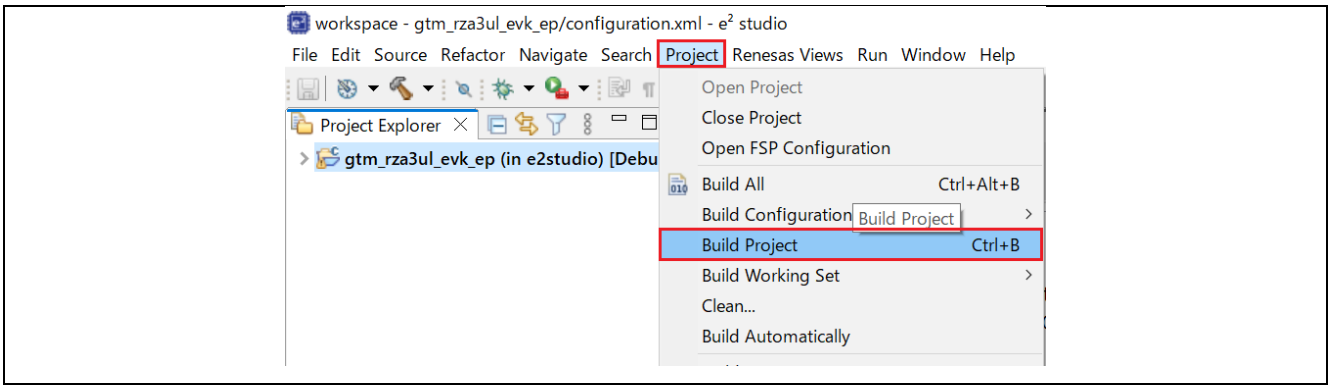
1. Import an existing project.
   Refer to the section *Importing an Existing Project into e2 studio* in *Getting Started with Flexible Software Package.*

