

RZ/G3E Evaluation Board Kit

This document provides quick-start instructions for how to bring up an RZ/G3E Evaluation Board Kit (EVK), and how to boot Linux by using RZ/G3E Board Support Package (BSP) Pre-built image.

Important: To ensure the RZ/G3E EVK is set up correctly, complete the steps in the order listed in “Quick Start Procedure”.

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1. EVK Information

1.1 How to Get the EVK

To obtain the RZ/G3E EVK, go to the RZ/G3E EVK [RTK9947E57S01000BE](#) product page and click on Buy/Quote under Product Options ([Buy Direct](#)).

1.2 EVK Contents

The RZ/G3E EVK is the most suitable board kit for RZ/G3E evaluation.
RZ/G3E EVK consists of Module Board and Common carrier board.

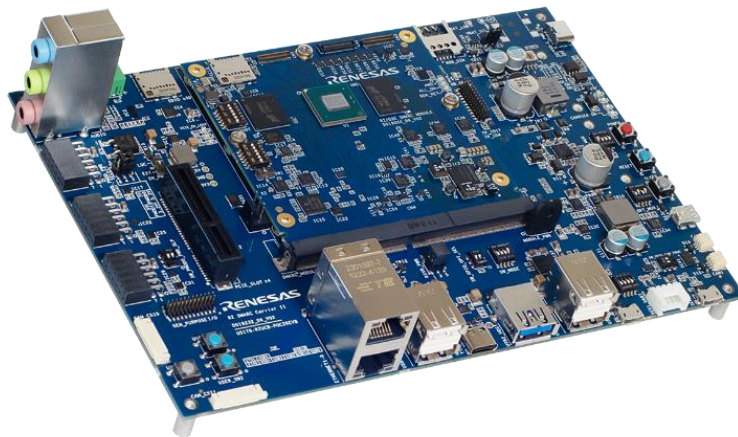
The RZ/G3E EVK conforms to the SMARC v2.1 standard, and is comprised of the following:

- RZ/G3E Module Board (SMARC2.1)
- RZ SMARC Series Carrier Board II
- Various adapter boards, cables, screws, etc.

The following items must be purchased separately by customers:

- 65W USB Type-C Charger and USB Type-C to Type-C cable
 - USB PD support
 - Output: 5V3A, 9V3A, 15V3A, 20V3.25A
- micro SD UHI-Class10 (8GB or more)

In addition, please prepare Windows PC (Windows 10 or Windows 11) for your host PC to program the root loader files to EVK.



2. Quick Start Procedure

Complete the following quick-start steps in the order listed.

2.1 Run the “Pre-built Image

After getting the RZ/G3E EVK, download the RZ/G3E BSP Pre-Built Image and try running it. Please download the RZ/G3E_BSPx.x.x_Pre-built_Images_EN.zip from below link and decompress the file on your PC. Please read the file version “x.x.x” as the version you use.

[RZ/G3E Board Support Package | Renesas](#)

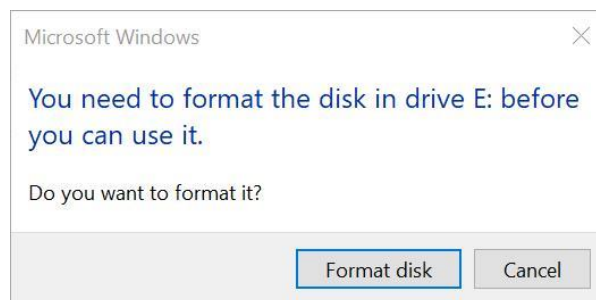
2.1.1. Prepare the microSD Card

Write the “Images_RZG3E_vx.x.x.zip” included in “RZG3E_BSPx.x.x_Pre-built_Images.zip” to your microSD card.

Case 1: Use Windows PC

1. Copy the “Images_RZG3E_vx.x.x.zip” to a Windows PC and unzip it.
2. Write the microSD card image (core-image-weston-smarc-rzg3e.rootfs.wic.gz) to the SD card which has a 2GB or more capacity by using any tool like as below:
 - Win32 Disk Imager ([Win32 Disk Imager download | SourceForge.net](#)), or
 - balenaEtcher ([balenaEtcher - Flash OS images to SD cards & USB drives](#)).

