RZ/V 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/V FSP.

Target Device

- RZ/V2L

Supported Kit

- RZ/V2L Evaluation Board Kit.

Contents

1. Prerequisites

1. Tool experience: It is assumed that the user has prior experience working with integrated development environments, such as e2 studio, SEGGER J-Link RTT Viewer and terminal emulation programs, such as Tera Term.

2. Subject knowledge: It is assumed that the user has basic knowledge about microcontrollers, embedded systems, and FSP to modify the example projects. First time users are recommended to refer to FSP User Manual for Tutorial on *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/V FSP Example projects are designed to operate using Evaluation Board Kit for RZ/V2L 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.

Software Requirements

- Windows® 10 operating system
- RZ/V FSP v1.1.0
- e² studio 2024-01.1
- SEGGER J-Link RTT Viewer v7.84f

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/rzv-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.

3.2 J-Link RTT Viewer installation

Download and install SEGGER J-Link Software for Windows from

https://www.segger.com/downloads/jlink#J-LinkSoftwareAndDocumentationPack.

Default install path is `C:\Program Files\SEGGER\JLink`.

Note: Select version 7.84f from the drop-down menu in Version tab.

4. Importing and Running the Project

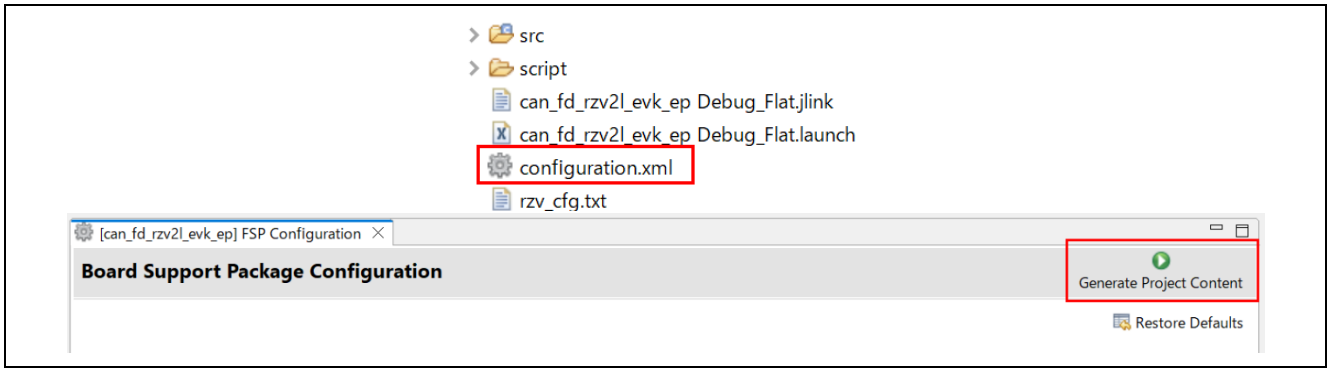
4.1 Downloading the Project

Download the example project which is "RZ/V FSP Example Projects" from RZ/V2L Group Multi-OS Package | Renesas.

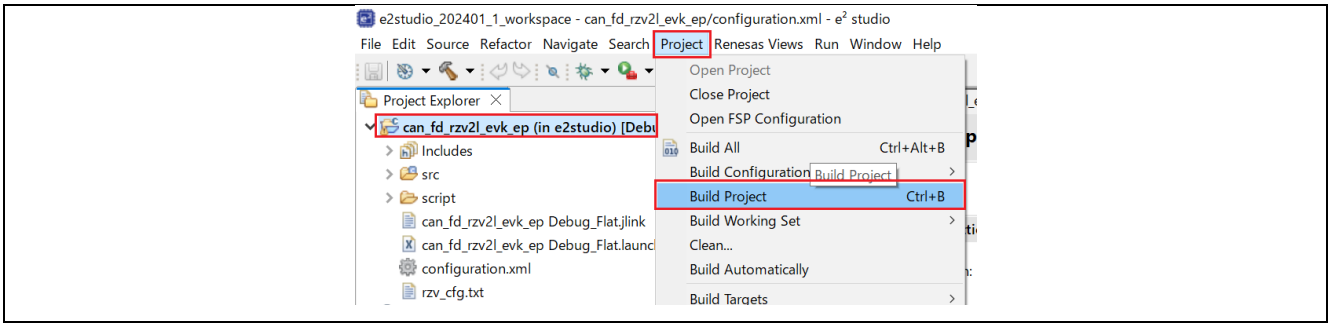
4.2 Running the project

4.2.1 Importing the project into e2studio

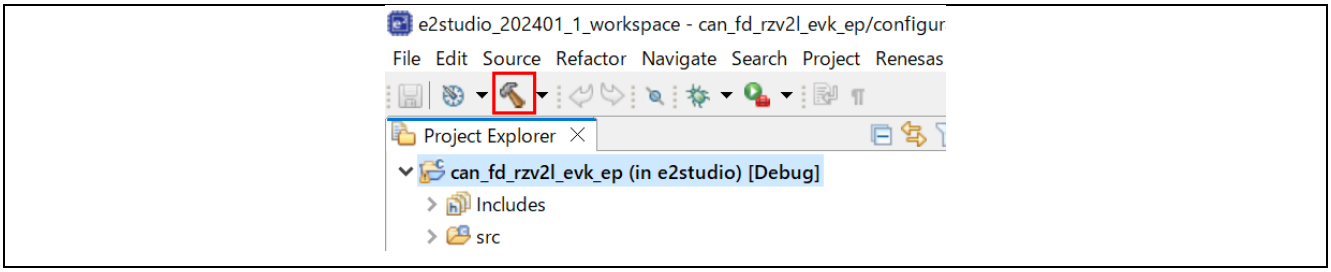
1. Import an existing project.
   Refer to the section *Importing an Existing Project into e2 studio* of *Getting Started with Flexible Software Package.*
2. Generate project content.
   Double clicks to open **configuration.xml** and then click **Generate Project Content**.



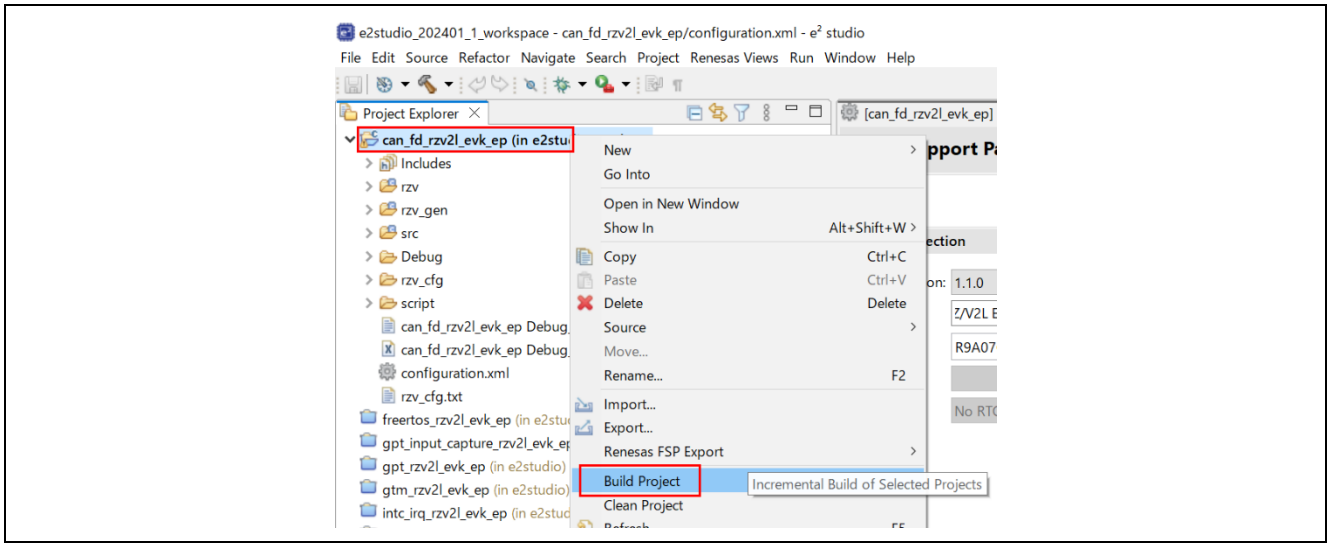
3. Build the project.
   There are three ways to build a project:
   a. Click on **Project** in the menu bar and select **Build Project**.



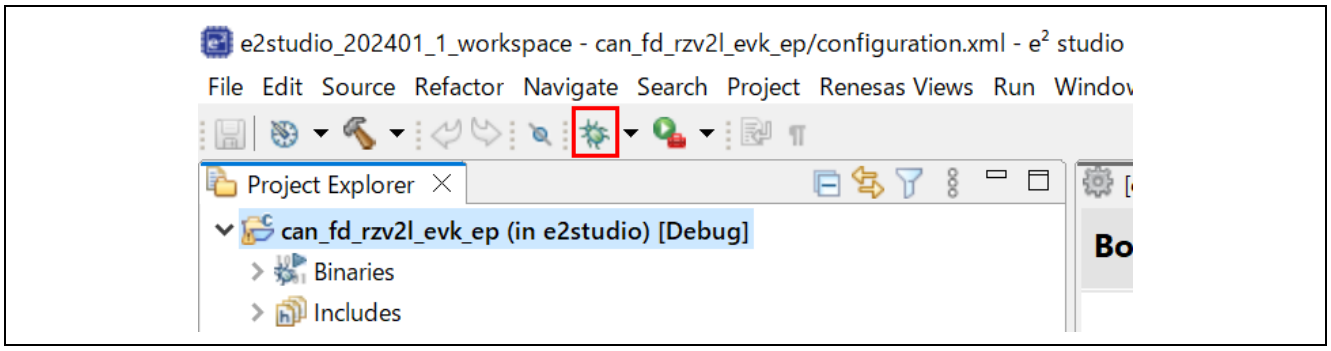
   b. Click on the hammer icon.