2. Generate Project content.
   Double click to open **configuration.xml** and then click **Generate Project Content**.

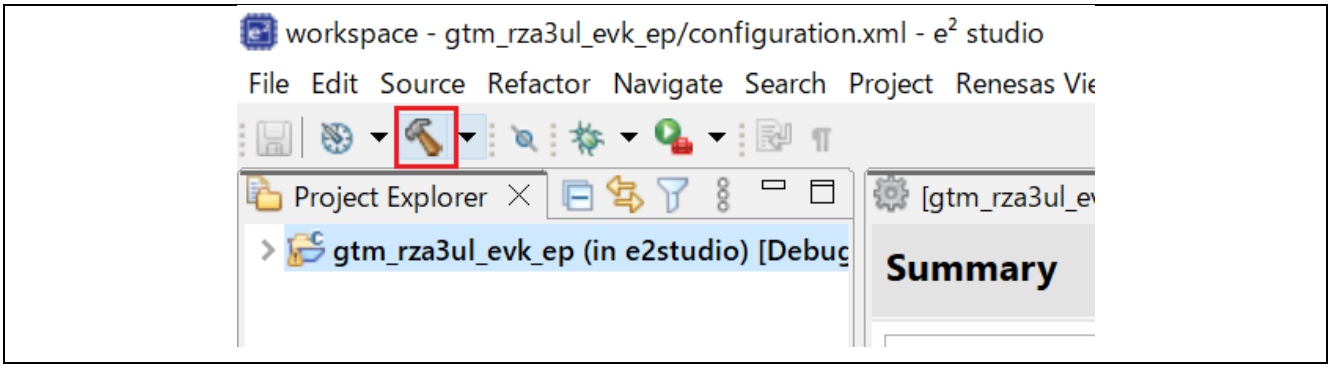


3. Build the project.
   There are three ways to build a project:

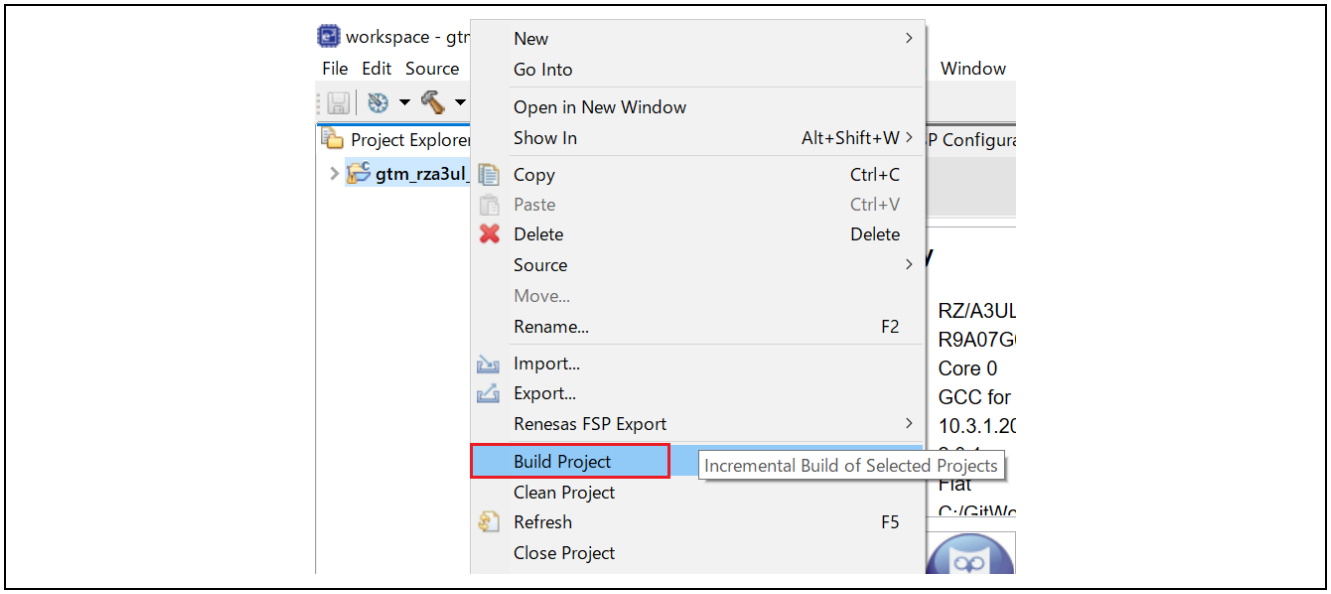
   a. Click on **Project** in the menu bar and select **Build Project**.



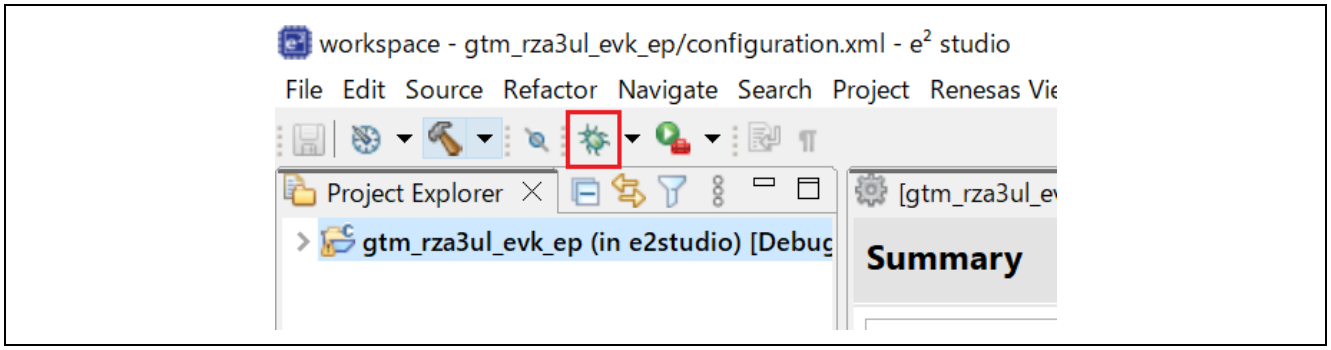
   b. Click on the hammer icon.