Note: If the following message is shown after inserting the microSD card in the Window PC, or after writing the image to the microSD card, please select “Cancel”.



Case 2: Use Linux Host PC

If you would like to program the image to your microSD card by Linux Host PC, see following steps.

Prepare the microSD card by entering the following commands on your Linux PC.

1. Unzip the Images_RZG3E_vx.x.x.zip file to get the “core-image-weston-smarc-rzg3e.rootfs.wic.gz” and “core-image-weston-smarc-rzg3e.rootfs.wic.bmap”.
2. Check the microSD Card Device Name: enter the **lsblk** command before and after inserting your microSD card.

Note: Be careful not to use other device names (**sdb** is used in this document).

<before inserting microSD card>

```
$ lsblk
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
sda 8:0 0 30.9G 0 disk
├─sda1 8:1 0 512M 0 part /boot/efi
├─sda2 8:2 0 1K 0 part
└─sda5 8:5 0 30.3G 0 part /
sr0 11:0 1 1024M 0 rom
```

then...

<after inserting microSD card>

```
$ lsblk
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
sda 8:0 0 30.9G 0 disk
├─sda1 8:1 0 512M 0 part /boot/efi
├─sda2 8:2 0 1K 0 part
└─sda5 8:5 0 30.3G 0 part /
sdb 8:16 1 29.7G 0 disk
└─sdb1 8:17 1 29.7G 0 part
sr0 11:0 1 1024M 0 rom
```

3. Unmount the SD card partitions mounted automatically.
/dev/sdb is an example and the actual partitions path depend on your environment.

```
$ sudo umount /dev/sdb
```

4. Using the Device name found above, write the image file into the microSD card by the following commands. Put core-image-weston-smarc-rzg3e.rootfs.wic.gz and core-image-weston-smarc-rzg3e.rootfs.wic.bmap on the same working directory.

```
$ sudo apt-get install bmap-tools
$ sudo bmaptool copy core-image-weston-smarc-rzg3e.rootfs.wic.gz /dev/sdb
```

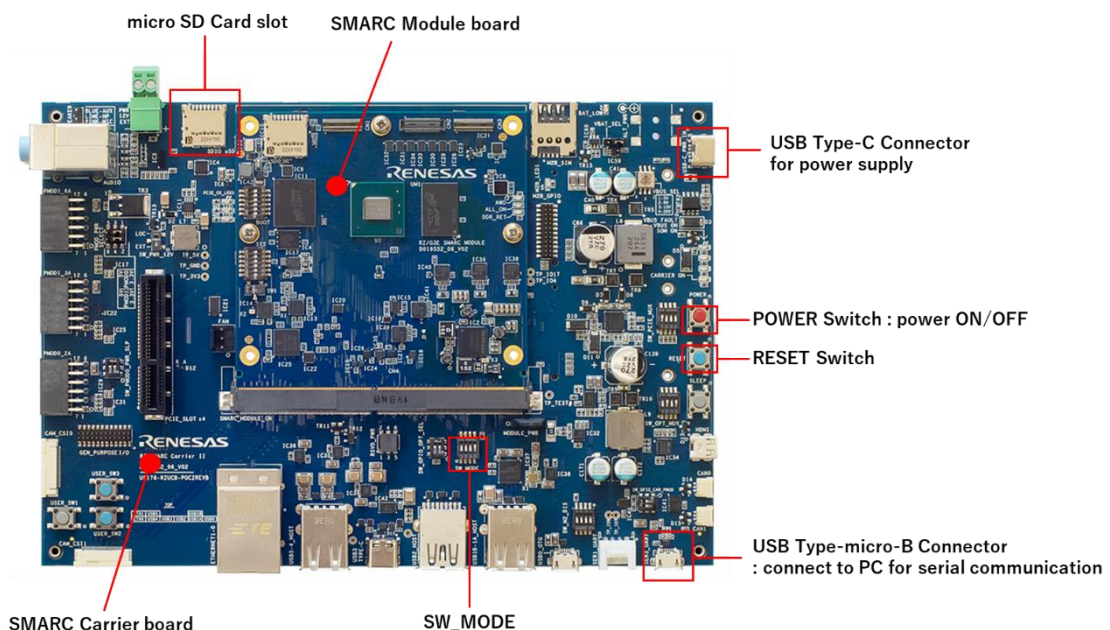
5. After that, remove and insert the microSD card again to confirm that the image file has been written to the microSD card normally.