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

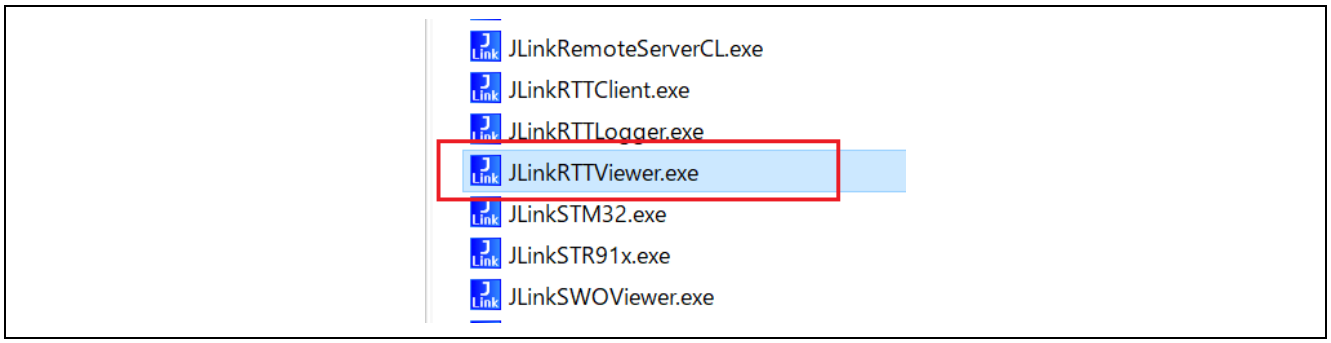


4. Downloading the project image to the board.
Click **Debug** to begin debugging the application.

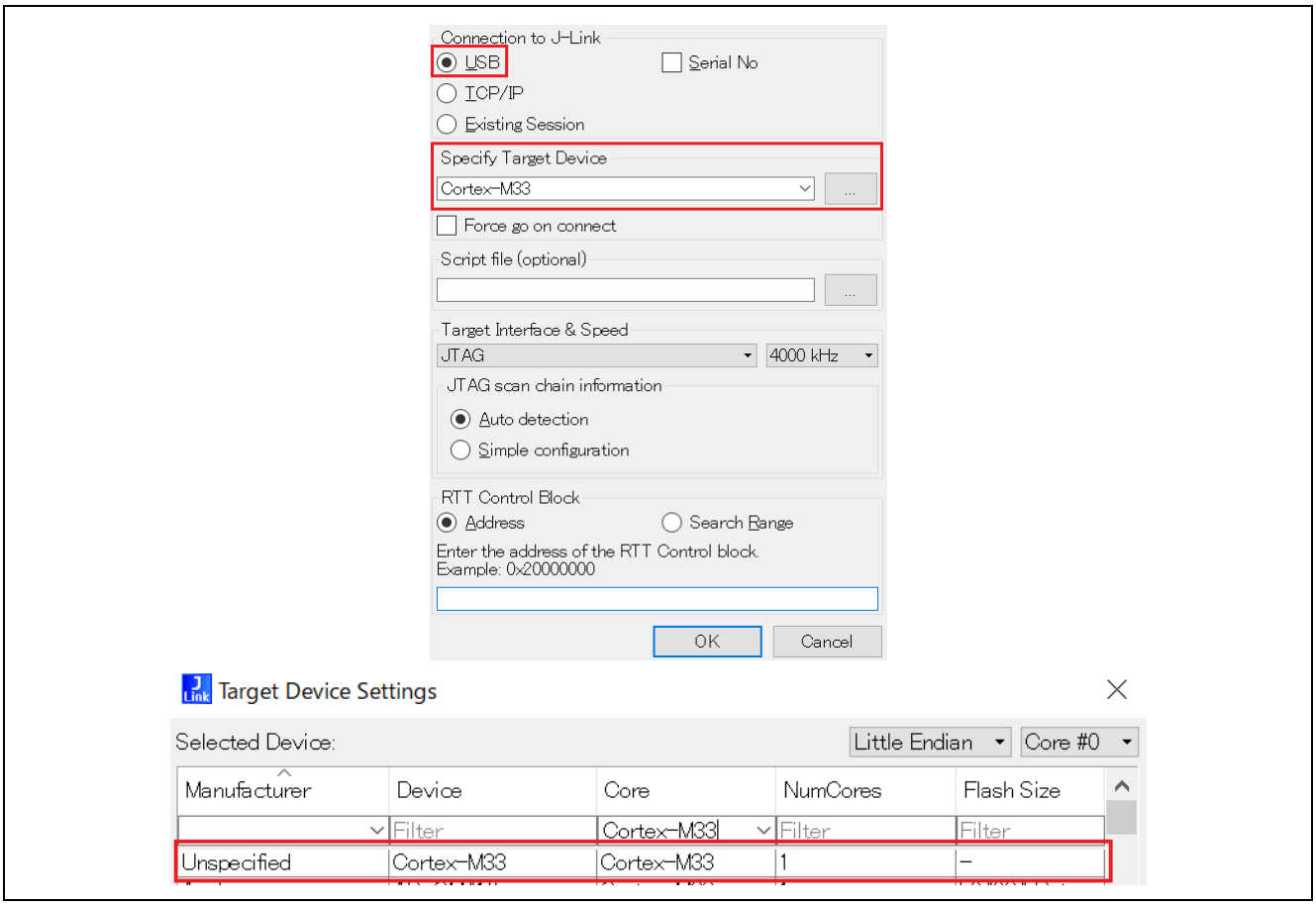


4.2.2 Connecting with J-Link RTT Viewer

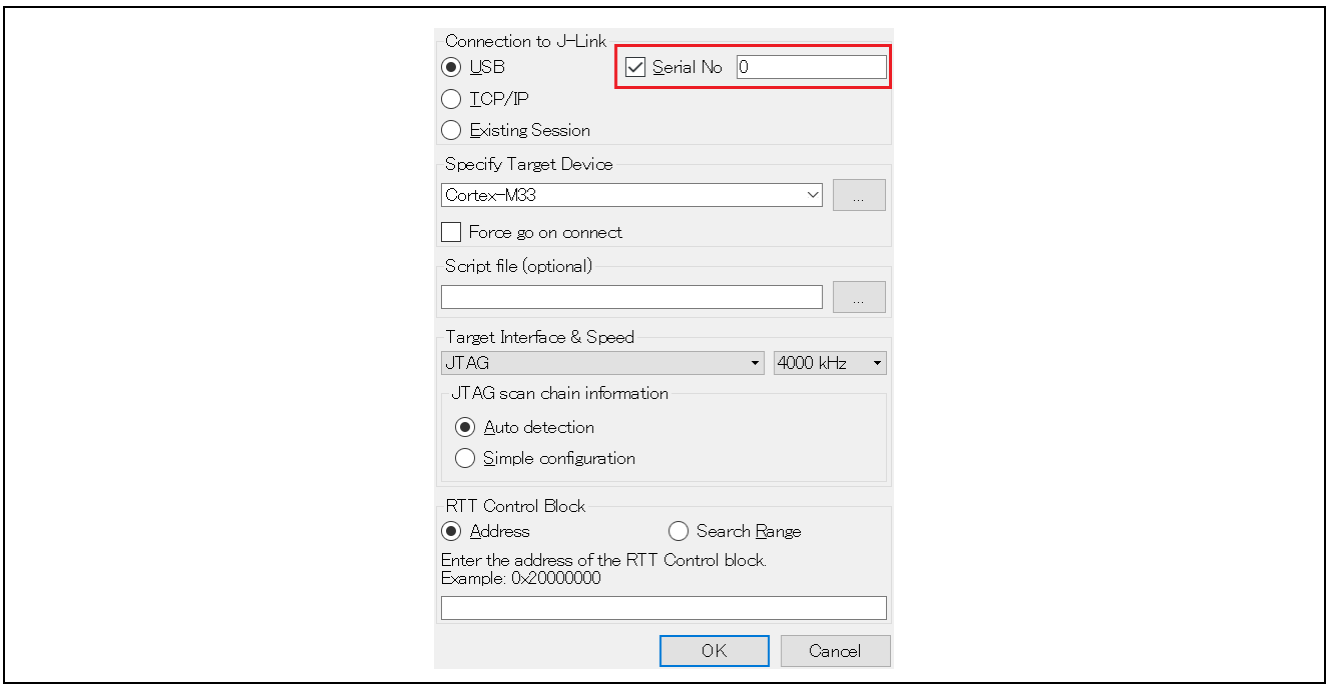
1. Open RTT Viewer by double clicking **JLinkRTTViewer.exe** in the installed /SEGGER/JLink folder.



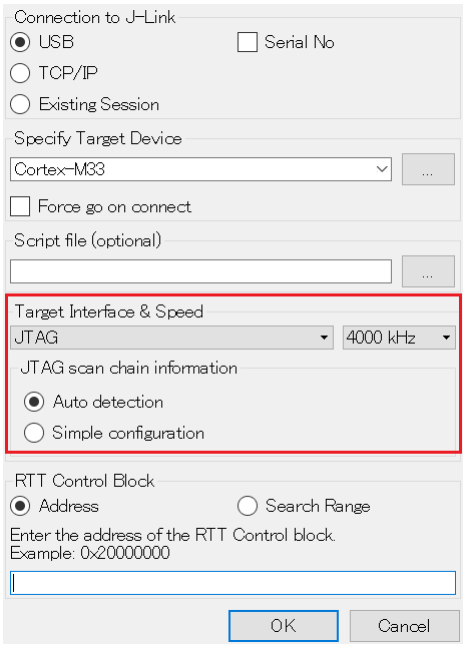
2. On opening, the field **Specify Target Device** shows up as **unspecified**. Click on the "…" tab to select the Cortex-M33 device (Cortex-M33 Core) as follows.



3. (This setting is optional.) If multiple kits are connected to the PC, make sure to choose the corresponding serial number. The default is 0.