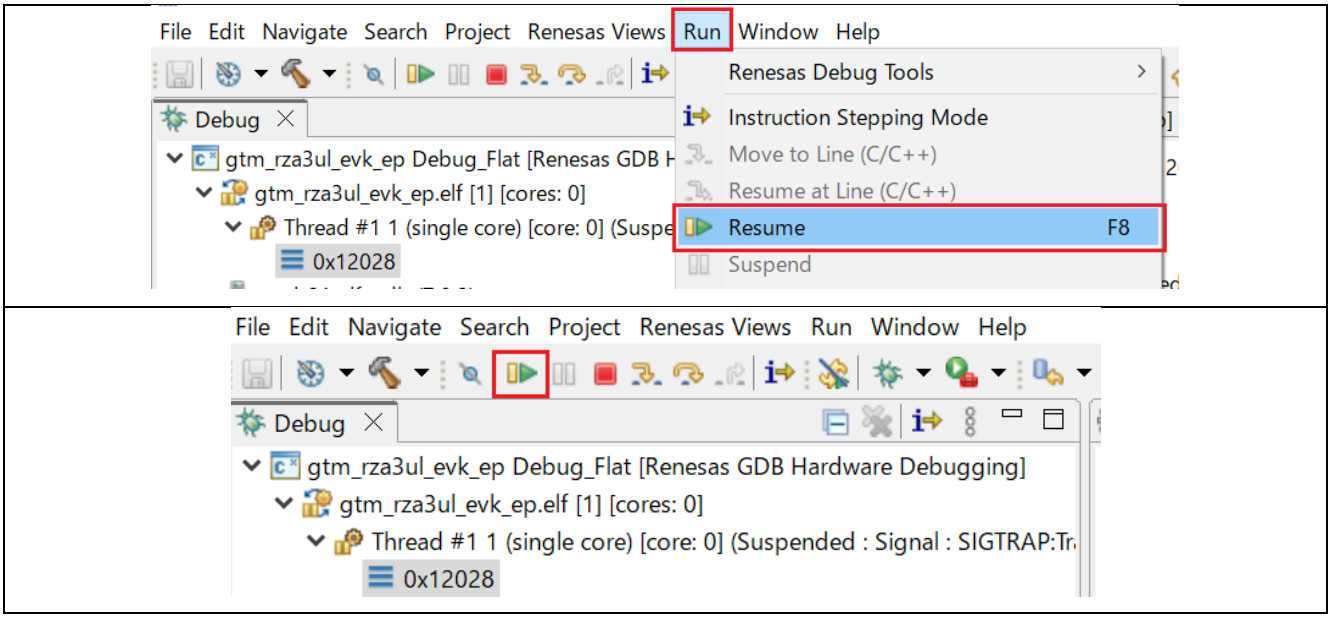
c. Right-click on the project and select **Build Project**.



4. Refer to the `readme.txt` file in the project folder and configure the hardware settings. Turn on the board and connect it to the PC. Set the configuration of Terminal Emulator.
   - Speed: 115200bps
   - Data: 8bit
   - Parity: None
   - Stop bits: 1bit
   - Flow control: None
5. Downloading the project image to the board.
   Click **Debug** to begin debugging the application.



6. In Debug mode, click **Run** > **Resume** or click on the **Play** icon twice.



7. Follow the instructions displayed on the Terminal Emulator as shown below.

Note:

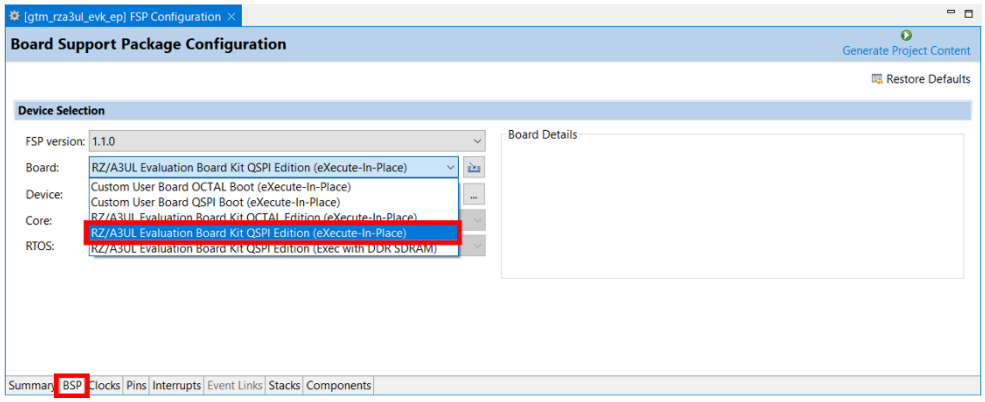
1. Example Projects do not support floating point or special characters or any non-numeric characters.
2. Example projects do not handle cases where the user input is greater than the expected input array size.