2.1.2. Write the Bootloader and U-boot

Copy Flash_Writer_SCIF_RZG3E_EVK_LPDDR4X.mot, bl2_bp_spi-smarc-rzg3e.srec and fip-smarc-rzg3e.srec included in the first partition of SD card prepared by Step2-1 to your PC.

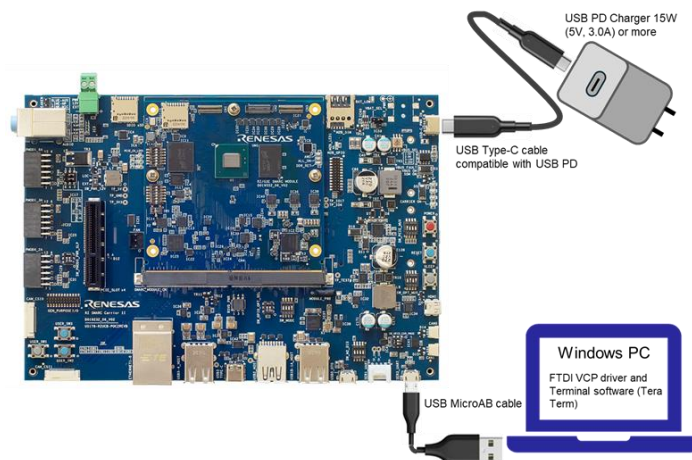
Main specification of the EVK

The components of the RZ/G3E EVK that are used in this step are as follows.



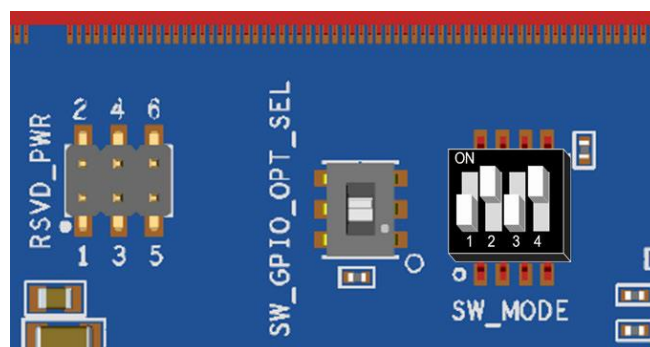
2.1.2.1. Prepare the Hardware

1. Attach the PD capable USB Type-C cable to the USB Type-C port (“USB-C_PWR_IN”). Then, you can see LEDs (“VBUS ON” and “SOM ON”) are illuminated.



2. Set the board to SCIF Download mode to write to the serial flash memory on the EVK board. Please set the SW_MODE as below.

SW_MODE (SCIF Download mode)

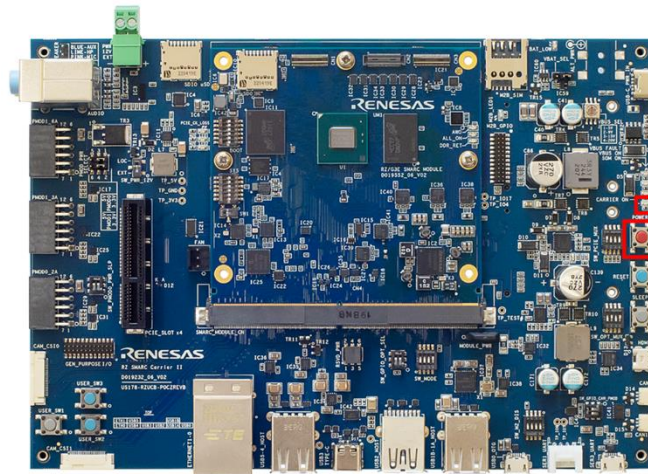


SW_MODE

1	2	3	4
OFF	ON	OFF	ON

- Press the red button (POWER) for 2 seconds to turn on the power. Then the LED(CARRIER_ON) is illuminated additionally.

