Quick Start Guide

RX74N Group

Evaluation Kit for RX74N Microcontroller Group
EK-RX74N
Quick Start Guide

Renesas RX Family
RX700 Series

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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.
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   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.
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The product generates, uses, and can radiate radio frequency energy and may cause harmful interference to radio communications. There is no guarantee that interference will not occur in a particular installation. If this equipment causes harmful interference to radio or television reception, which can be determined by turning the equipment off or on, you are encouraged to try to correct the interference by one or more of the following measures:

• Ensure attached cables do not lie across the equipment.

• Reorient the receiving antenna.

• Increase the distance between the equipment and the receiver.

• Connect the equipment into an outlet on a circuit different from that which the receiver is connected.

• Power down the equipment when not in use.

• Consult the dealer or an experienced radio/TV technician for help.

Note: It is recommended that wherever possible shielded interface cables are used.

The product is potentially susceptible to certain EMC phenomena. To mitigate against them it is recommended that the following measures be undertaken:

• The user is advised that mobile phones should not be used within 10 m of the product when in use.

• The user is advised to take ESD precautions when handling the equipment.

The Evaluation Kit does not represent an ideal reference design for an end product and does not fulfill the regulatory standards for an end product.

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Renesas RX Family

EK-RX74N - Quick Start Guide

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1. Introduction

This Quick Start Guide (QSG) provides:

- An overview of the Quick Start Example Project that the EK-RX74N comes pre-programmed with.
- Instructions for running the Quick Start Example Project.
- Instructions for importing, modifying, and building the Quick Start Example Project using Flexible Software Package (FSP) and e^2 studio Integrated Development Environment (IDE).

1.1 Assumptions and Advisory Notes

- Tool experience: It is assumed that the user has prior experience working with IDEs such as e^2 studio and terminal console applications such as TeraTerm.
- Subject knowledge: It is assumed that the user has basic knowledge about microcontrollers, embedded systems, and FSP to modify the example project described in this document.
- Prior to running the Quick Start Example Project, default jumper and DIP SW settings must be used. Refer to the *EK-RX74N User's Manual* for the default jumper and DIP SW settings.
- 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. Kit Contents

The kit includes the following component:

- EK-RX74N

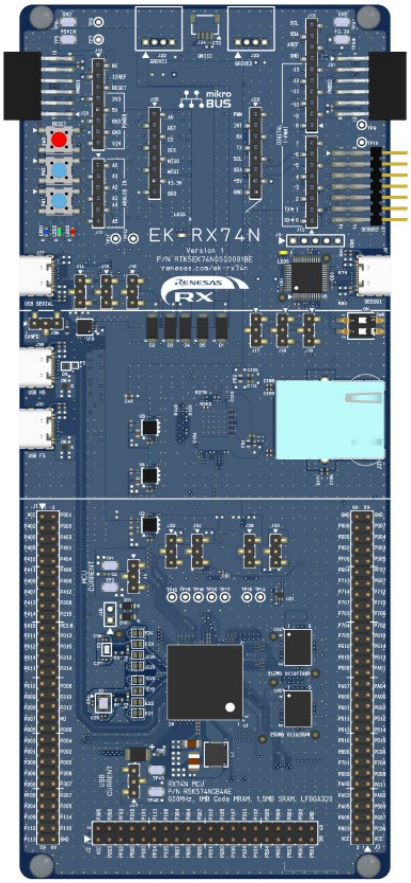

Figure 1. EK-RX74N Kit Contents

3. Overview of the Quick Start Example Project

The Quick Start Example Project allows the user to change the frequency and intensity of the on-board user LED1 (blue) using the user switches (SW1 and SW2). The supported frequencies are 1 Hz, 5 Hz, and 10 Hz and the supported intensities are 10%, 50%, and 90%.

When the EK-RX74N running the Quick Start Example Project is connected to a host PC via USB connector (J27), the kit information, MCU die temperature, and user LED blinking frequency are displayed on a terminal console.

3.1 Quick Start Example Project Flow

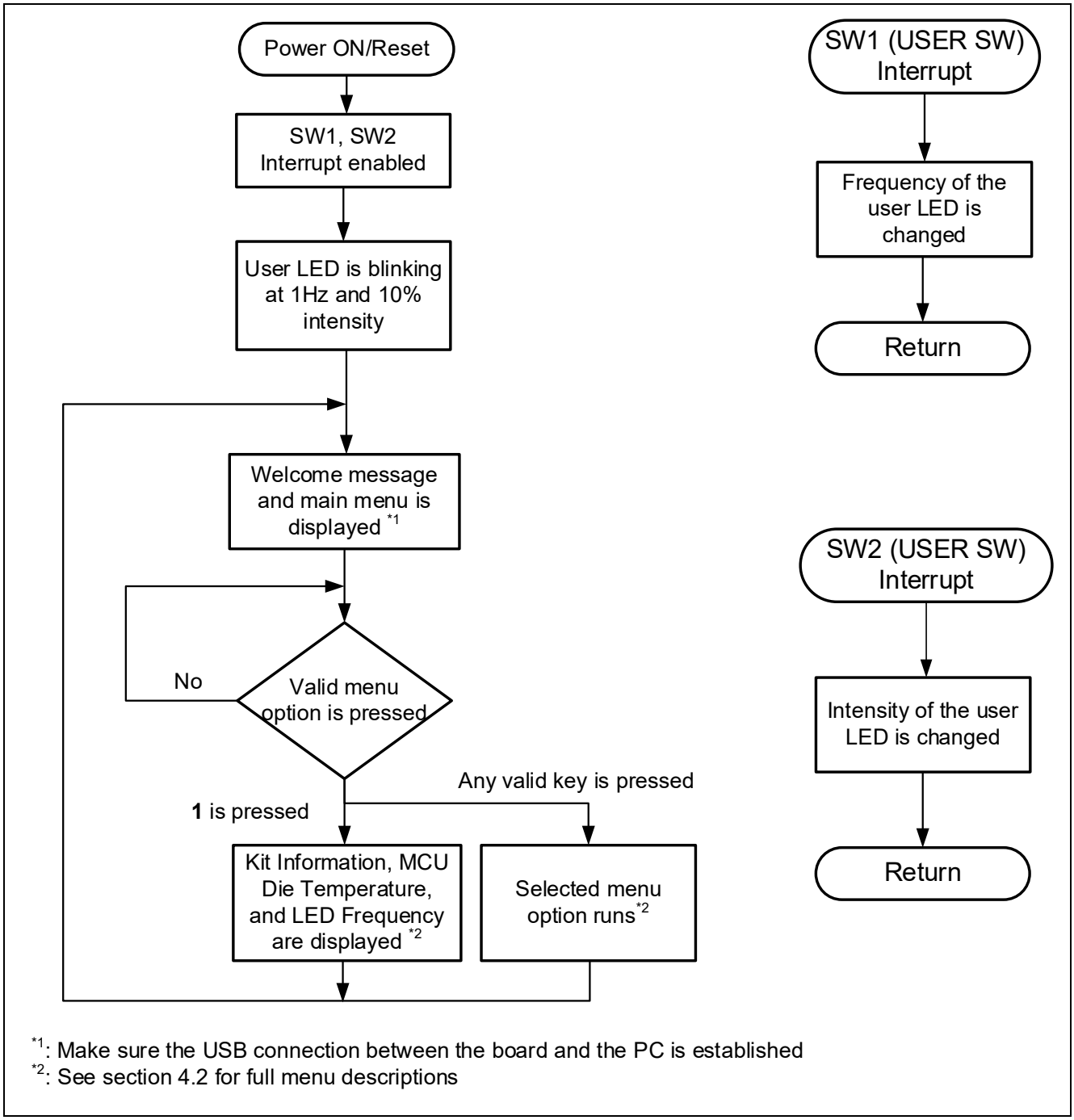

Figure 2. Operation overview of Quick Start Example Project

4. Running the Quick Start Example Project

This section lists the requirements and instructions to power up the EK-RX74N and run the Quick Start Example Project.

Hardware Requirements

- EK-RX74N
- USB Type-C device cable
- A Host PC with at least 1 USB port

Software Requirements

- Microsoft® Windows® 11 operating system
- USB Serial Drivers
  The user must install the following drivers from the FTDI's web site.
  - VIRTUAL COM PORT (VCP) Drivers
  https://ftdichip.com/
- TeraTerm (or similar) terminal console application

4.1 Connecting and Powering Up the EK-RX74N

1. Configure the DIP SW (SW6) on the EK-RX74N as following table.

Table 1. DIP SW (SW6) configuration for Quick Start Example Project

SW6-Pin1	SW6-Pin2
ON	OFF

2. Connect the USB Type-C end of the USB Type-C device cable to USB connector (J27) of the EK-RX74N.
3. Connect the other end of this cable to the USB port of the host PC. Power LED (LED4) on the EK-RX74N lights up white, indicating that the EK-RX74N is powered on.