5. Change Board Edition Settings on the Project

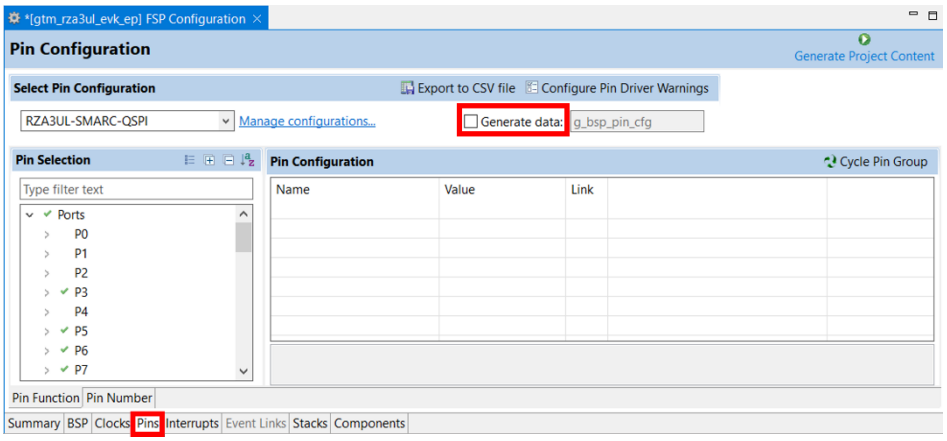
This example project sets RZ/A3UL Evaluation Board Kit QSPI Edition (Exec with DDR-SDRAM) as default. If you can use the project for other board edition, follow the below procedure.

5.1 Change to RZ/A3UL Evaluation Board Kit QSPI Edition (eXecute-In-Place)

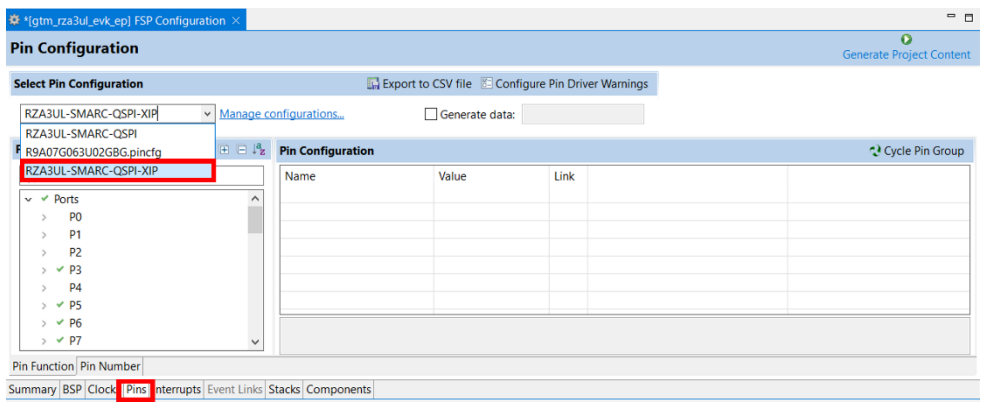
1. Change **Device Selection** to **RZ/A3UL Evaluation Board Kit QSPI Edition (eXecute-In-Place)** in FSP Configuration > BSP tab.