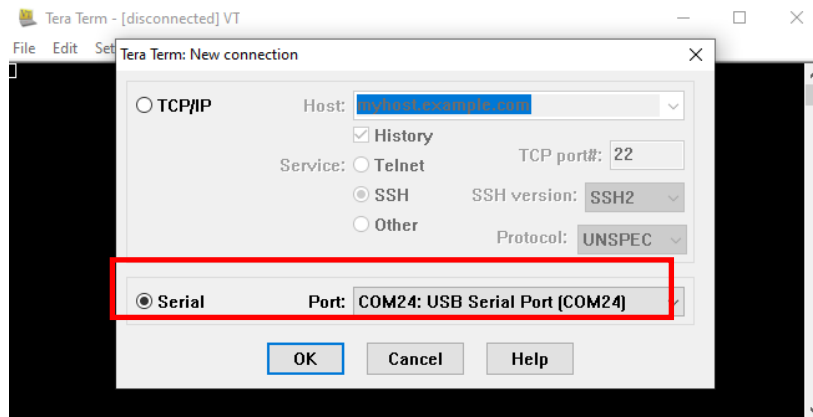
When turn off the power, press and hold the red button for 2 seconds. Then, check that LED(CARRIER ON) is turned off.



Press the Red button (PWR)
CARRIER ON LED
will be light up.

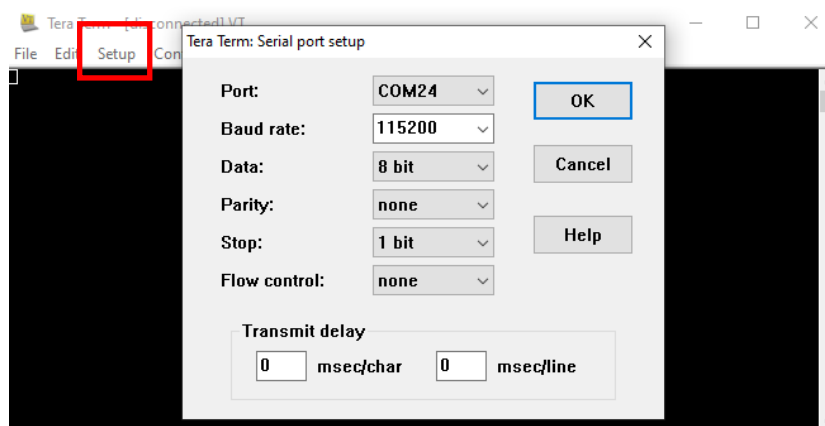
2.1.2.2. Prepare to Serial Communication

- Bring up the terminal software on your PC. Please get the Tera Term (latest version) from the link below.
Available at : [Releases TeraTermProject/teraterm \(github.com\)](https://github.com/teratermproject/teraterm/releases).
- Select "Serial" as shown in the following picture. "Port:" is "COM[number]: **USB Serial Port (COM[number])**".

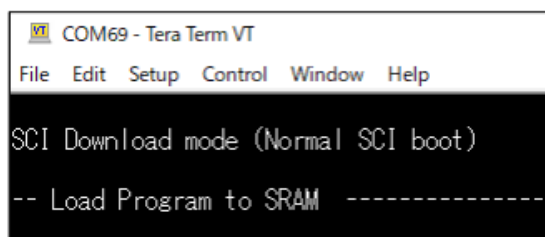


3. Select “Setup” > “Serial port” to set the settings about serial communication protocol on the software. Set each setting as below:

- Baud rate :115200
- Data :8 bit
- Parity :none
- Stop :1 bit
- Flow control :none