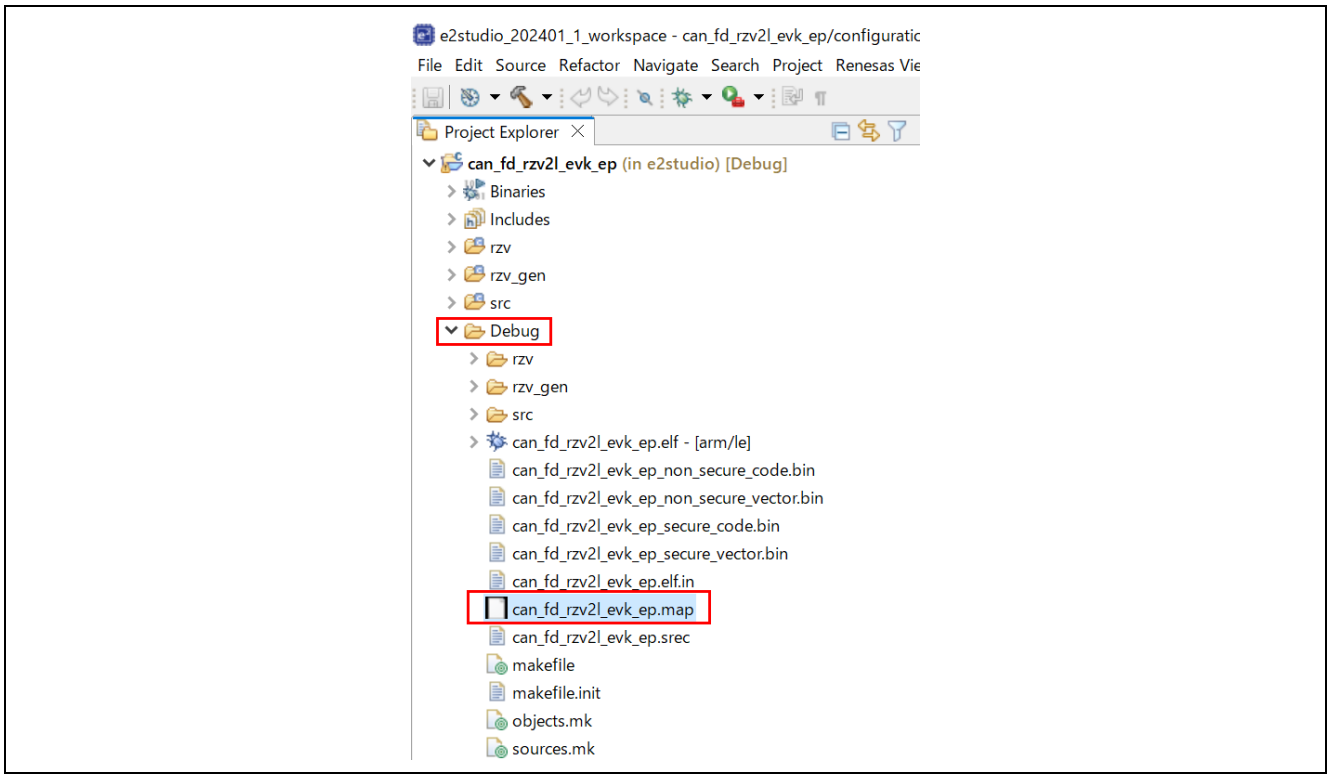


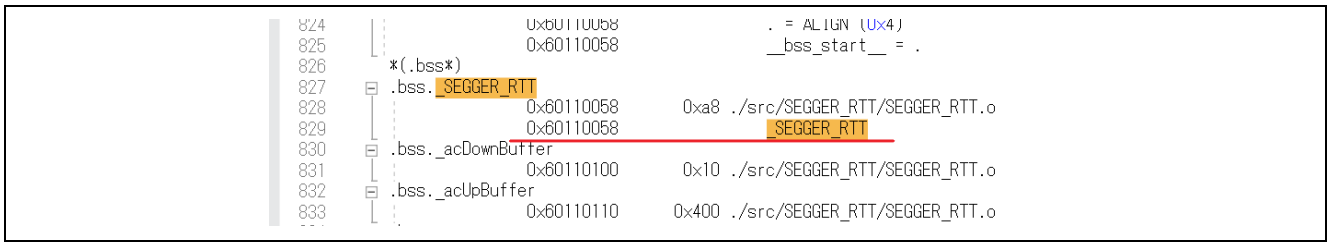
4. Select Target Interface & Speed as JTAG and 4000kHz as follows. At the same time, ensure JTAG scan chain information is Auto detection.



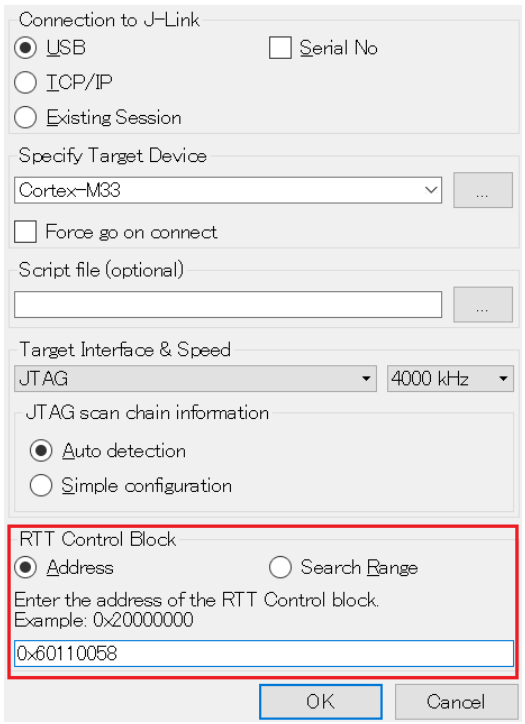
5. Configurate RTT Control Block.

   1. Segger RTT block address is required to connect J-Link RTT Viewer. Search **_SEGGER_RTT** variable in the map file, generated upon successfully building a configuration of an example project, which is by default located in the address space for SDRAM.

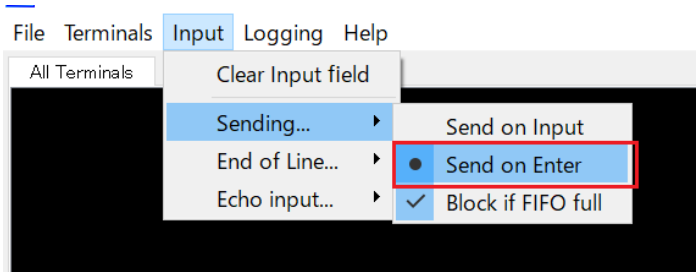




2. Select the Address and enter the address of RTT Control Block into textbox.

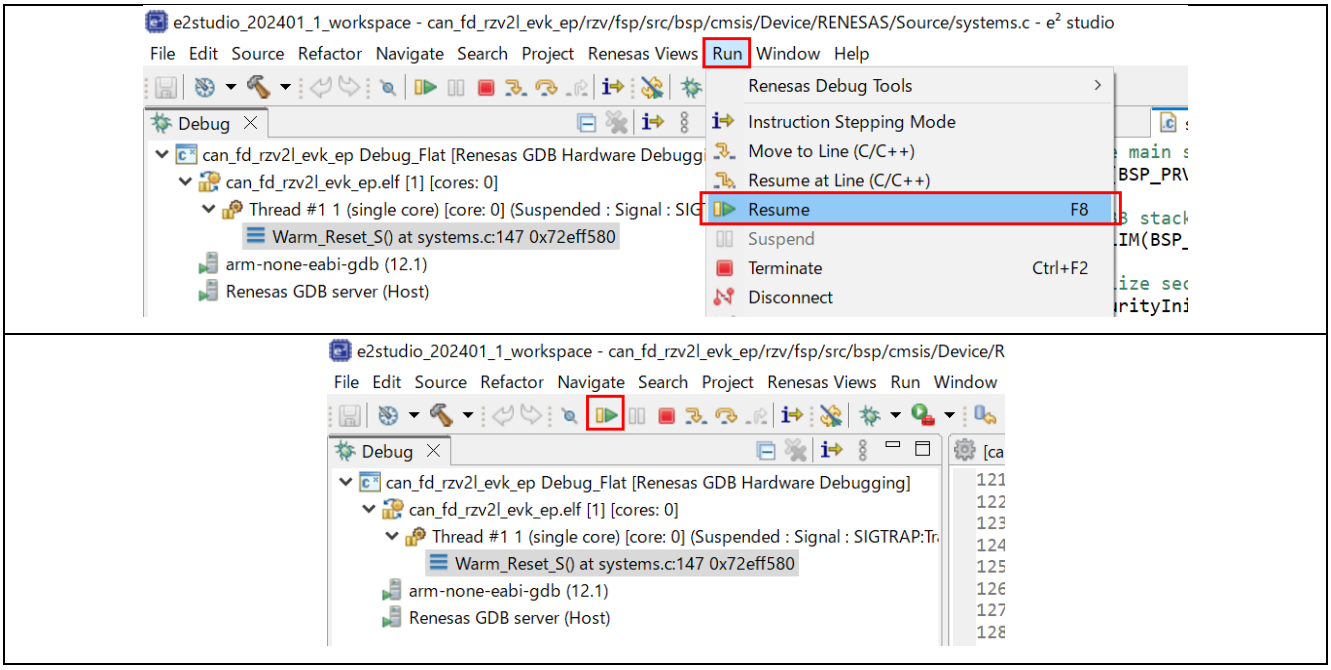


3. Click OK.
4. Click on the Input tab and change Sending option to Send on Enter. Every time input in entered, you must either press the Enter or Enter tab on the RTT viewer.

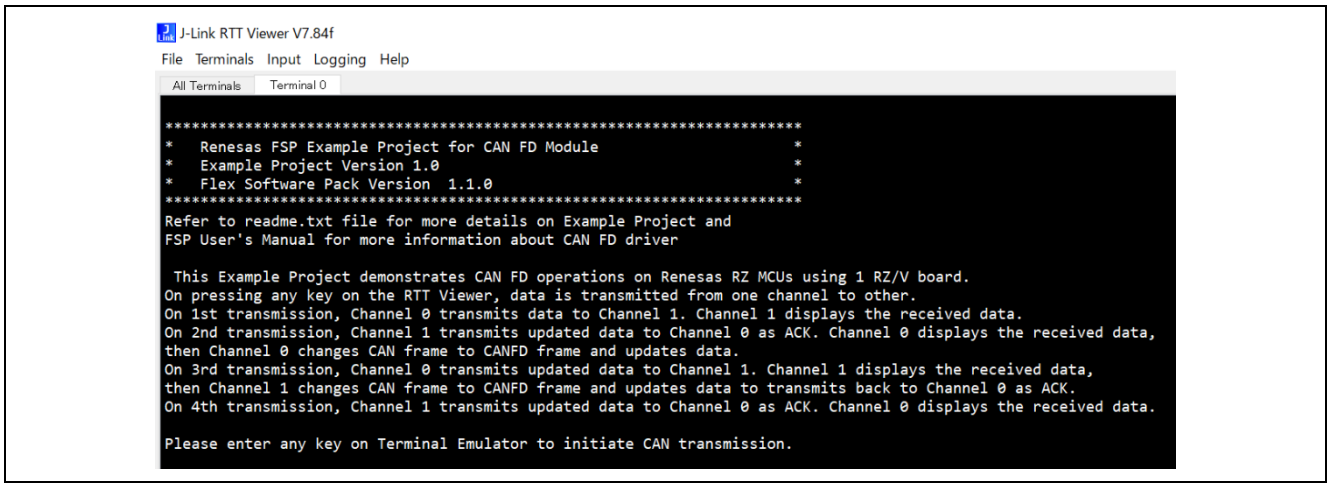


4.2.3 Running the project

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



2. Follow the instructions displayed on the RTT Viewer as shown below. Also refer to `readme.txt` file in the project folder to run the project.