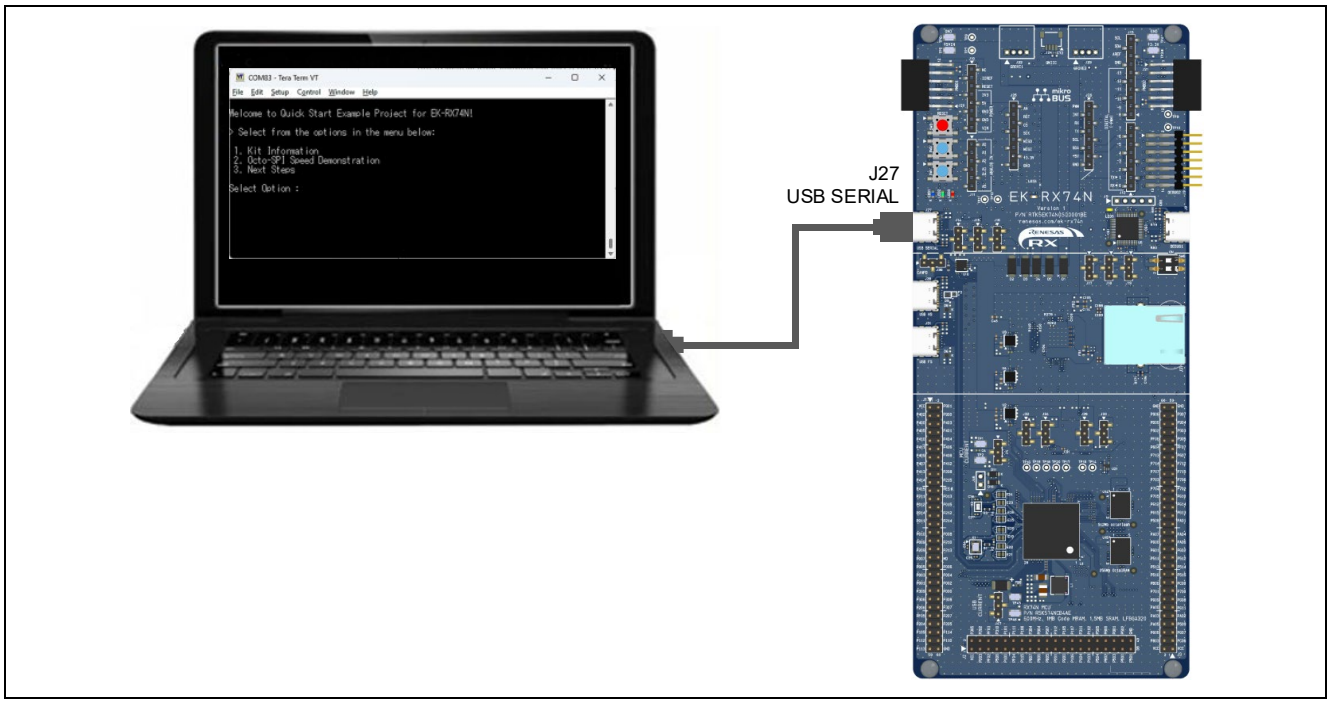

Figure 3. Connecting the EK-RX74N to the Host PC via USB Connector (J27)

4.2 Running the Quick Start Example Project

To run the Quick Start Example Project, use the following instructions:

1. On power up or RESET, the three user LEDs will take on the following states:
   - LED1 Blue - Blinking at 1 Hz frequency and at 10% intensity
   - LED2 Green - Steady, full intensity
   - LED3 Red - Off

2. Press the user switch (SW1) on the EK-RX74N to change the blinking frequency of the user LED1. With every press of the user switch (SW1), the frequency will switch from 1 Hz to 5 Hz to 10 Hz and cycle back.
3. Press the user switch (SW2) on the EK-RX74N to change the intensity of the user LED1 (blue). With every press of the first user switch (SW2), the intensity will switch from 10% to 50% to 90% and cycle back.
4. On the host PC, open Windows Device Manager. Expand **Ports (COM & LPT)**, locate **USB Serial Port (COMxx)** and note down the COM port number for reference in the next step.

   Note: USB Serial Device drivers (FTDI) are required to communicate between the EK-RX74N and the terminal console application on the host PC.

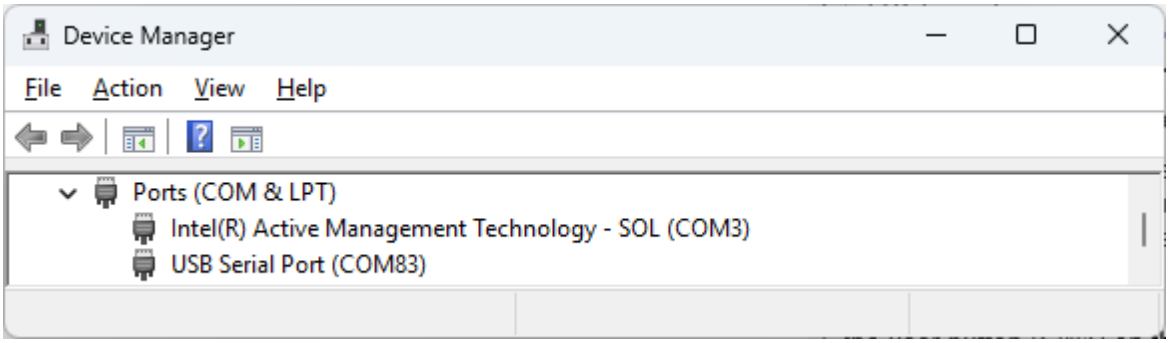

Figure 4. USB Serial Port in Windows Device Manager

5. Open Tera Term, select **Serial** and **COMxx: USB Serial Port (COMxx)** and click **OK**.

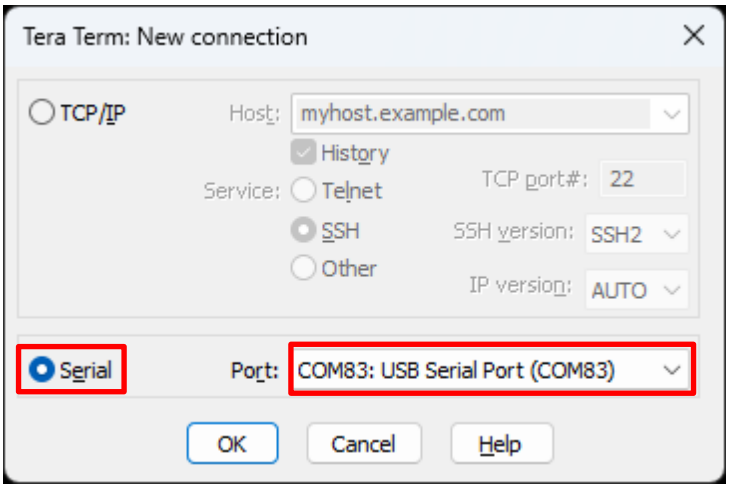

Figure 5. Selecting the Serial Port on Tera Term

6. Using the **Setup** menu pull-down, select **Serial port…** and ensure that the speed is set to 115200, refer to the settings other than the speed as shown below.

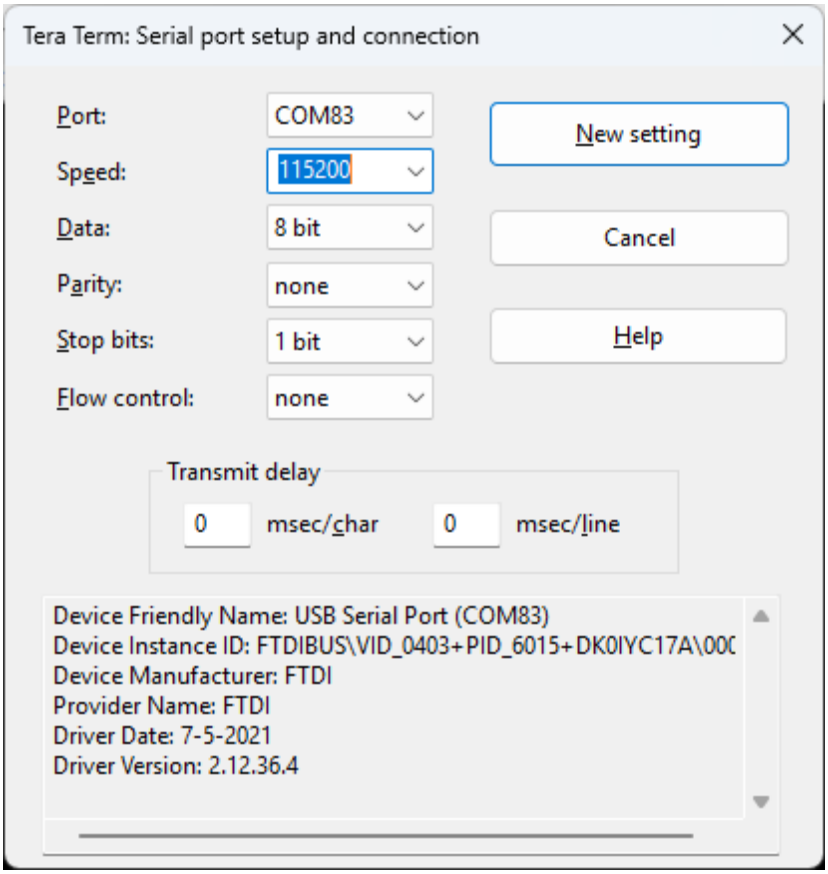

Figure 6. Serial port setup and connection

7. After completing the connection, press switch SW3 (RESET). The terminal console will display the Welcome text and Main menu.