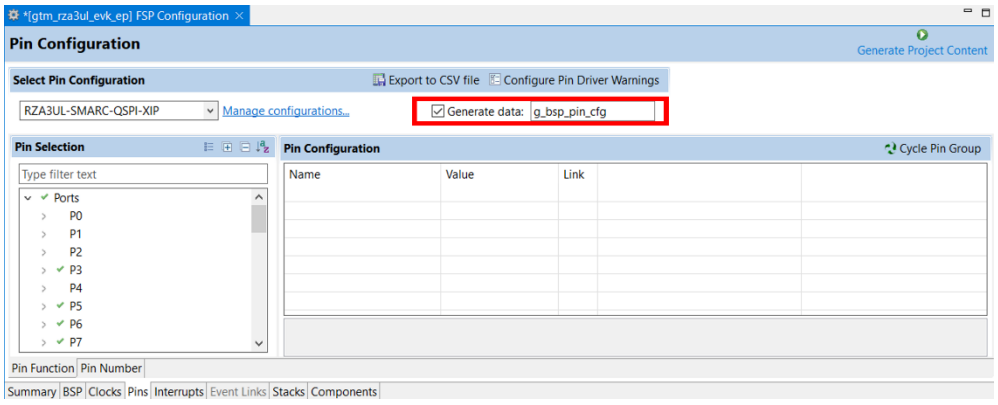
2. Uncheck the box in **Generate data** of FSP Configuration > Pins tab.



3. Change **Select Pin Configuration** to **RZA3UL-SMARC-QSPI-XIP** in FSP Configuration > Pins tab.



4. Check the box and enter **g_bsp_pin_cfg** in **Generate data** of FSP Configuration > Pins tab.

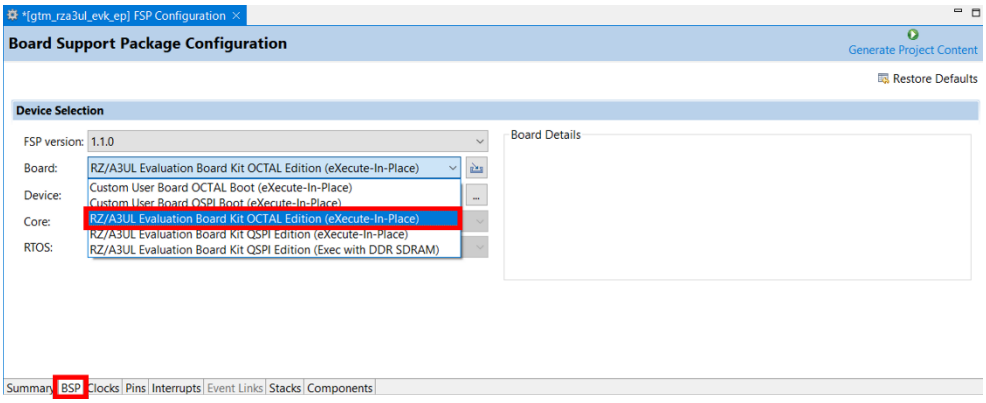


5. Click **Generate Project Content**.

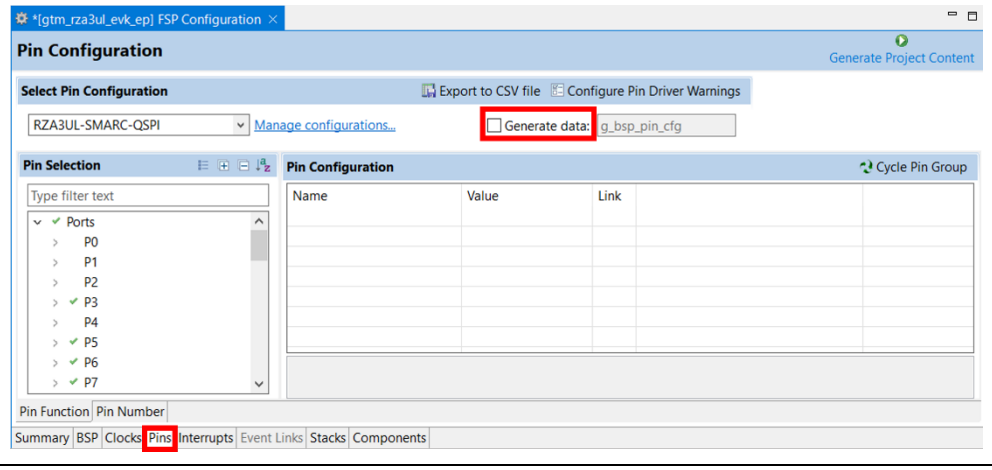
6. Build the project.