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. About Examples

5.1 CANFD

5.1.1 Project Overview

The example project shows the operation of CAN-FD running on Renesas RZ MPUs using channel 0 and channel 1 on board. On pressing any key on the Terminal Emulator, data is transmitted from one channel to another.

On the 1st transmission, Channel 0 transmits data to Channel 1. Channel 1 displays the received data.
On the 2nd transmission, Channel 1 transmits updated data to Channel 0 as ACK. Channel 0 displays the received data. Then, Channel 0 changes CAN frame to CANFD frame and updates data.
On the 3rd transmission, Channel 0 transmits updated data to Channel 1. Channel 1 displays the received data. Then, Channel 1 changes CAN frame to CANFD frame and updates data to transmits back to Channel 0 as ACK.
On 4th transmission, Channel 1 transmits updated data to Channel 0 as ACK. Channel 0 displays the received data.

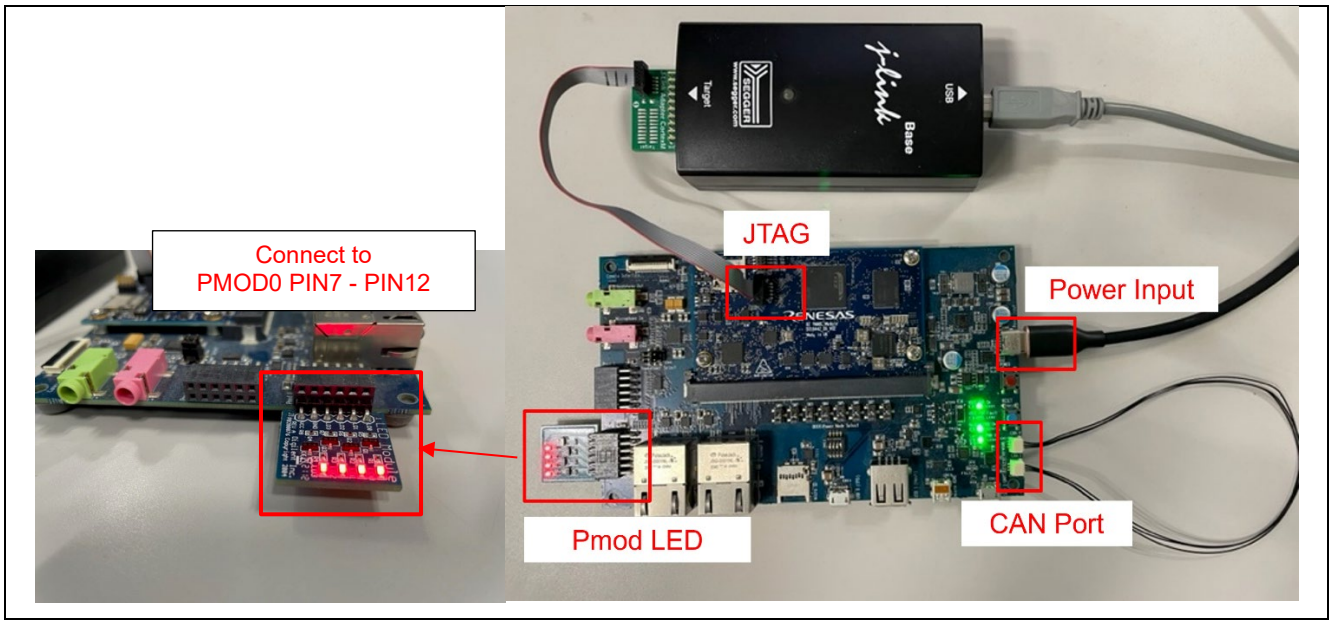
5.1.2 Hardware Requirements

External hardware: Pmod LED

Also, The Evaluation Board Kit must have IC15 (to support CAN port) is on the carrier board.

5.1.3 Hardware Settings

Please connect each hardware as below.



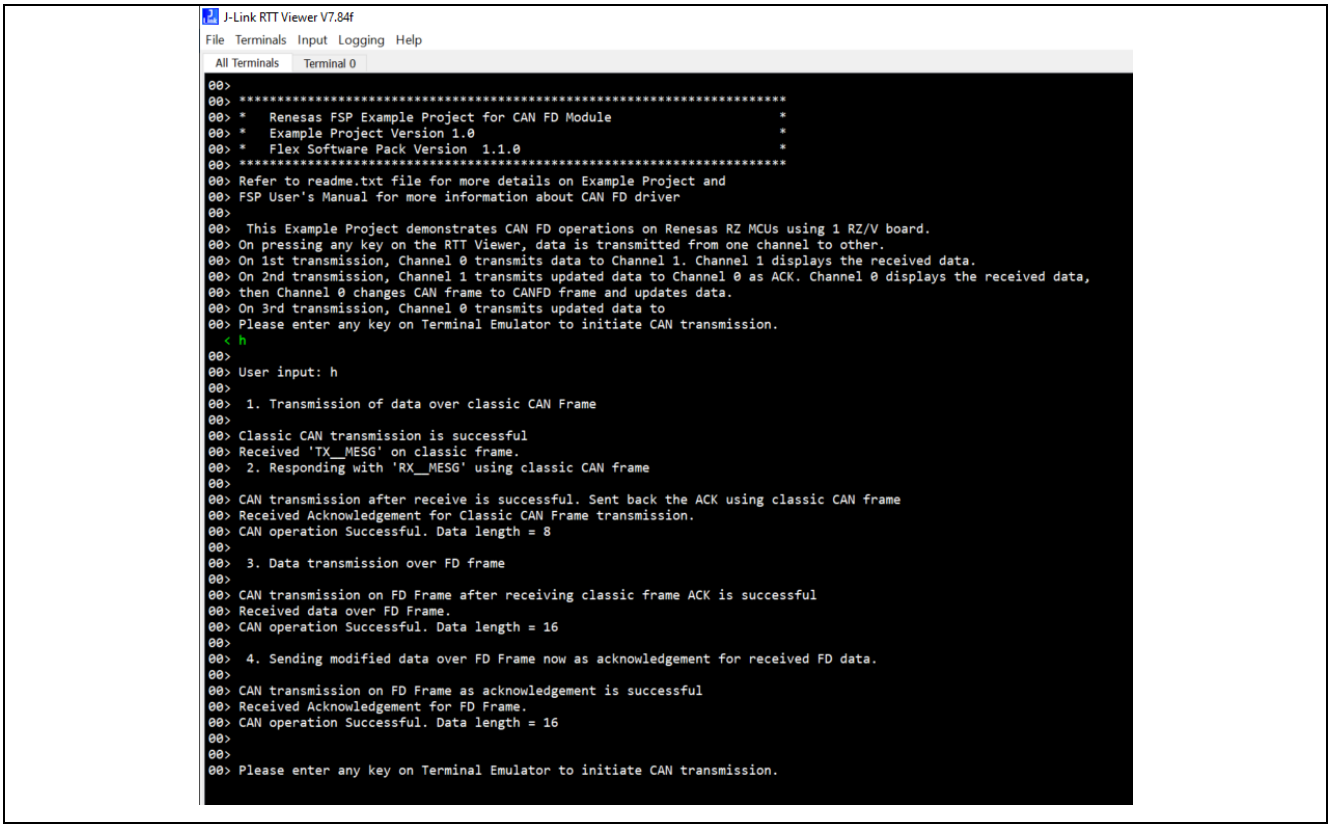
Board Setting (RZ/V2L)

Please set each DIP switch and jumpers as below.

Board	**RZ/V2L EVK**
Module board	SW1-1: OFF SW1-2: Don’t care.
Carrier board	SW1: Don't care. SW2: Don't care. SW3: Don't care. SW4: Don't care. SW5: Don't care. SW6: Don't care. SW7: 1-2 SW8: 1-2 SW11-1: OFF SW11-2: OFF SW11-3: OFF SW11-4: ON CN4: Jumper connects 1-3 Jumper connects 2-4

5.1.4 Operation

After running the example, the message below is displayed on console. After inputting any key, the transmission will be performed accordingly.



5.2 RIIC Master

5.2.1 Project Overview

The example project demonstrates the typical use of the RIIC master HAL module APIs. The project initializes RIIC master module with fast mode and interfaces with PmodACL™ Board for ADXL345.

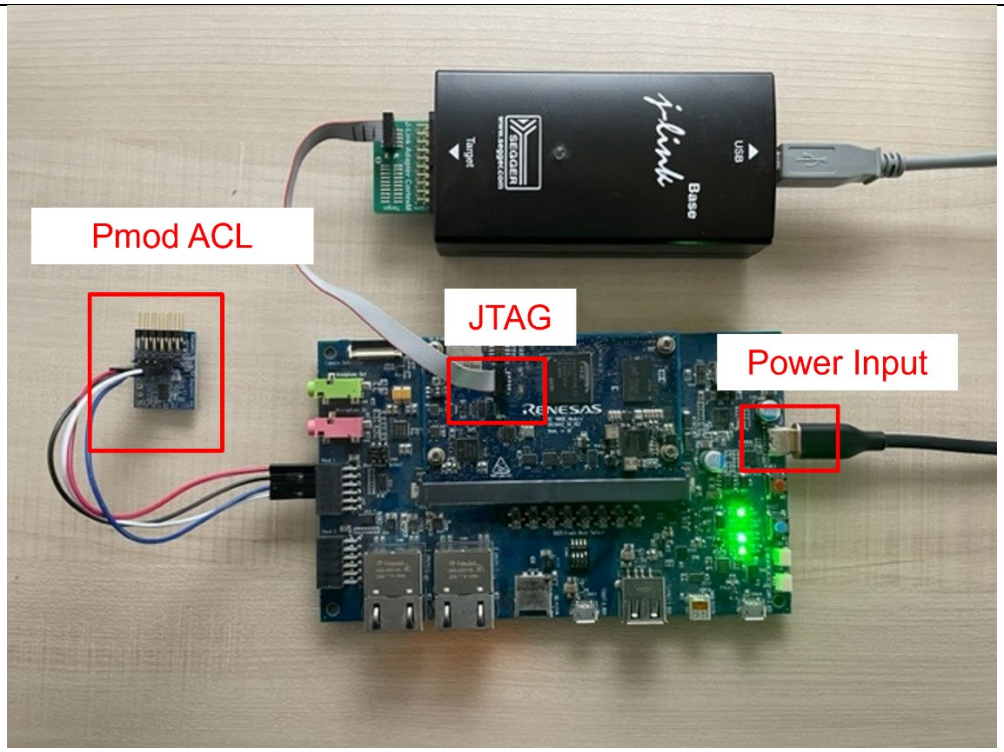
On powers up after establishing the connection of sensor with RZ/V2L board, it displays accelerometer axis data on RTTviewer. Any API/event failure will be displayed on RTTviewer.