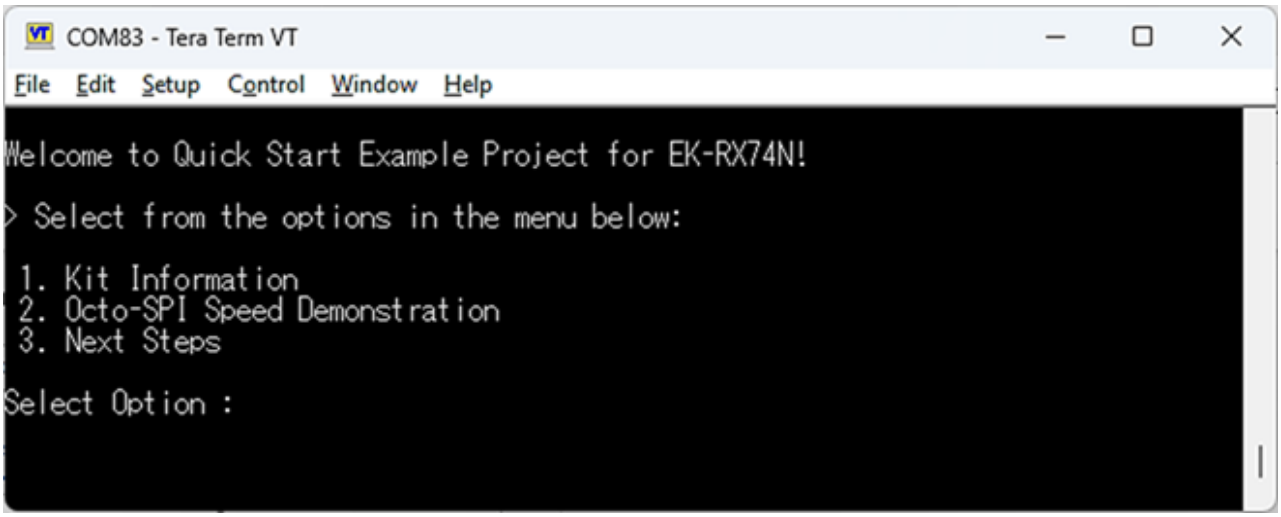

Figure 7. Welcome and Main Menu

8. Press **1** to display the **Kit Information**, which includes the kit name, kit ordering part number, MCU part number, MCU unique ID, MCU die temperature, and the Blue LED's current blinking frequency & intensity.

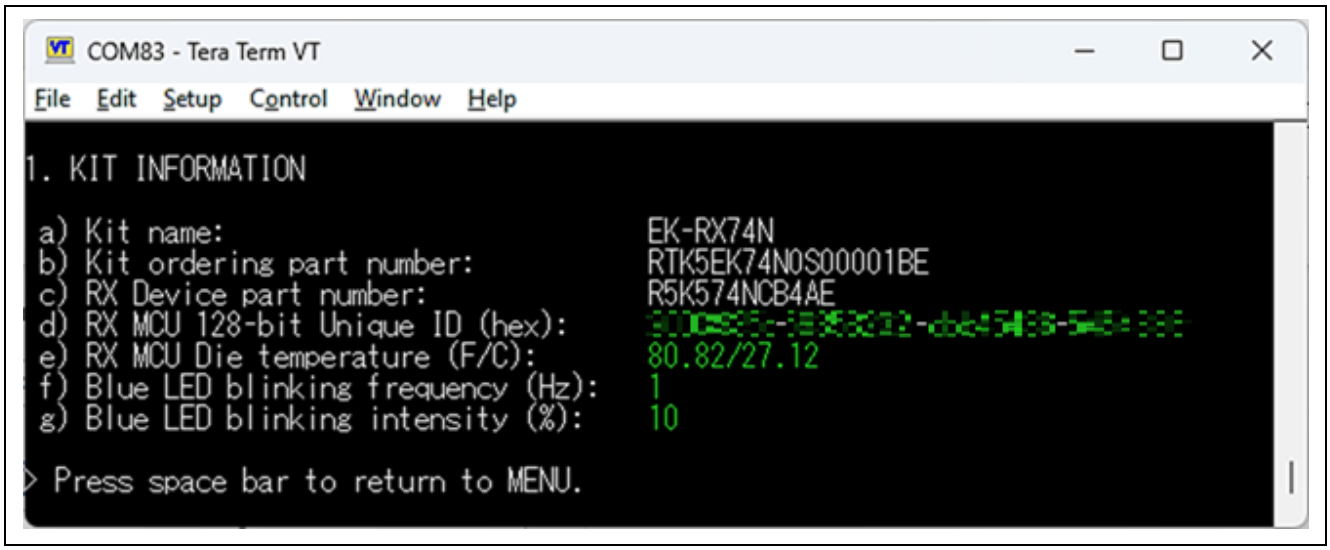

Figure 8. Kit Information

9. When the MCU die temperature, LED blinking frequency, or intensity values change, the KIT INFORMATION updates automatically.
10. Press **Space** to return to the main menu.
11. Press **2** to transition to the Octo-SPI Flash Write/Read menu. This menu executes writing and reading to the Octo-SPI memory of EK-RX74N and measure each processing time.

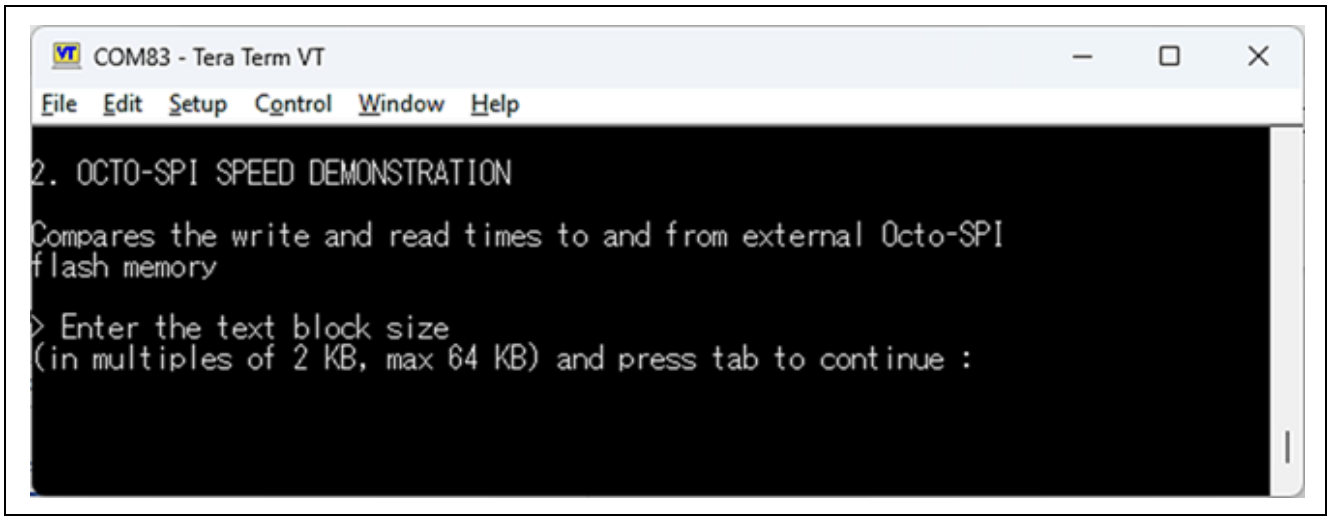

Figure 9. Octo-SPI Write/Read Block Size Entry Screen

12. Enter a read-write block size in the range of 2 KB to 64 KB (multiples of 2 KB) and press **Tab**.
    Note: If invalid input characters (i.e. keys other than 0 to 9, Tab, and Space) or out of range values are entered, the error messages will appear. Enter the correct inputs and press Tab. Pressing Space will bring the 'welcome and main menu' screen. Enter is an invalid character.
13. The EK-RX74N will write a block of memory, of the entered size, then read it back. On successful completion the cycle times will be displayed as follows:

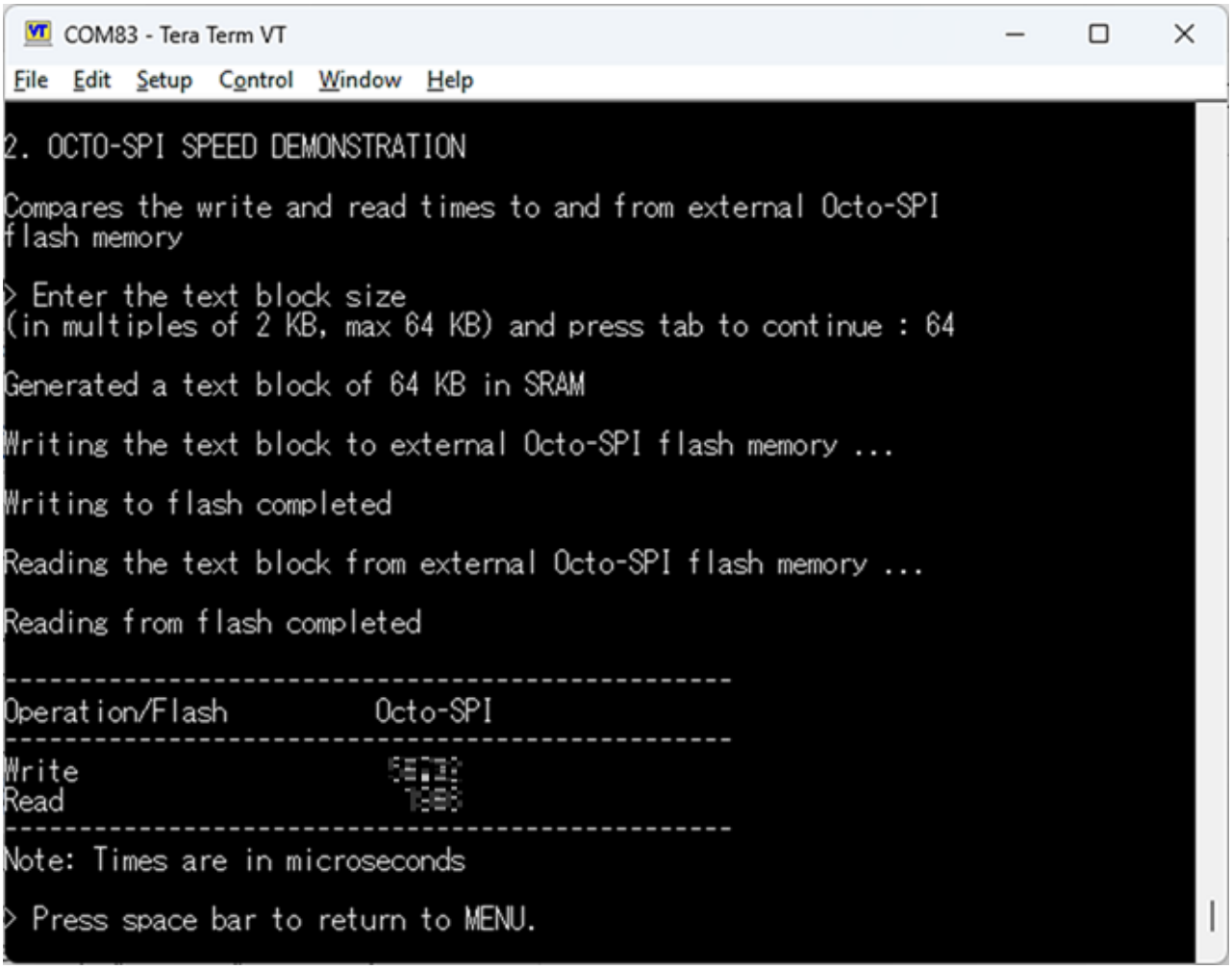

Figure 10. Octo-SPI Write/Read Processing Measurement Results

14. Press **Space** to return to the 'welcome and main menu' screen.

15. Press **3** to display **Next Steps**.

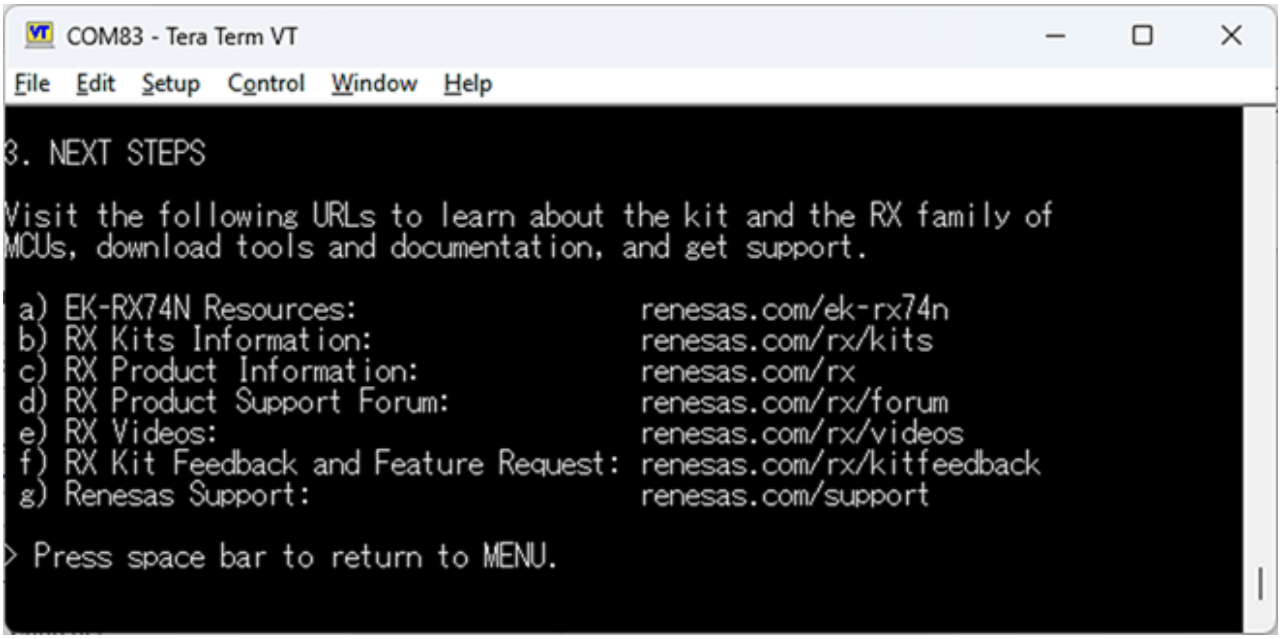

Figure 11. Next Steps

16. Press **Space** to return to the ‘welcome and main menu’ screen.

5. Customizing the Quick Start Example Project

This section lists the requirements and instructions for customizing the Quick Start Example Project.

Hardware Requirements

- EK-RX74N
- USB Type-C device cable x2
- A Host PC with at least 2 USB ports

Software Requirements

- Microsoft® Windows® 11 operating system
- USB Serial Drivers
  The user must install the following drivers from the FTDI's web site.
  - VIRTUAL COM PORT (VCP) Drivers
  https://ftdichip.com/
- TeraTerm (or similar) terminal console application
- e² studio IDE 2026-07 or later
- Quick Start Example Project
- FSP v1.0.0 or later
- C/C++ Compiler Package for RX Family [CC-RX] v3.08.00 or later

5.1 Downloading and Installing Software

Before the Quick Start Example Project can be modified, it is necessary to download the Quick Start Example Project and install the e² studio and compiler package CC-RX on the host PC.

These can be downloaded from the website at renesas.com/ek-rx74n.

The FSP and e² studio are bundled in a downloadable platform installer available on the FSP webpage at renesas.com/rx-fsp. New users are recommended to use the Quick Install option provided in the installation wizard, to minimize the amount of manual configuration needed

5.2 Importing the Quick Start Example Project

1. Place the Quick Start Example Project in a local directory on the host PC.
2. Launch e² studio.
3. Enter the name in the Workspace dialog box to create a new workspace.