5.2 Change to RZ/A3UL Evaluation Board Kit OCTAL Edition (eXecute-In-Place)

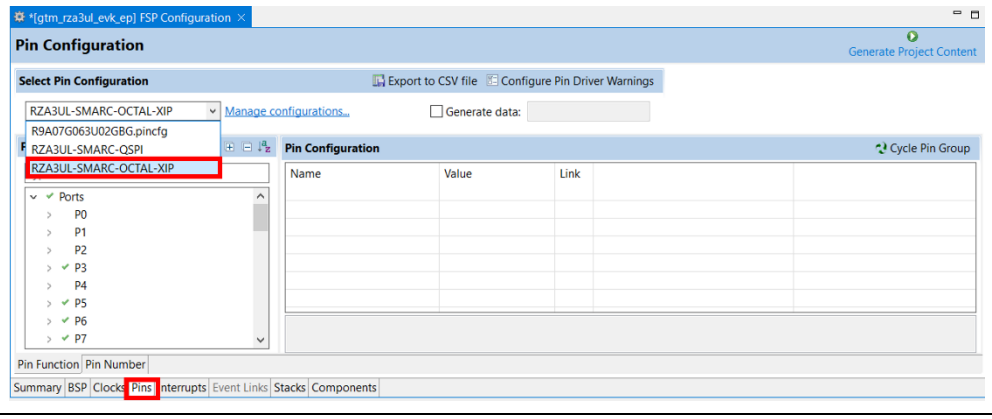
1. Change **Device Selection** to **RZ/A3UL Evaluation Board Kit OCTAL Edition (eXecute-In-Place)** in FSP Configuration > BSP tab.



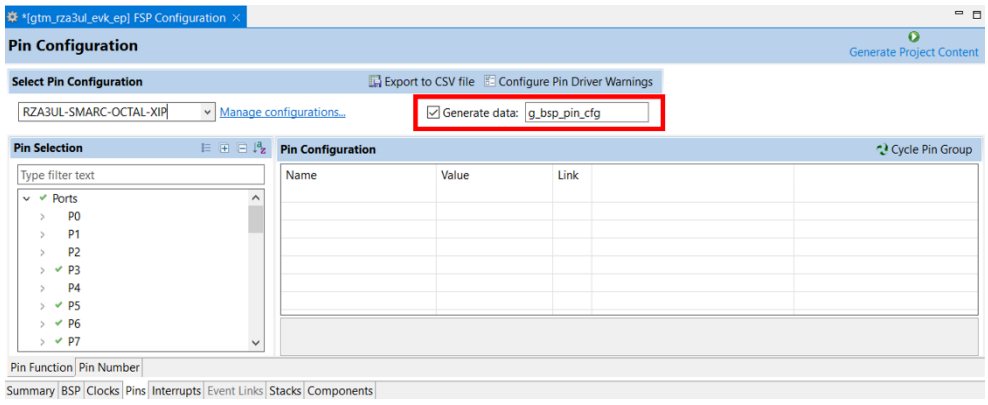
2. Uncheck the box in **Generate data** of FSP Configuration > Pins tab.



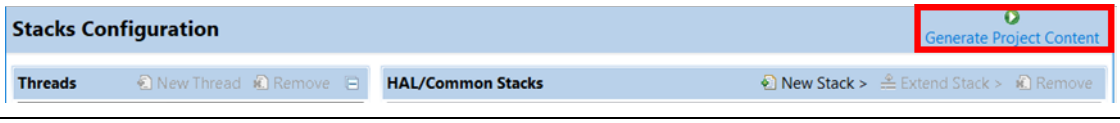
3. Change **Select Pin Configuration** to **RZA3UL-SMARC-OCTAL-XIP** in FSP Configuration > Pins tab.