5.2.2 Hardware Requirements

External hardware: Pmod ACL

5.2.3 Hardware Settings

Please connect each hardware as below.



Board Setting (RZ/V2L)

Please set the connection between Pmod ACL and PMOD1 on board as below.

Connection of Pmod ACL	
SCL:	Pmod ACL J2 PIN5 – PMOD1 PIN3
SDA:	Pmod ACL J2 PIN6 – PMOD1 PIN4
GND:	Pmod ACL J2 PIN7 – PMOD1 PIN5
VCC:	Pmod ACL J2 PIN8 – PMOD1 PIN6

Please set each DIP switch and jumpers as below.

Board	**RZ/V2L EVK**
Module board	SW1-1: OFF SW1-2: Don’t care.
Carrier board	SW1: Don't care. SW2: Don't care. SW3: 1-2 SW4: 1-2 SW5: Don't care. SW6: Don't care. SW7: Don't care. SW8: Don't care. SW11-1: OFF SW11-2: OFF SW11-3: OFF SW11-4: ON CN4: Jumper connects 1-3 Jumper connects 2-4

5.2.4 Operation

After running the example, the message below is displayed on console. The sensor information is shown.

```
00> ************************************************************
00> *   Renesas FSP Example Project for r_riic_master Module         *
00> *   Example Project Version 1.0                                  *
00> *   Flex Software Pack Version  1.1.0                            *
00> ************************************************************
00> Refer to readme.txt file for more details on Example Project and
00> FSP User's Manual for more information about r_riic_master driver
00>
00> This project utilizes PMOD ACL sensor as iic slave device
00> Upon successful initialization, MPU displays sensor axis data
00>
00> If SDA line is kept in LOW by any error
00> Please input 1 on J-Link RTT Viewer to Open bus.
00>
00>
00> X-axis = 0.00, Y-axis = 0.00, Z-axis = 0.00
00> X-axis = 250.00, Y-axis = 5.00, Z-axis = 65516.00
00> X-axis = 65493.00, Y-axis = 65535.00, Z-axis = 65535.00
00> X-axis = 239.00, Y-axis = 3.00, Z-axis = 64.00
00> X-axis = 251.00, Y-axis = 4.00, Z-axis = 65513.00
```

5.3 RSPI

5.3.1 Project Overview

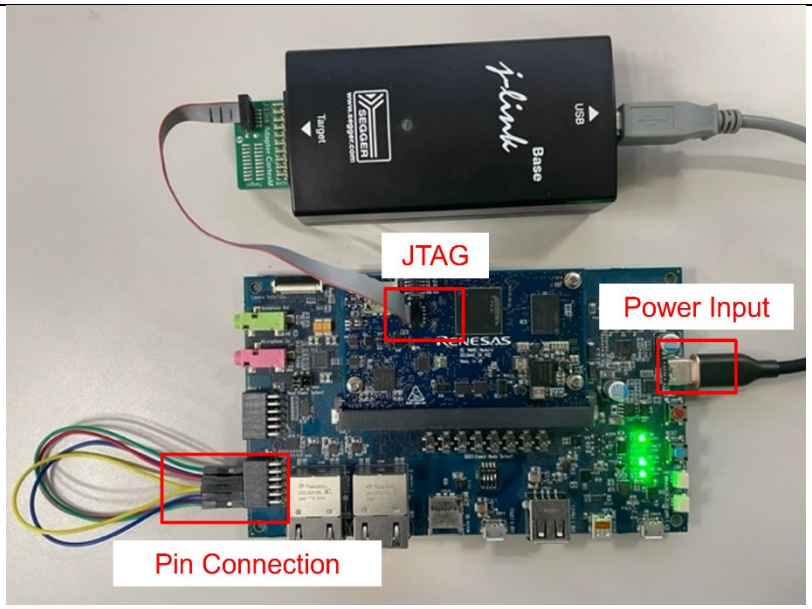
The example project demonstrates the typical use of the RSPI HAL module APIs. The project configures RSPI channels (Channel 0 and Channel 1) in Master and Slave mode. Once the module is initialized and the channels are configured, Master and Slave can transmit and receive data based on commands from user sent through JLinkRTTViewer.

5.3.2 Hardware Requirements

External hardware: None

5.3.3 Hardware Settings

Please connect each hardware as below.



Board Setting (RZ/V2L)

Please set the Pin Connection as below.

RZ/V2L EVK
MISO: PMOD0 PIN3 - PMOD0 PIN8 MOSI: PMOD0 PIN2 - PMOD0 PIN10 CK: PMOD0 PIN4 - PMOD0 PIN7 SSL: PMOD0 PIN1 - PMOD0 PIN11

Please set each DIP switch and jumpers as below.

Board	**RZ/V2L EVK**
Module board	SW1-1: OFF SW1-2: Don’t care.
Carrier board	SW1: Don't care. SW2: Don't care. SW3: Don't care. SW4: Don't care. SW5: Don't care. SW6: Don't care. SW7: Don't care. SW8: Don't care. SW11-1: OFF SW11-2: OFF SW11-3: OFF SW11-4: ON CN4: Jumper connects 1-3 Jumper connects 2-4

5.3.4 Operation

After running the example, the message below is displayed on console.

```
00> ****************************************************************
00> *   Renesas FSP Example Project for r_rspi Module               *
00> *   Example Project Version 1.0                                *
00> *   Flex Software Pack Version  1.1.0                          *
00> ****************************************************************
00> Refer to readme.txt file for more details on Example Project and
00> FSP User's Manual for more information about r_rspi driver
00>
00> The project initializes RSPI driver and configures RSPI channels
00> in Master and Slave mode. After initialization, master and slave
00> can transmit and receive data based on the commands from user.
00> Refer to the MPU User Manual for valid bit rates and corresponding
00> clock settings.
00>
00>  ** RSPI INIT SUCCESSFUL **
00>
00> Select from the below Menu options
00>
00> Press 1 for Write() and Read()
00> Press 2 for WriteRead()
00> Press 3 to Exit
```

Enter “1” to run Write() and Read() example and transmission will be performed after input data from Master to Slave. Then, Slave sends back same data to Master.

```
00> Press 1 for Write() and Read()
00> Press 2 for WriteRead()
00> Press 3 to Exit
  < 1
00>
00> Enter text input for Master buffer. Data size should not exceed 64 bytes.
  < aaa
00>
00> MASTER SEND: aaa
00>
00> SLAVE RECEIVE: aaa
00>
00> Master transmitted user input data to Slave
00>
00> Slave transmitted the data back to Master
00>
00> Master received data: aaa
00>
00>
00> ** SPI WRITE AND READ Demo Successful**
00>
00> Enter any other key to go back to the main menu
```

Enter “2” to run WriteRead() example. User can specify the data for Master and Slave. Transmission will be performed after inputting each data. Master received data and Slave received data will be shown on console once the transmission complete.

```
00> Select from the below Menu options
00>
00> Press 1 for Write() and Read()
00> Press 2 for WriteRead()
00> Press 3 to Exit
  < 2
00>
00> Enter text input for Master buffer. Data size should not exceed 64 bytes.
  < abcdefghijklmnopqrstuvwxyz012345
00>
00> Enter text input for Slave buffer. Data size should not exceed 64 bytes.
  < abcdefghijklmnopqrstuvwxyz012345
00>
00> Master buffer data transmitted to Slave
00>
00> Slave buffer data transmitted to Master
00>
00> Master received data: abcdefghijklmnopqrstuvwxyz012345
00>
00> Slave received data: abcdefghijklmnopqrstuvwxyz012345
00> ** SPI WRITE_READ Demo Successful**
00>
00> Enter any other key to go back to the main menu
```

5.4 SCIF

5.4.1 Project Overview

The example project demonstrates the typical use of the UART HAL module APIs. The project initializes the UART with Baud rate of 115200 bps and GTM module. Using a Terminal Program (like Tera Term) user can provide a value & press enter key to set the period of the Pmod LED signal.

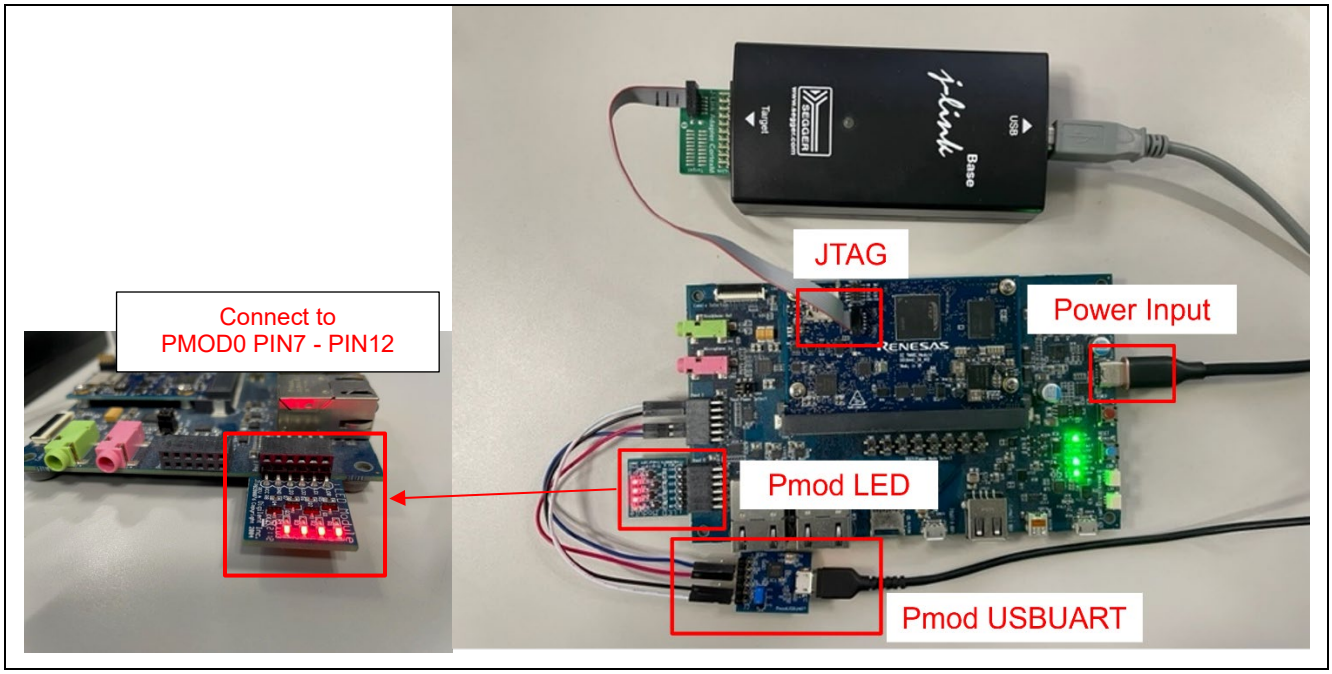
The range of input values are displayed on the JLinkRTTViewer. Any failure will also be displayed using JLinkRTTViewer. To see user input values on Serial terminal, enable local echo option.