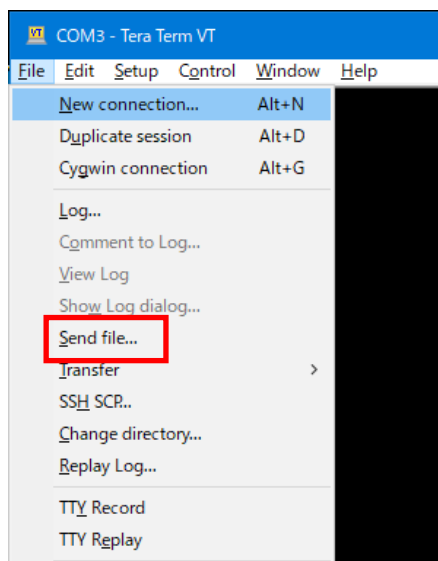
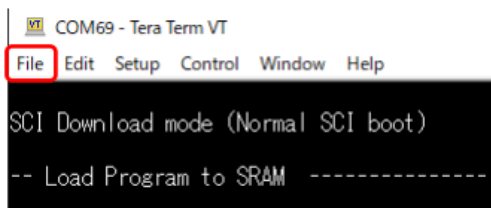


4. After serial port setting, press the blue button (RESET). Check the message below is displayed on the console.



2.1.2.3. Sending the Flash Writer

1. Send an image of Flash Writer using terminal software after the message “please send !” is shown. Select the “File” > “Send file” menu.



2. Select “Flash_Writer_SCIF_RZG3E_EVK_LPDDR4X.mot”, and then click “Open” button. The image will be sent to the board via serial connection.

After successfully downloading the binary, Flash Writer starts automatically and shows a message like below on the terminal.

After a successful download

```
Flash writer for RZ/G3E Series
Product Code : RZ/G3E
>
```


2.1.2.4. Write the Bootloader

1. Before writing the loader files, change the Flash Writer transfer rate from default (115200bps) to high speed (921600bps) with "SUP" command of Flash Writer.

```
>SUP
```

```
Scif speed UP
```

```
Please change to 921.6Kbps baud rate setting of the terminal.
```

After "SUP" command, change the serial communication protocol speed from 115200bps to 921600bps as well by following the steps described in 2.1.2.2 step3, and push the enter key.

2. Next, two boot loader files need to be written to the target board.

Enter the following bolded commands. Send "bl2_bp_spi-smarc-rzg3e.srec" by the terminal software as same manner in 2-2-3 after the message "please send !" is shown.

```
>XLS2
```

```
===== Qspi writing of RZ/G3E Board Command =====
```

```
Load Program to Spiflash
```

```
Writes to any of SPI address.
```

```
Dialog : AT25QL128A
```

```
Program Top Address & Qspi Save Address
```

```
===== Please Input Program Top Address =====
```

```
Please Input : H'8003600
```

```
===== Please Input Qspi Save Address ===
```

```
Please Input : H'0
```

```
please send ! ( '.' & CR stop load)
```

If you get the following message, press "y".

```
SPI Data Clear(H'FF) Check : H'00000000-0000FFFF,Clear OK?(y/n)
```

After successfully write the binary, the message like below is shown on the console.
(The address may be different depending on the version of the boot loader used.)

```
Erase SPI Flash memory...
```

```
Erase Completed
```

```
Write to SPI Flash memory.
```

```
===== Qspi Save Information =====
```

```
SpiFlashMemory
```

```
Stat Address : H'00000000
```

```
SpiFlashMemory
```

```
End Address : H'00021170
```

```
=====
```

3. Next, write another loader file by using bolded commands again.

Send fip-smarc-rzg3e.srec by the terminal software as same manner in 2.1.2.4-2. after the message “please send !” is shown.

```
>XLS2
===== Qspi writing of RZ/G3E Board Command =====
Load Program to Spiflash
Writes to any of SPI address.
  Dialog : AT25QL128A
Program Top Address & Qspi Save Address
===== Please Input Program Top Address =====
Please Input : H'0

===== Please Input Qspi Save Address ===
Please Input : H'60000
please send ! ('.' & CR stop load)
```

If you get the following message, press “y”.

```
SPI Data Clear(H'FF) Check : H'00000000-0000FFFF,Clear OK?(y/n)
```

After successfully write the binary, the message like below is shown on the console.
(The address may be different depending on the version of the boot loader used.)