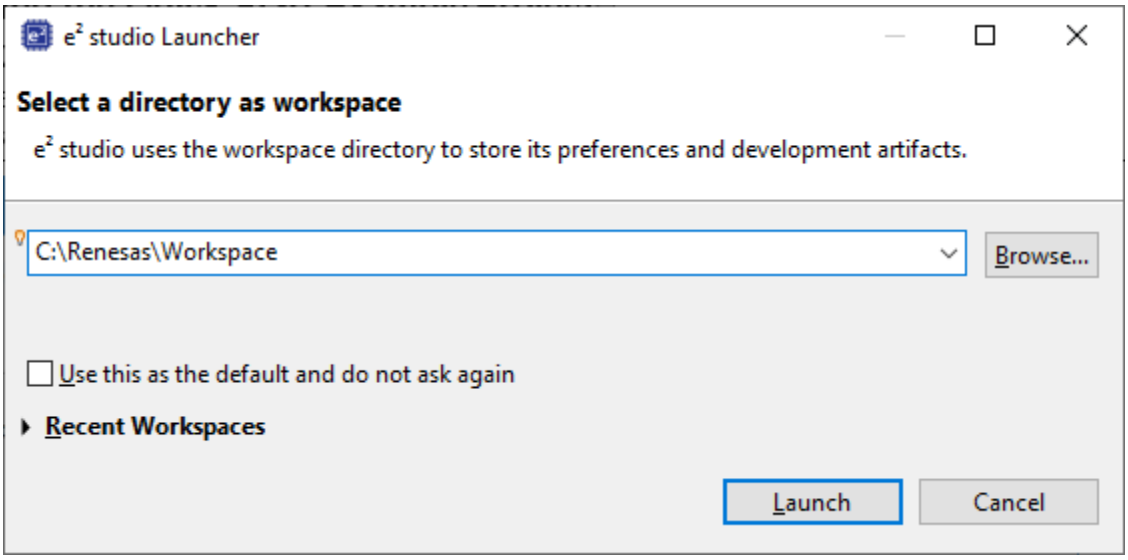

Figure 12. Creating a New Workspace

4. Click **Launch.**

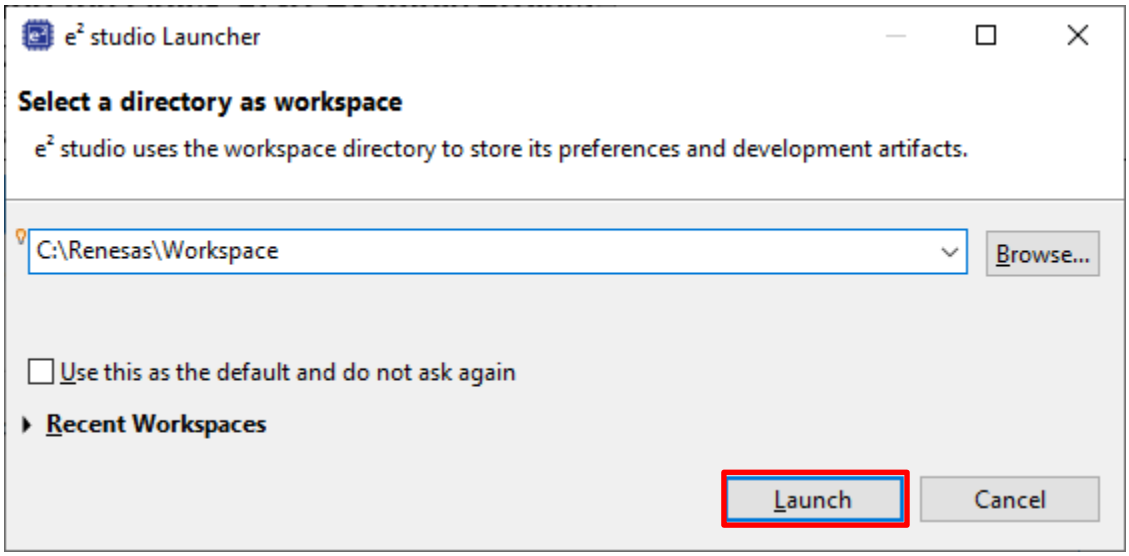

Figure 13. Launching the Workspace

5. Click **Import** from the **File** drop-down menu.

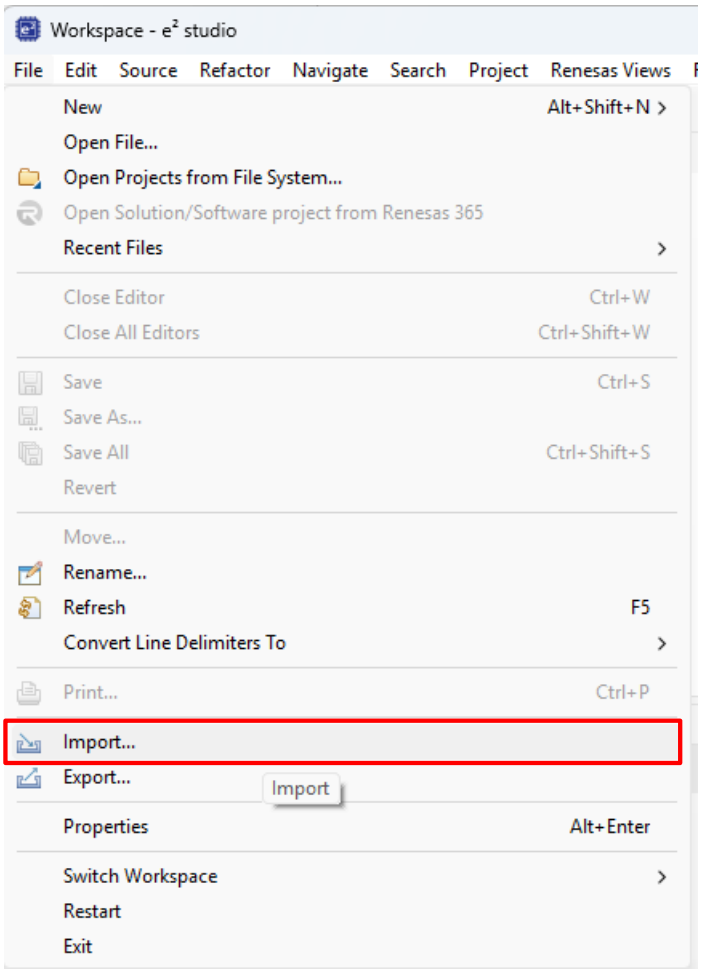

Figure 14. Importing the Project

6. In the **Import** dialog box, select **General**, and then select **Existing Projects into Workspace.**

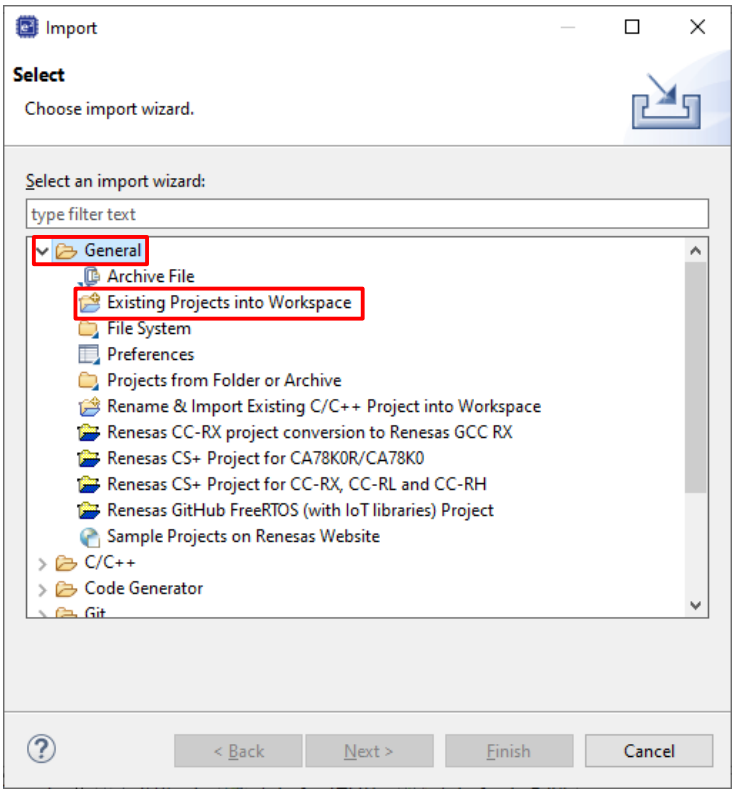

Figure 15. Importing Existing Projects into Workspace

7. Click **Next**.

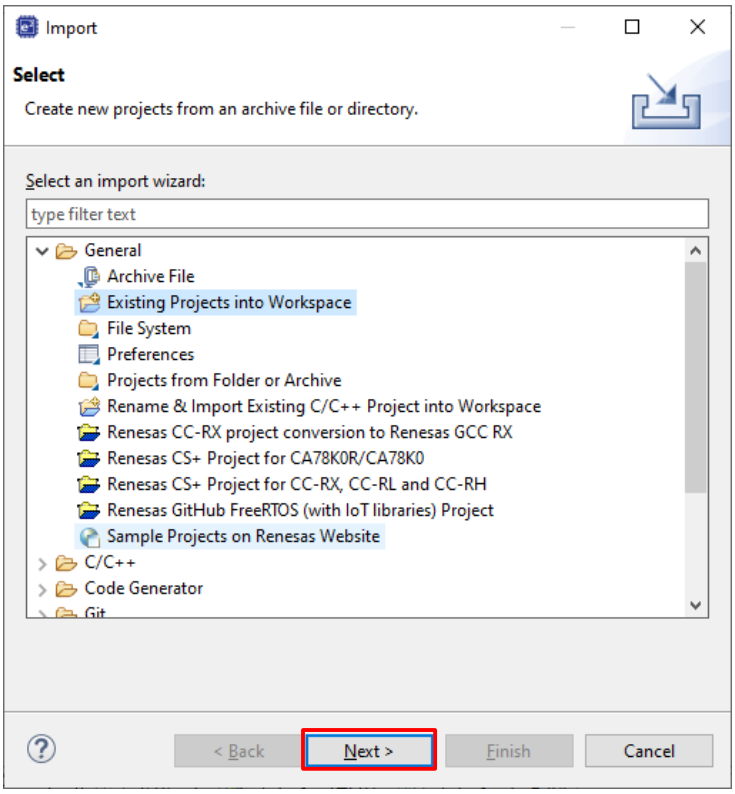

Figure 16. Clicking Next to Import Existing Projects into the Workspace

8. Click **Select root directory** and click **Browse** to go to the location of the Quick Start Example Project folder.

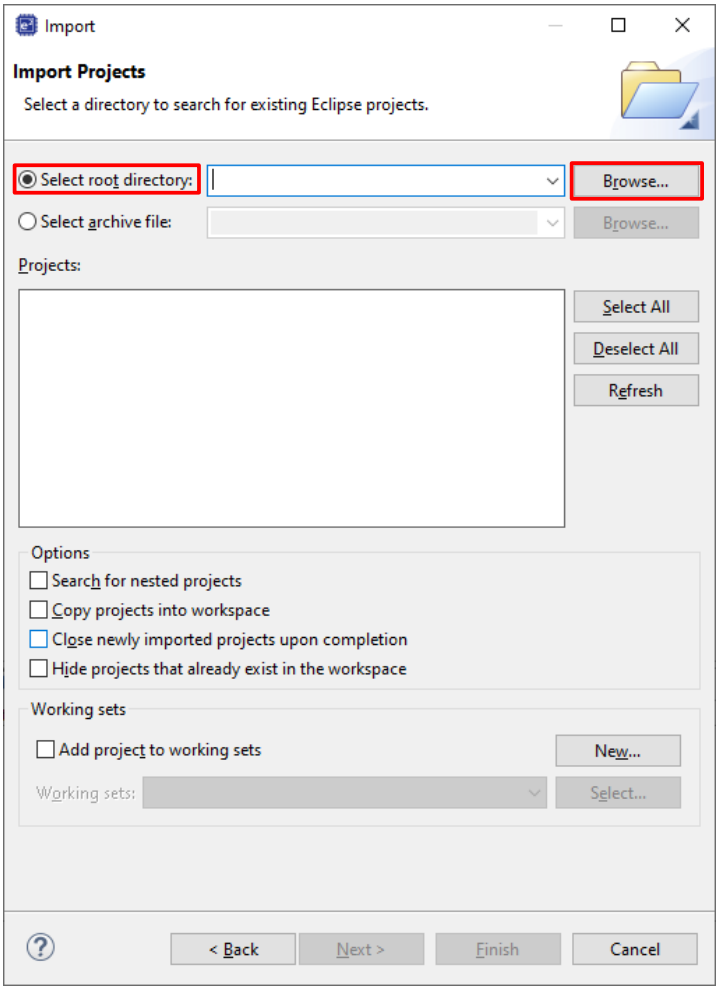

Figure 17. Selecting the Root Directory

9. Select the Quick Start Example Project and click **Finish.**

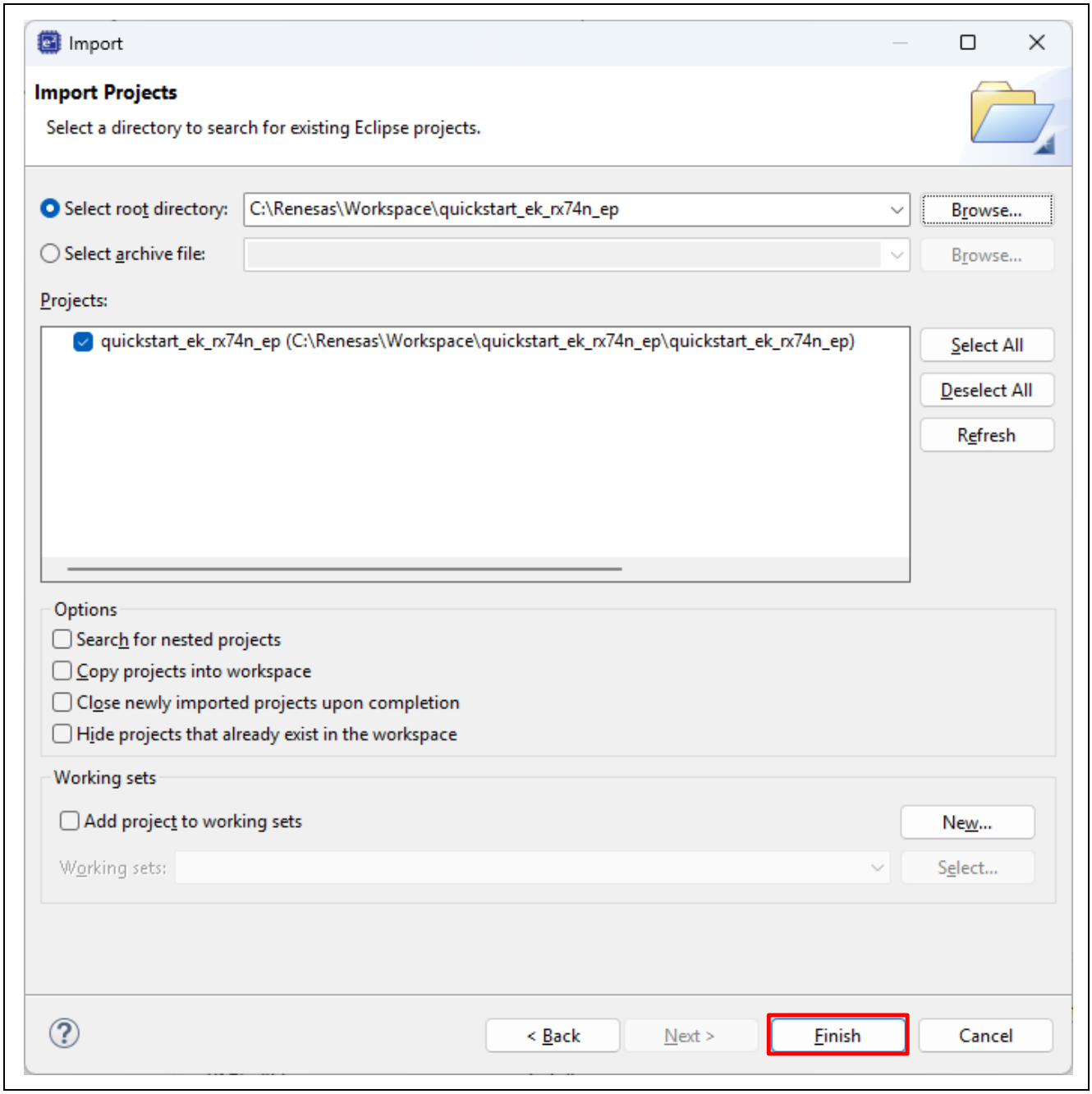

Figure 18. Finishing Importing the Quick Start Example Project

5.3 Modifying, Generating, and Building the Quick Start Example Project

This section provides instructions to modify the Quick Start Example Project. The Quick Start Example Project can be modified by editing the source code and reconfiguring the properties of the MCU peripherals, pins, clocks, interrupts, and so forth.