5.4.2 Hardware Requirements

External hardware: Pmod USBUART and Pmod LED

5.4.3 Hardware Settings

Please connect each hardware as below.



Board Setting (RZ/V2L)

Please set the connection between Pmod USBUART and PMOD1 on the board below.

Connection of Pmod USBUART	
RXD:	Pmod USBUART J2 PIN2 – PMOD1 PIN2
TXD:	Pmod USBUART J2 PIN3 – PMOD1 PIN3
GND:	Pmod USBUART J2 PIN5 – PMOD1 PIN5
VCC:	Pmod USBUART J2 PIN6 – PMOD1 PIN6

Please set each DIP switch and jumpers as below.

Board	**RZ/V2L EVK**
Module board	SW1-1: OFF SW1-2: Don’t care.
Carrier board	SW1: Don't care. SW2: 2-3 SW3: 2-3 SW4: Don't care. SW5: Don't care. SW6: Don't care. SW7: Don't care. SW8: Don't care. SW11-1: OFF SW11-2: OFF SW11-3: OFF SW11-4: ON CN4: Jumper connects 1-3 Jumper connects 2-4

5.4.4 Operation

After running the example, the message below is displayed on console.

```
00> ****************************************************************
00> *   Renesas FSP Example Project for r_scif_uart Module          *
00> *   Example Project Version 1.0                                 *
00> *   Flex Software Pack Version  1.1.0                           *
00> ****************************************************************
00> Refer to readme.txt file for more details on Example Project and
00> FSP User's Manual for more information about r_scif_uart driver
00>
00>
00> The project initializes the UART with baud rate of 115200 bps.
00> Open Serial Terminal with this baud rate value and
00> Provide Input ranging from 1 - 2000 to set LED Intensity
```

User can specify a value for LED blinking on Terminal Program.

```
500
Accepted value, the led is blinking with that value
Please set the next value
1000
Accepted value, the led is blinking with that value
Please set the next value
2000
Accepted value, the led is blinking with that value
Please set the next value
```

The configuration of Terminal Program is as below.

- Speed: 115200bps
- Data: 8bit
- Parity: None
- Stop bits: 1bit
- Flow control: None

Also, enables local echo option to see user input values on Serial terminal.

5.5 GPT (Input Capture)

5.5.1 Project Overview

The Example Project demonstrates the functionality of GPT Input capture module. GPT4 is used to generate periodic pulses of 500msec duration and provided as input to GPT3 used as Input capture.

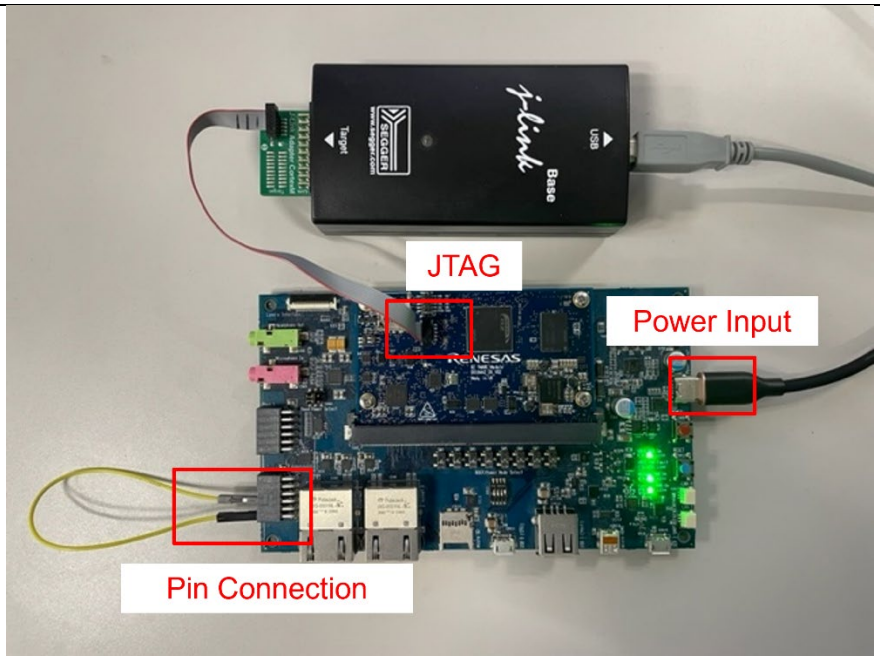
GPT3 counts the event pulse received at its input. Based on the period and capture event, the time period of pulse is calculated and displayed on RTTViewer.

5.5.2 Hardware Requirements

External hardware: None

5.5.3 Hardware Settings

Please connect each hardware as below.



Board Setting (RZ/V2L)

Please set the Pin Connection as below.

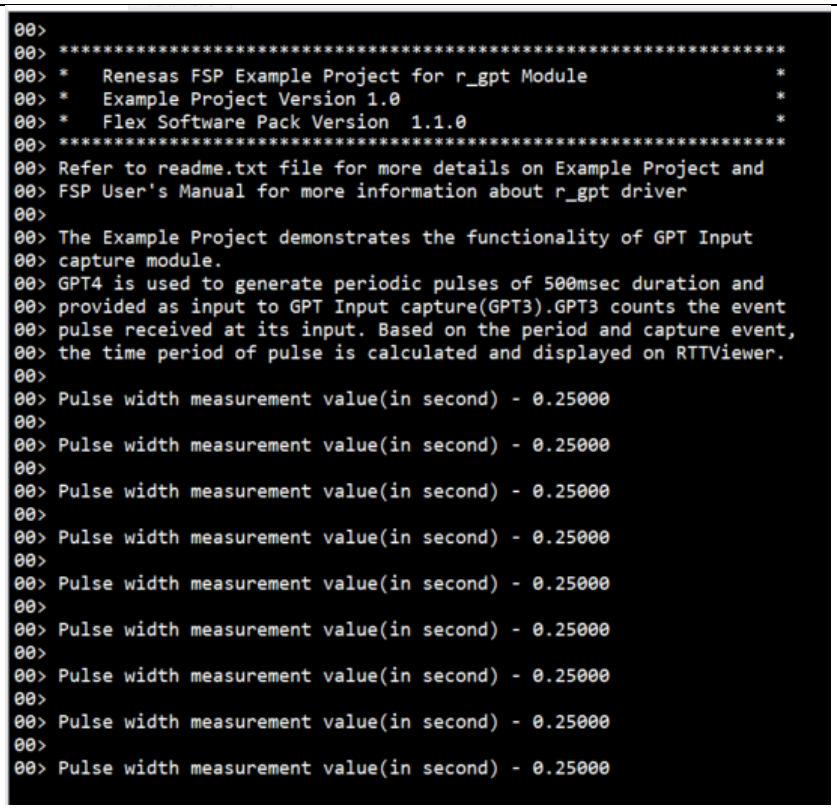
RZ/V2L EVK
PMOD0 PIN7 - PMOD0 PIN9

Please set each DIP switch and jumpers as below.

Board	**RZ/V2L EVK**
Module board	SW1-1: OFF SW1-2: Don’t care.
Carrier board	SW1: Don't care. SW2: Don't care. SW3: Don't care. SW4: Don't care. SW5: Don't care. SW6: Don't care. SW7: Don't care. SW8: Don't care. SW11-1: OFF SW11-2: OFF SW11-3: OFF SW11-4: ON CN4: Jumper connects 1-3 Jumper connects 2-4

5.5.4 Operation

After running the example, the message below is displayed on console.



5.6 GPT (PWM)

5.6.1 Project Overview

The example project demonstrates typical use of GPT HAL module APIs. Users have the provision to input value as per displayed menu through JLinkRTTViewer to select different GPT supported modes (Periodic, PWM, One-Shot).

In periodic mode, the user can enter the period within the permitted ranges to change the frequency of the user Pmod LED. In PWM mode, the user can enter the duty cycle within the specified range to adjust the intensity of the user Pmod LED. In One-Shot mode, output will be displayed on JLinkRTTViewer.

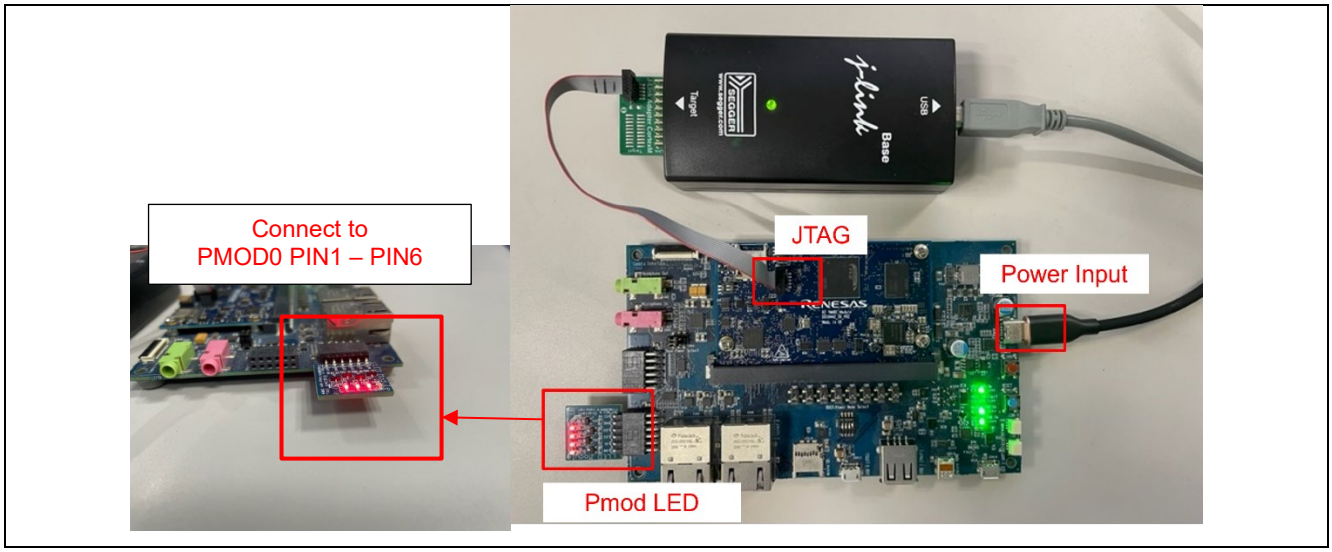
Any failure will also be displayed on JLinkRTTViewer.