4. Check the box and enter **g_bsp_pin_cfg** in **Generate data** of FSP Configuration > Pins tab.



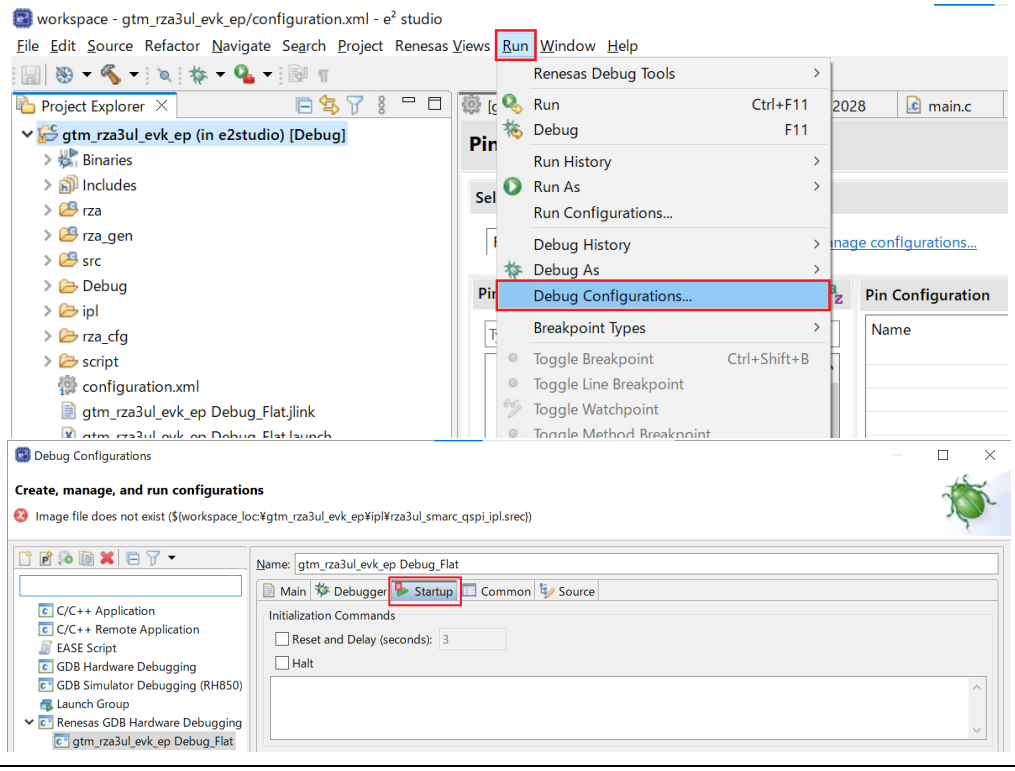
5. Click **Generate Project Content**.



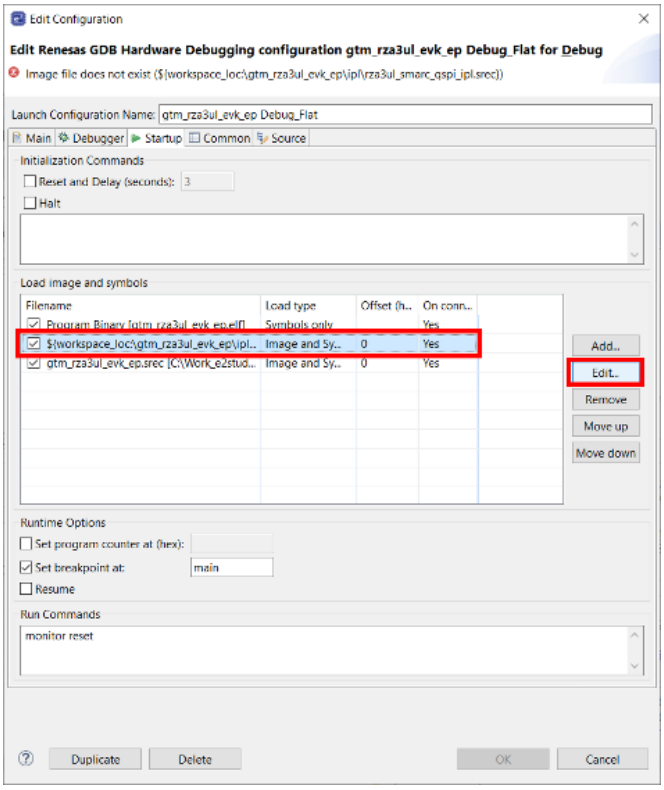
6. Build the project.