Note: The specific modifications that can be performed to the Quick Start Example Project are not prescribed in this QSG. User discretion is advised while modifying the Quick Start example project.

1. Once the Quick Start example project is imported, double click the **configuration.xml** file to open the configurator. The configurator provides an easy to use interface to configure the properties of the MCU peripherals.

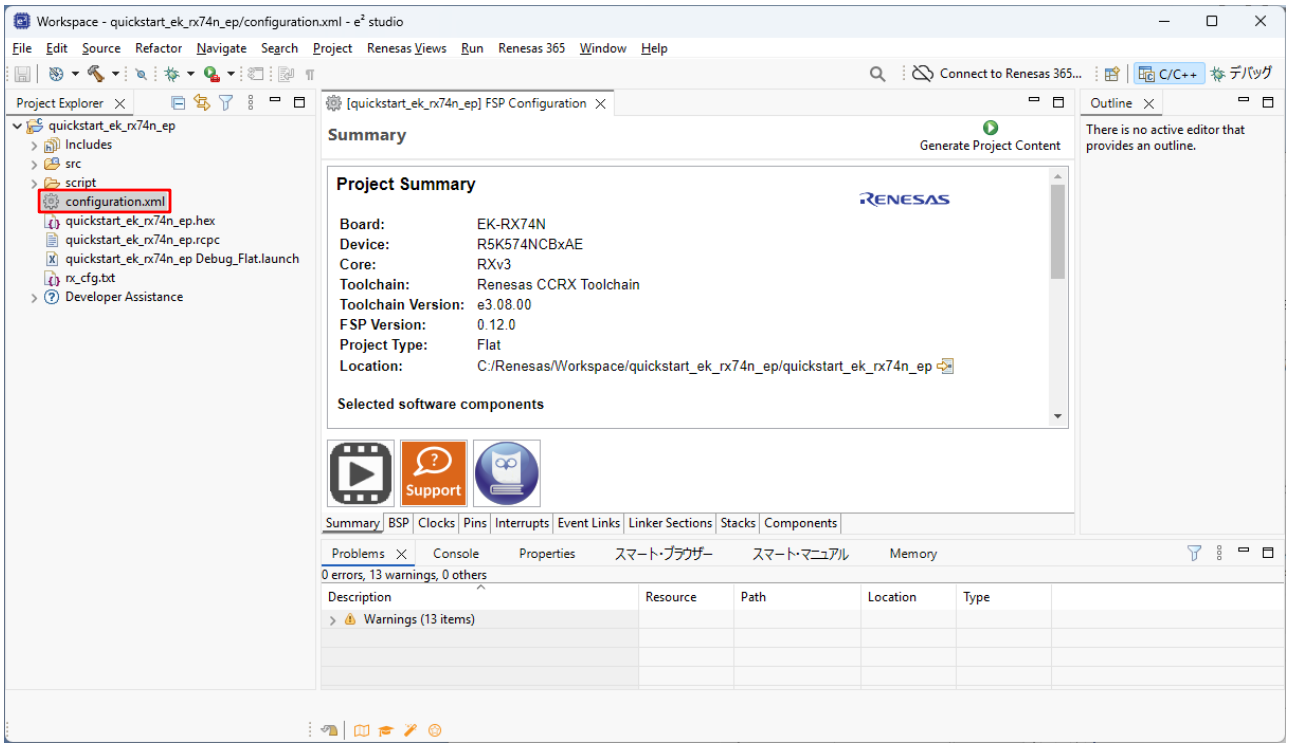

Figure 19. Opening the Configurator

2. For example, in the **Stacks** tab of the configurator, the user can click to select modules to modify the configuration settings, as required, in the **Properties** tab. The following screen shot illustrates modifying the ADC driver configuration.

Note: To access the stack component properties, the **view** must be set to **FSP Configuration**. Use the **Open Perspective** button, if necessary.

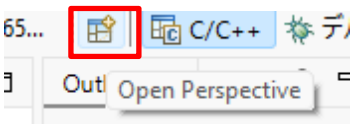

Figure 20. Open Perspective

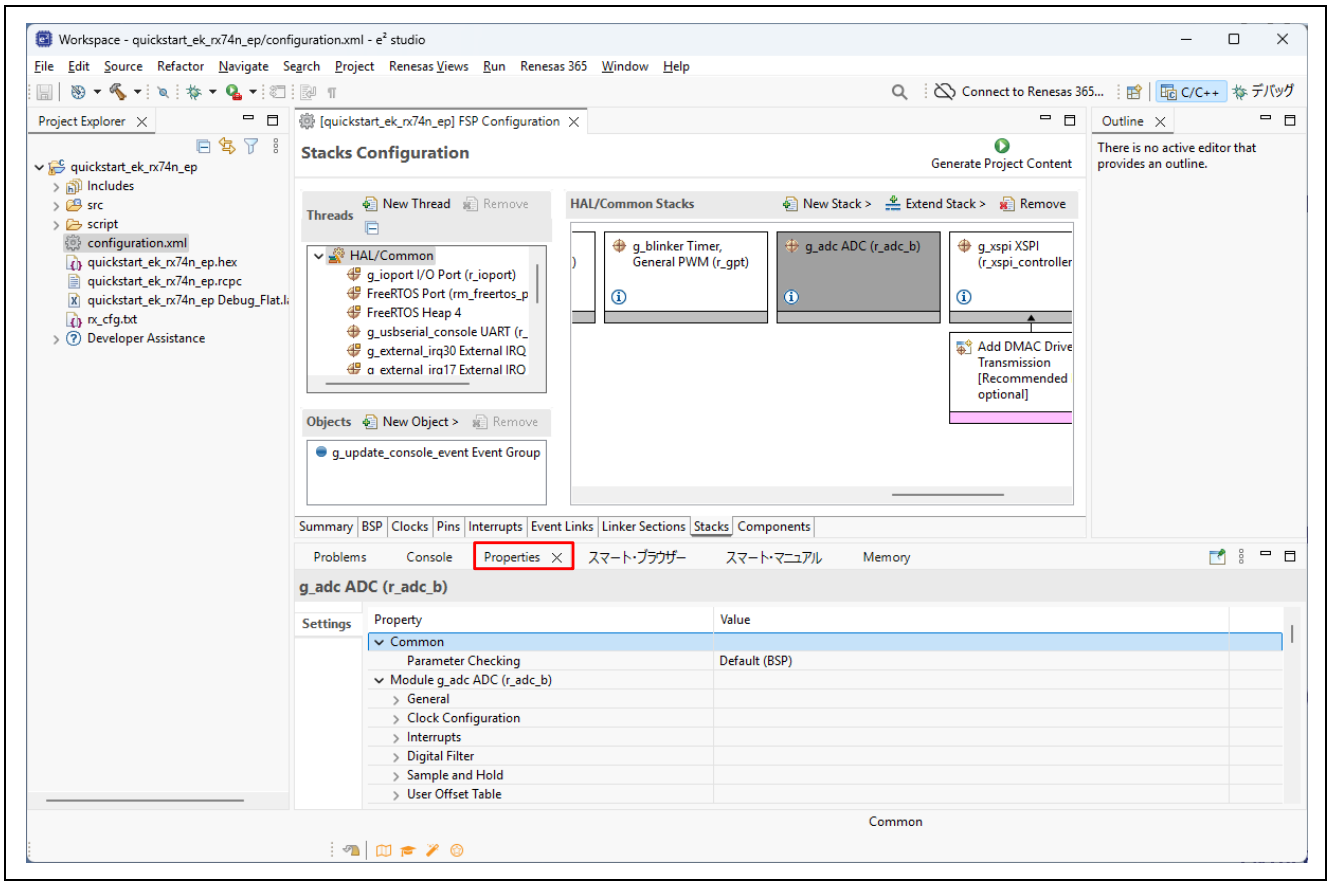

Figure 21. Modifying the Configuration Settings

3. After the desired modifications are made, click **Generate Project Content**. This will produce the auto-generated code within the project.
   A dialog box may appear with an option of saving the configuration changes. Click **Proceed**.