5.6.2 Hardware Requirements

External hardware: Pmod LED

5.6.3 Hardware Settings

Please connect each hardware as below.



Board Setting (RZ/V2L)

Please set each DIP switch and jumpers as below.

Board	**RZ/V2L EVK**
Module board	SW1-1: OFF SW1-2: Don’t care.
Carrier board	SW1: Don't care. SW2: Don't care. SW3: Don't care. SW4: Don't care. SW5: Don't care. SW6: Don't care. SW7: Don't care. SW8: Don't care. SW11-1: OFF SW11-2: OFF SW11-3: OFF SW11-4: ON CN4: Jumper connects 1-3 Jumper connects 2-4

5.6.4 Operation

After running the example, the message below is displayed on console.

```
00> ****************************************************************
00> *   Renesas FSP Example Project for r_gpt Module                *
00> *   Example Project Version 1.0                                 *
00> *   Flex Software Pack Version  1.1.0                           *
00> ****************************************************************
00> Refer to readme.txt file for more details on Example Project and
00> FSP User's Manual for more information about r_gpt driver
00>
00> The project initializes GPT module in Periodic, PWM or One-shot
00> mode based on user input from the displayed menu options.
00> In periodic mode, user can enter the time period within the
00> permitted ranges to change the frequency of the user LED.
00> In PWM mode, user can enter the duty cycle within the
00> specified range to adjust the intensity of the user LED.
00> In ONE SHOT mode, Output will be displayed on JlinkRTTViewer
00> when timer expires.
00>
00> Menu Options
00> 1. Enter 1 for Periodic mode
00> 2. Enter 2 for PWM mode
00> 3. Enter 3 for one shot mode
```

In periodic mode, the user can enter period of the timer, then LED starts blink.

```
00> Menu Options
00> 1. Enter 1 for Periodic mode
00> 2. Enter 2 for PWM mode
00> 3. Enter 3 for one shot mode
00> User Input:
  < 1
00>
00>  Enter the desired period in millisecond
  < 500
00> Opened Timer in Periodic Mode
00> Started Timer in Periodic Mode
```

In periodic mode, the user can enter the duty cycle, then LED starts blink.

```
00> Menu Options
00> 1. Enter 1 for Periodic mode
00> 2. Enter 2 for PWM mode
00> 3. Enter 3 for one shot mode
00> User Input:
  < 2
00> Periodic Timer Instance Closed, Start PWM Timer Instance
00>
00> Enter The Desired Duty Cycle in Percentage of Range 0 - 100:
  < 30
00> Opened Timer in PWM Mode
00> Started Timer in PWM Mode
00>
```

In One-Shot mode, One-shot timer is started after selecting this mode.

```
00> Menu Options
00> 1. Enter 1 for Periodic mode
00> 2. Enter 2 for PWM mode
00> 3. Enter 3 for one shot mode
00> User Input:
  < 3
00> PWM Timer Instance Closed, Start ONE-SHOT Timer Instance
00> Opened Timer in ONE-SHOT Mode
00> Started Timer in ONE-SHOT Mode
00>
00>  Timer Expired in One-Shot Mode
00>
```

5.7 GTM

5.7.1 Project Overview

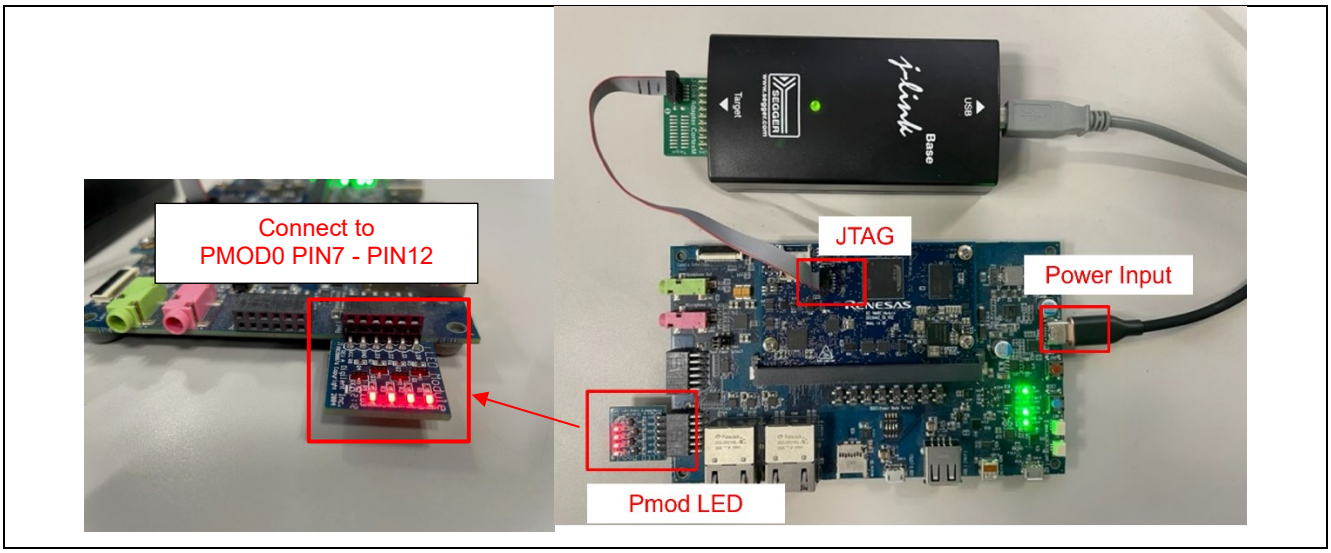
This Example Project demonstrates the functionality of GTM in periodic mode and one-shot mode. On providing any input on the RTTviewer, GTM channel 2 starts in one-shot mode. GTM channel 1 starts in periodic mode when GTM channel 2 expires. Timer in periodic mode expires periodically at a time period specified by user and toggles the LED1 on Pmod LED.

5.7.2 Hardware Requirements

External hardware: Pmod LED

5.7.3 Hardware Settings

Please connect each hardware as below.



Board Setting (RZ/V2L)

Please set each DIP switch and jumpers as below.

Board	**RZ/V2L EVK**
Module board	SW1-1: OFF SW1-2: Don’t care.
Carrier board	SW1: Don't care. SW2: Don't care. SW3: Don't care. SW4: Don't care. SW5: Don't care. SW6: Don't care. SW7: Don't care. SW8: Don't care. SW11-1: OFF SW11-2: OFF SW11-3: OFF SW11-4: ON CN4: Jumper connects 1-3 Jumper connects 2-4

5.7.4 Operation

After running the example, the message below is displayed on console. Users can input the period for One-shot mode and Periodic mode.


J-Link RTT Viewer V7.84f
File Terminals Input Logging Help
All Terminals
Terminal 0
00>
00> **
00> *   Renesas FSP Example Project for r_gtm Module   *
00> *   Example Project Version 1.0   *
00> *   Flex Software Pack Version 1.1.0   *
00> **
00> Refer to readme.txt file for more details on Example Project and
00> FSP User's Manual for more information about r_gtm driver
00>
00> This Example Project demonstrates the functionality of GTM in
00> periodic mode and one-shot mode. On providing any input on the
00> RTTviewer, GTM channel 2 starts in one-shot mode. GTM channel 1
00> starts in periodic mode when GTM channel 2 expires. Timer in
00> periodic mode expires periodically at a time period specified
00> by user and toggles the Pmod0 pin 8 LED.
00>
00> Please enter time period values for one-shot and periodic mode
00> timers in milliseconds. Valid range: 1 to 2000.
00>
00> One-shot mode:
< 1000
00>
00> Time period for one-shot mode timer: 1000
00>
00> Periodic mode:
< 1000
00>
00> Time period for periodic mode timer: 1000
00>
00> Enter any key to start or stop the timers
<
00>
00> GTM2 is Enabled in OneShot mode
00>
00> One-shot mode GTM timer elapsed
00>
00> GTM1 is Enabled in Periodic mode
00> LED will toggle for set time period
00> Enter any key to stop timers

5.8 FreeRTOS

5.8.1 Project Overview

The example projects demonstrate Message Queue and Semaphore between tasks and interrupt. Message Queue is demonstrated between Tasks and between Task and interrupt. GTM timer periodically generates interrupt at 1000msec. For the first few seconds, messages are shared between Sender and Receiver Tasks and GTM ISR0. Receiver task pends on Message Queue, receives and displays message received on RTTViewer periodically at 500msec. For the next few seconds, Semaphore Task waits for semaphore until it is released by GTM ISR1. GTM ISR1 releases semaphore periodically at 1000msec.

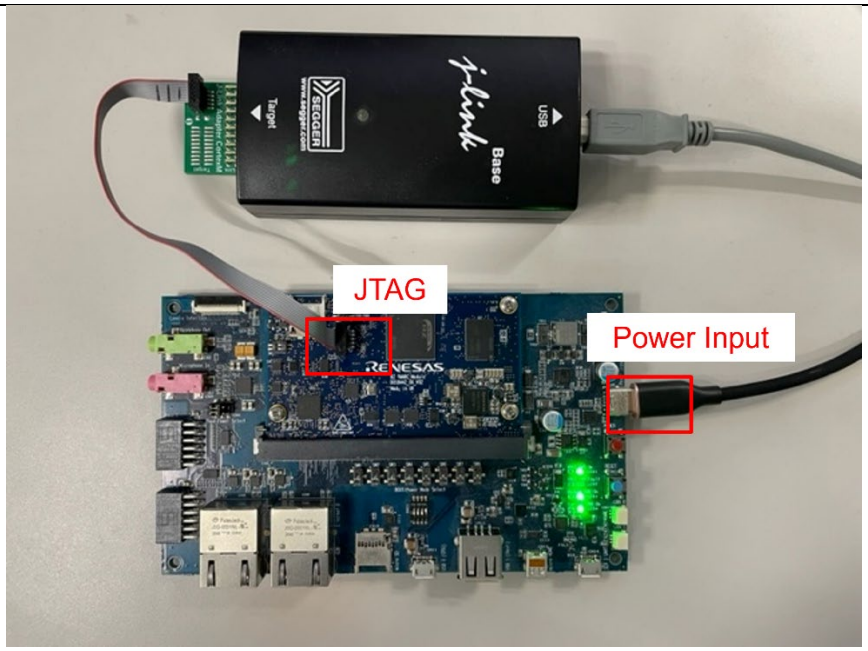
All the tasks run with equal priority level.