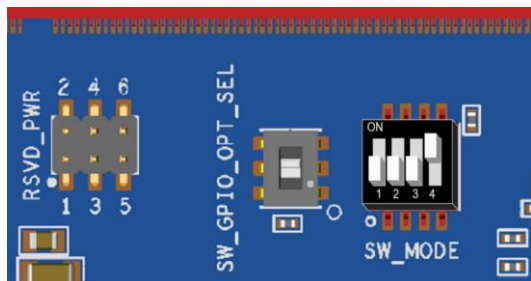
```
Erase SPI Flash memory...
Erase Completed
Write to SPI Flash memory.
===== Qspi Save Information =====
SpiFlashMemory Stat Address : H'00060000
SpiFlashMemory End Address : H'0014738E
=====
```

4. After writing two loader files normally, change the serial communication protocol speed from 921600 bps to 115200 bps by following the steps described in 2.1.2.2 step3, and push the enter key again.
At last, turn off the power of the board by pressing the red button (POWER).

2.1.3. Start Up Linux on the EVK

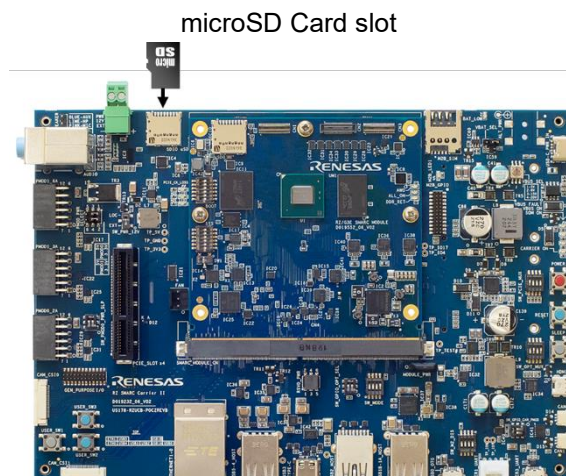
1. Set the board to SPI Boot mode to start the Bootloader.

Please change the SW_MODE as below (SW_MODE[2] ON→OFF). Insert your microSD card to the slot (CN10) on the carry board.



SW_MODE

1	2	3	4
OFF	OFF	OFF	ON



2. Turn on the power of the board by pressing the power red button. The settings of Terminal in this process are the same as in 2.1.2.2-3.

Press the blue button to reset and after “Hit any key to stop autoboot:” appears, press the enter key on the PC within 3 seconds.

```
U-Boot 2024.07 (Jun 13 2025 - 15:56:19 +0000)

CPU:   Renesas Electronics CPU rev 1.0
Model: Renesas SMARC EVK based on r9a09g047e57
DRAM:  3.9 GiB
Core:  45 devices, 18 uclasses, devicetree: separate
MMC:   mmc@15c00000: 0, mmc@15c10000: 1, mmc@15c20000: 2
Loading Environment from MMC... Reading from MMC(0)... OK
In:    serial@11c01400
Out:   serial@11c01400
Err:   serial@11c01400
Hit any key to stop autoboot: 0
=>
```

To set the default environment variables, enter the bolded commands bellow.

```
=> env default -a
## Resetting to default environment
=> saveenv
Saving Environment to MMC... Writing to MMC(0)...OK
=>
```

3. Please turn off and on the power pressing red button again to boot up the board. When “smarc-rzg3e login:” is displayed, enter “root” to login. (No password required).

```
Version: x.x.x
smarc-rzg3e login: root
root@smarc-rzg3e:~#
```

4. To power down the system, run shutdown command on the console as below. After that, the shutdown sequence will start. After executing the shutdown command, you will see the "reboot: Power down" message. Then, push the red "PWR" button.

```
root@smarc-rzg3e:~# shutdown -h now
```

2.2 Build the Linux Environment

Section 2.1 describes how to startup the RZ/G3E by using RZ/G3E BSP Pre-built image. If you would like to configure your Linux environment from the BSP build stage, please download the latest RZ/G3E Board Support Package from the below link and build it by the Linux Start-up Guide included in the BSP.

[RZ/G3E Board Support Package | Renesas](#)

3. Revision History

Revision	Date	Description
1.00	Aug , 2024	Initial release.