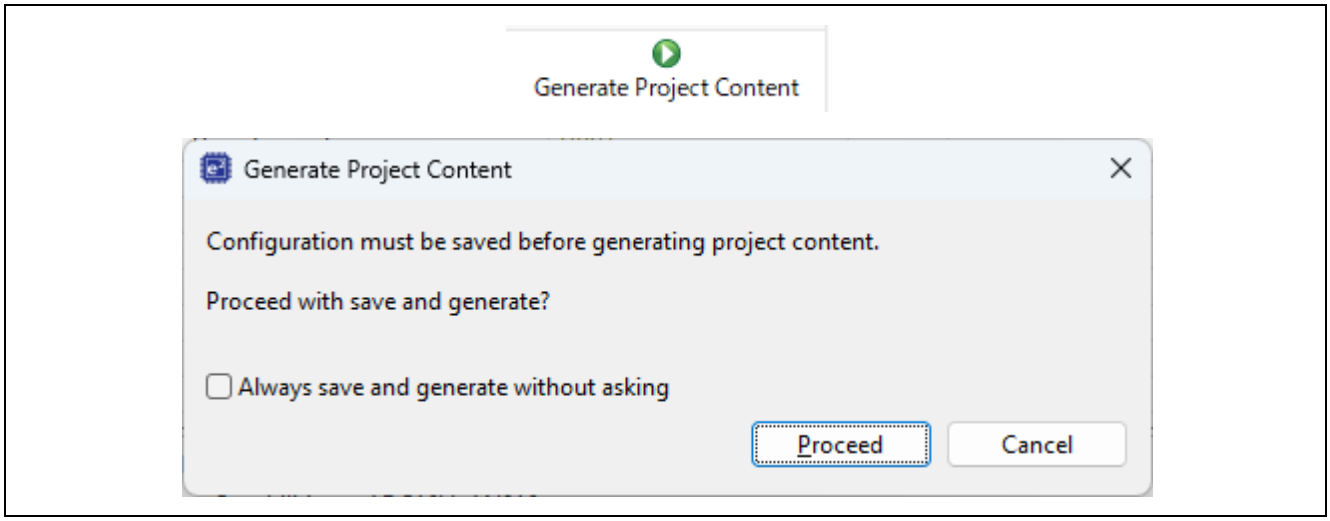

Figure 22. Saving the Configuration changes

4. Modify the source files in the **/src** folder as needed and save the changes.
5. Build the project by clicking the build icon.

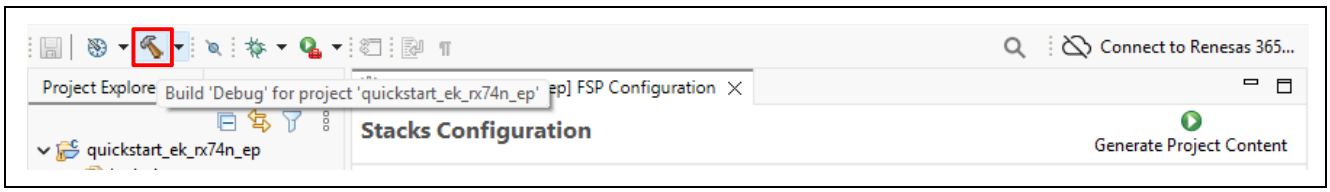

Figure 23. Building the Project

6. If the build finishes successfully, the following message will be output to the console.

Figure 24. Console screen when the build is successful

5.4 Setting Up Debug Connection between the EK-RX74N and Host PC

To program the modified Quick Start Example Project on to the EK-RX74N, a debug connection is necessary between the EK-RX74N and host PC.

1. Configure the DIP SW (SW6) on the EK-RX74N as following table.

Table 2. DIP SW (SW6) configuration for Debug On-Board

SW6-Pin1	SW6-Pin2
OFF	OFF

2. Connect the USB Type-C ends of the USB Type-C device cables, one to the EK-RX74N USB connector (J27) and the other to the DEBUG1 connector (J8).

Note: The EK-RX74N supports 2 debugging modes. In this section and the following sections, default debugging mode, Debug On-Board, is used. More information on debugging modes is available in *EK-RX74N User's Manual*.

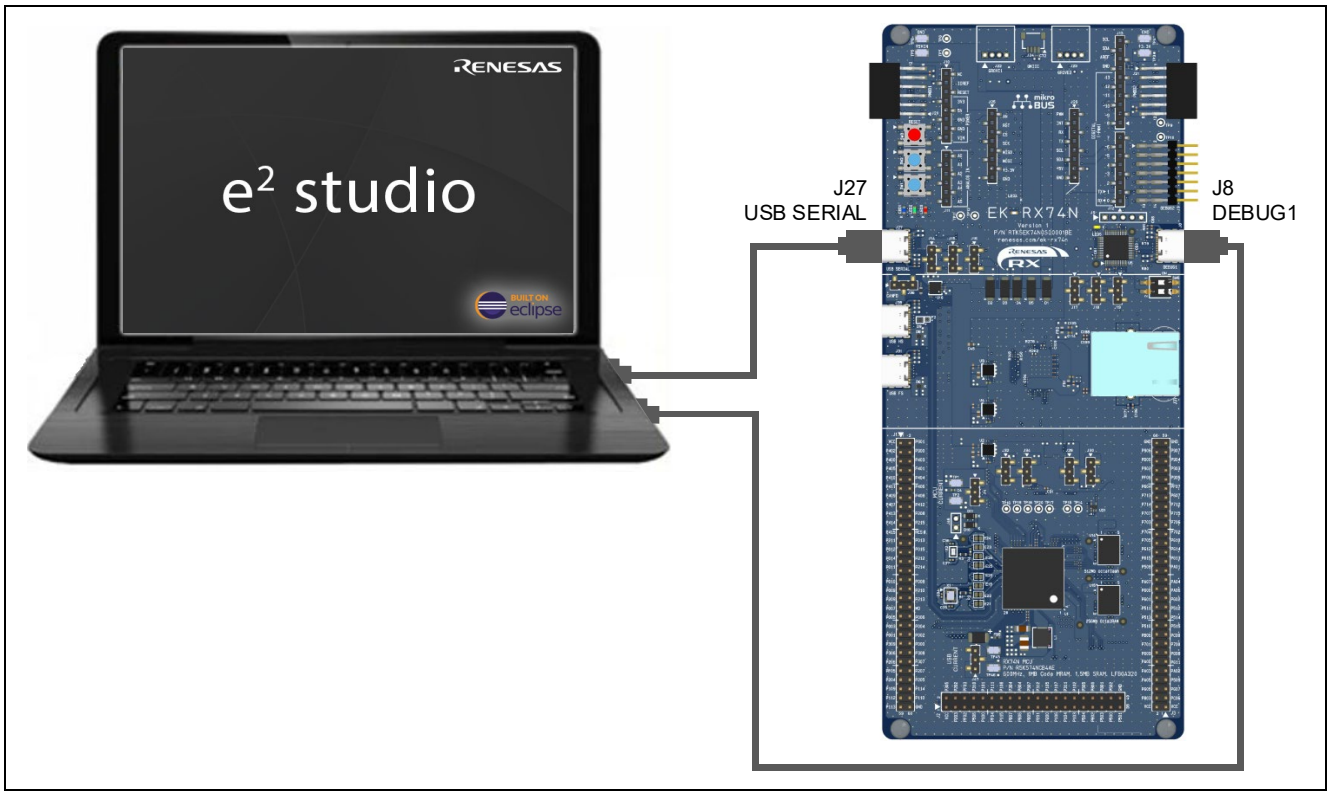

Figure 25. Connecting the EK-RX74N to the Host PC via USB Debug Port

3. The debug LED (LED5) flashes yellow to indicate that the E2OB driver has been detected by the EK-RX74N.

5.5 Downloading and Running the Modified Quick Start Example Project

1. In e² studio, click the drop-down menu for the debug icon, select **Debug Configurations** option.

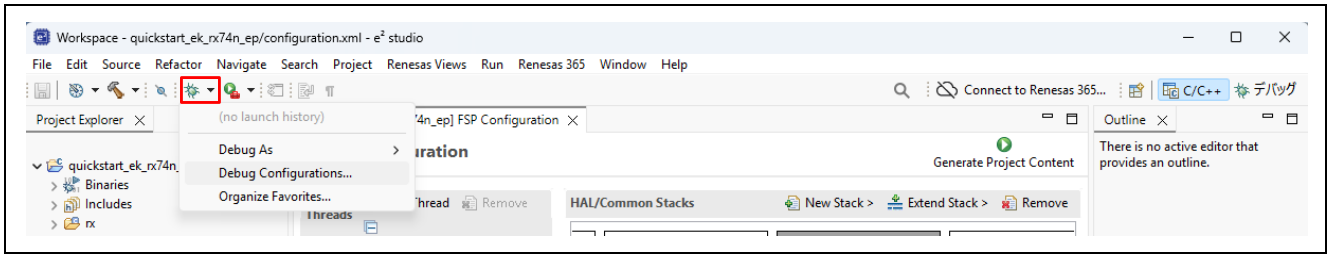

Figure 26. Selecting the Debug Option

2. In the dialogue, on the left-hand pane, expand the **Renesas GDB Hardware Debugging** and select the built image to debug. In this case, the **quickstart_ek_rx74n_ep HardwareDebug_Flat**.