5.8.2 Hardware Requirements

External hardware: None

5.8.3 Hardware Settings

Please connect each hardware as below.



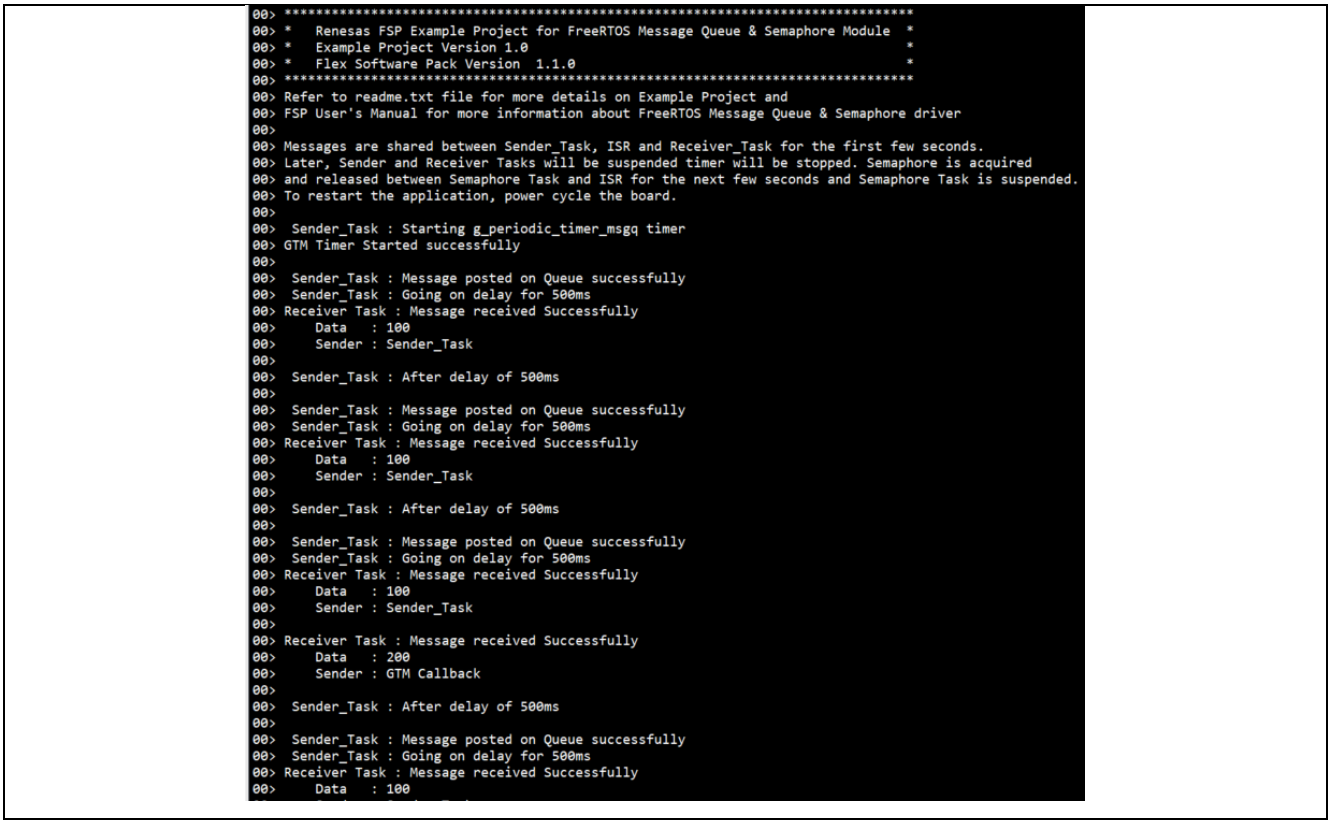
Board Setting (RZ/V2L)

Please set each DIP switch and jumpers as below.

Board	**RZ/V2L EVK**
Module board	SW1-1: OFF SW1-2: Don’t care.
Carrier board	SW1: Don't care. SW2: Don't care. SW3: Don't care. SW4: Don't care. SW5: Don't care. SW6: Don't care. SW7: Don't care. SW8: Don't care. SW11-1: OFF SW11-2: OFF SW11-3: OFF SW11-4: ON CN4: Jumper connects 1-3 Jumper connects 2-4

5.8.4 Operation

After running the example, the message below is displayed on console.



5.9 INTC_IRQ

5.9.1 Project Overview

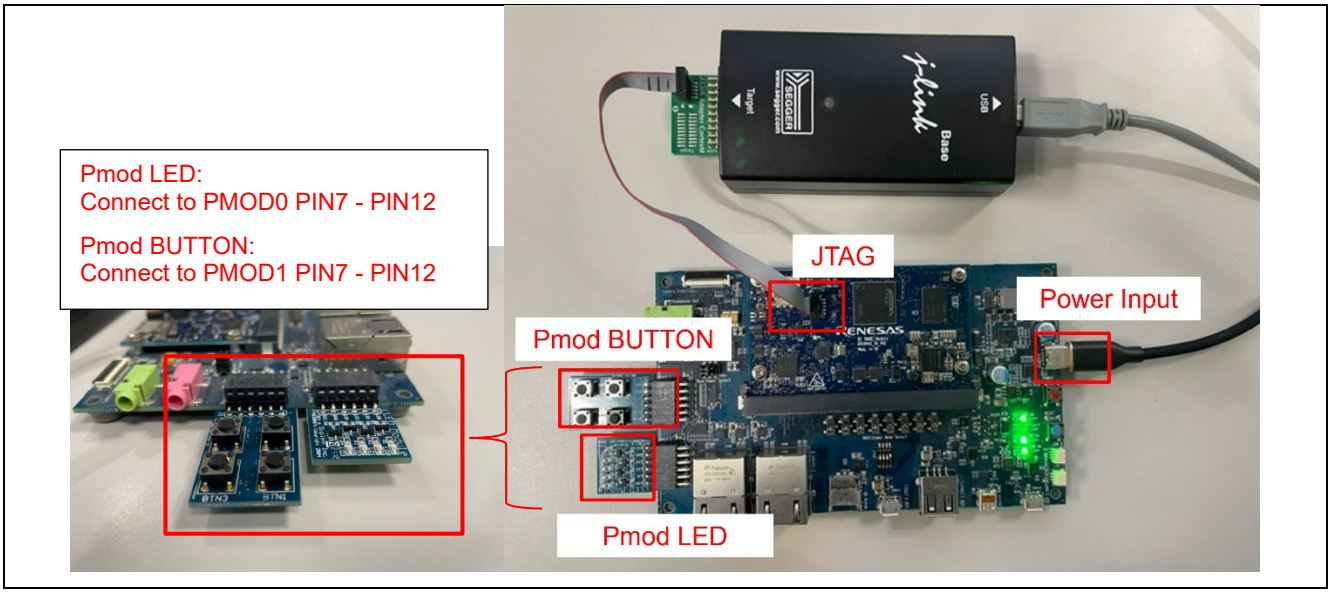
The example project demonstrates the typical use of the INTC IRQ module APIs. The project initializes the IRQ interrupt in Interrupt Controller. User is requested to press the push button to trigger the external IRQ and this then will start toggling of user LED.

5.9.2 Hardware Requirements

External hardware: Pmod BUTTON and Pmod LED

5.9.3 Hardware Settings

Please connect each hardware as below.



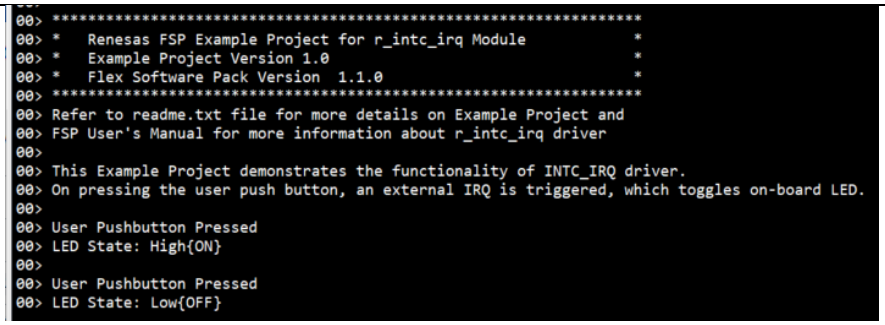
Board Setting (RZ/V2L)

Please set each DIP switch and jumpers as below.

Board	**RZ/V2L EVK**
Module board	SW1-1: OFF SW1-2: Don’t care.
Carrier board	SW1: Don't care. SW2: Don't care. SW3: Don't care. SW4: Don't care. SW5: 3-2 SW6: Don't care. SW7: Don't care. SW8: Don't care. SW11-1: OFF SW11-2: OFF SW11-3: OFF SW11-4: ON CN4: Jumper connects 1-3 Jumper connects 2-4

5.9.4 Operation

After running the example, the message below is displayed on console. LED ON/OFF status is displayed when pressing the BTN0 of Pmod BUTTON.



6. References

FSP GitHub:	github.com/renesas/rzv-fsp
FSP User Manual:	renesas.github.io/rzv-fsp/
Getting Started Guide	Getting Started with RZ/V Flexible Software Package V1.1.0 (renesas.com)
FSP Example Projects:	RZ/V2L Group Multi-OS Package | Renesas
Evaluation Kit Manual:	SMARC EVK of RZ/G2L, RZ/G2LC, RZ/G2UL, RZ/V2L, and RZ/Five Start-up Guide Rev.1.03 (renesas.com)
Knowledge Base:	Knowledge Base (renesas.com)
Renesas Support:	RZ/V2L - Support (renesas.com)

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Mar.29.24	–	First release document.

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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