7. Change Loaded file of IPL for OCTAL edition.

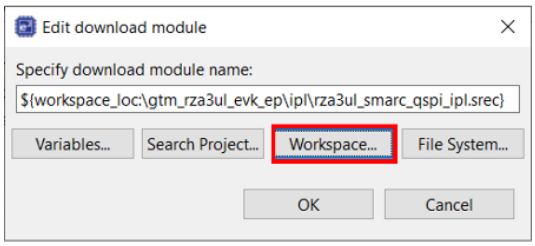
   1. Open **Debug Configurations** and move to **Startup** tab.

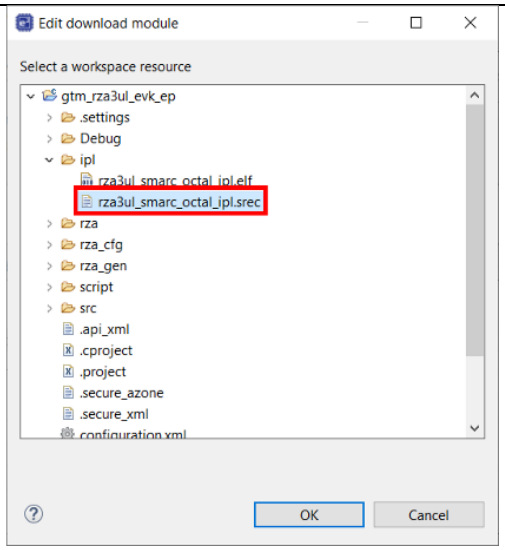


2. Click rza3ul_smarc_qspi_ipl.srec in **Load Image and Symbols** and click **Edit…**.

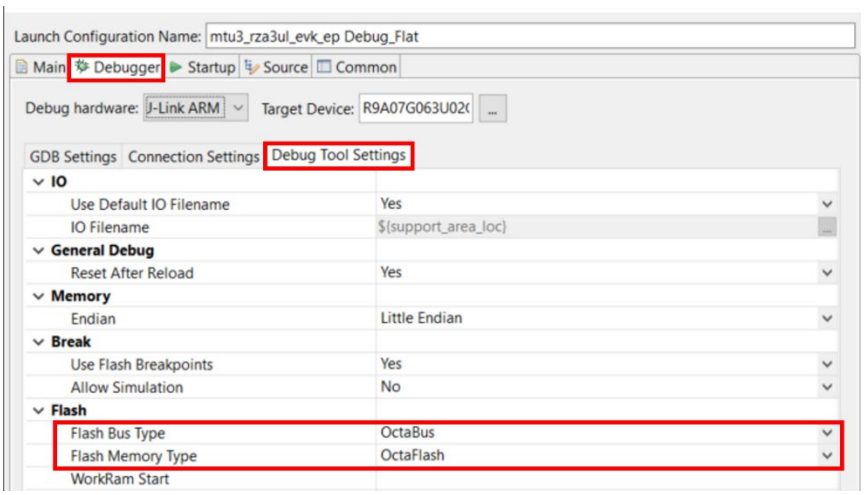


3. Click **Workspace…** and select project/ipl/rza3ul_smarc_octal_ipl.srec.





8. Then select the **Debug Tool Settings** tab inside the **Debugger** tab.
   Change **Flash Bus** Type to **OctaBus** (At this time, **Flash Memory Type** is automatically changed to **OctaFlash**).



9. Click OK and apply the Debug Configuration.

6. References

FSP GitHub:	github.com/renesas/rza-fsp
FSP User Manual:	renesas.github.io/rza-fsp/
Getting Started Guide	Getting Started with RZ/A Flexible Software Package V2.01 (renesas.com)
FSP Example Projects:	RZ/A3UL Software Package | Renesas
Evaluation Kit Manuals:	RZ/A3UL-Evaluation-Board-Kit (renesas.com)
Knowledge Base:	Knowledge Base (renesas.com)
Renesas Support:	RZ/A3UL - Support (renesas.com)

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Nov.8.22	–	First release document.
1.01	Dec.9 22	–	Added a setting procedure to change the project to RZ/A3UL Evaluation Board Kit OCTAL Edition.
1.10	Oct.27.23	3	Updated the version of FSP and e2 studio supported.
		4-6	Updated the section of running project.

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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