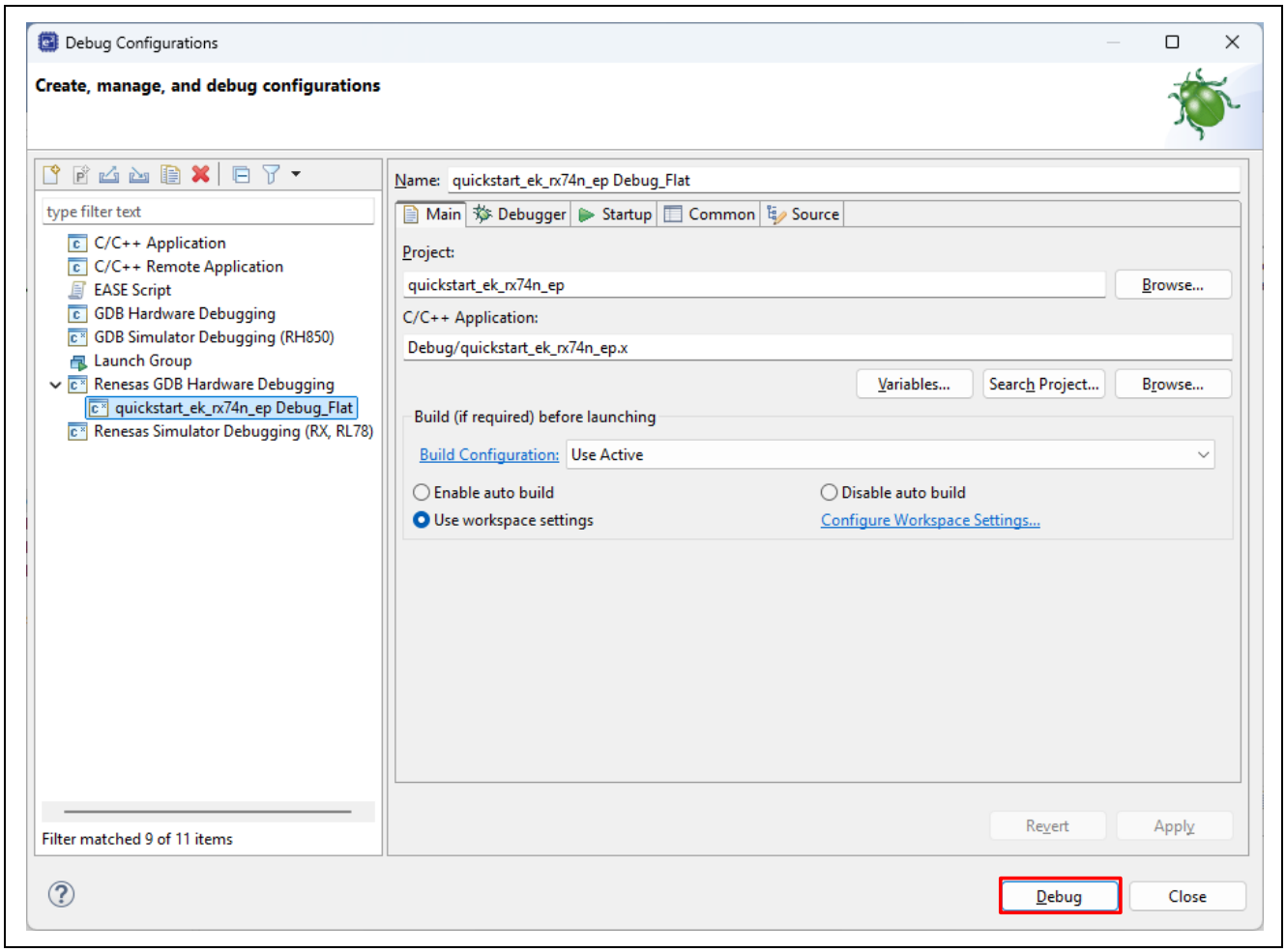

Figure 27. Selecting the Debug Image

3. If the firewall does not allow **'e2-server-gdb.exe'** to communicate, a confirmation dialog will be displayed. Check the '**Private networks, such as my home or work network**' box and click '**Allow access**'.
4. A user account control dialog may be displayed. Enter the administrator password and click **Yes**.
5. A dialog box may appear. Click **Switch**.

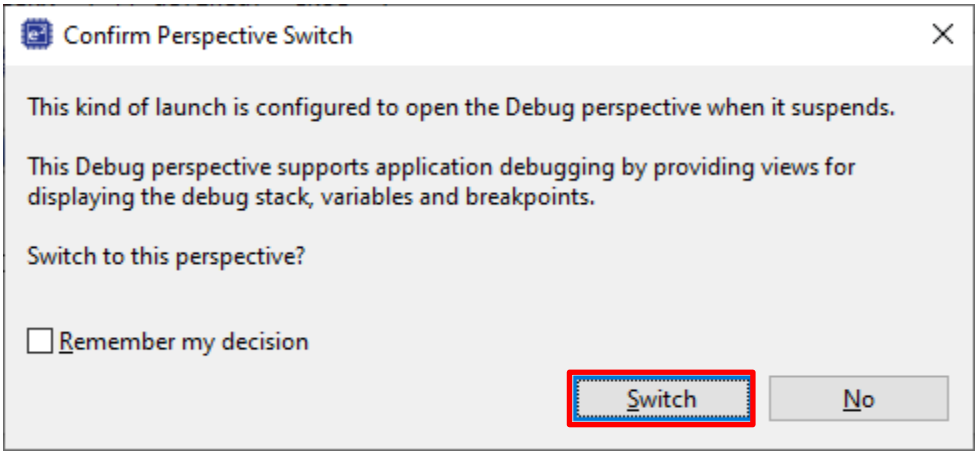

Figure 28. Opening the Debug Perspective

5.6 Running the Quick Start Example Project

1. Press **F8** or click **Resume** icon to begin executing the project.

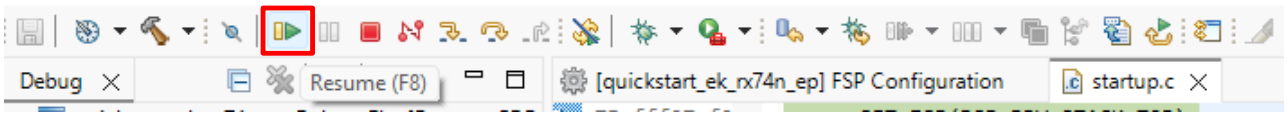

Figure 29. Executing the Project

2. The modified Quick Start Example Project is programmed into the EK-RX74N and is running. The project can be paused, stopped, or resumed using the debug controls.

6. Next Steps

1. To learn more about the EK-RX74N, refer to the *EK-RX74N User's Manual* and design package available in the EK-RX74N webpage at renesas.com/ek-rx74n.
2. Renesas provides several example projects that demonstrate different capabilities of the RX MCUs. These example projects can serve as a good starting point for users to develop custom applications. Example projects (source code and project files) for EK-RX74N kit are available in the EK-RX74N Example Projects Bundle. The example projects bundle is available in the EK-RX74N webpage.

   - Download and extract the example projects bundle (xxxxxxxxxxxxxxx-ek-rx74n-exampleprojects.zip) to a local directory on the host PC.
   - Refer to the list of all example projects (xxxxxxxxxxxxxxx-ek-rx74n-exampleprojects.pdf) available inside the example projects bundle.
   - Browse to the desired example project (for example: adc_ek_rx74n_ep) in the example projects bundle (xxxxxxxxxxxxxxx-ek-rx74n exampleprojects\ek_rx74n\adc\adc_ek_rx74n_ep).
   - For help on using example projects, refer to Example Project Usage Guide.pdf in the RX Example Repository on GitHub at: github.com/renesas/rx-fsp-examples/tree/master/example_projects
   - The archived versions of the source code of the example projects are available in the example project repository.

7. Website and Support

Visit the following URLs to learn about the kit and the RX family of microcontrollers, download tools and documentation, and get support.

EK-RX74N Resources	renesas.com/ek-rx74n
RX Kit Information	renesas.com/rx/kits
RX Product Information	renesas.com/rx
RX Product Support Forum	renesas.com/rx/forum
RX Videos	renesas.com/rx/videos
RX Kit Feedback and Feature Request	renesas.com/rx/kitfeedback
Renesas Support	renesas.com/support

Provide Feedback/Request a Feature

Renesas aims to provide the best microcontroller kit experience to help our customers jumpstart innovation and take products to market faster with the RX family of microcontrollers. The Renesas RX microcontroller kits have been designed with a lot of attention to detail and customer-centered thinking in every aspect of the design. Renesas aims to exceed customer expectation.

Renesas looks forward to hearing your feedback and learning how we can enhance your experience. Please share your feedback at renesas.com/rx/kitfeedback.

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		Page	Summary
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