e² studio

Quick Start Guide for the e² studio for macOS

1. Overview

This quick start guide describes how to install the e² studio for macOS and to install the related toolchains and register them with the e² studio. The target engineers of this guide are those who are developing software for Renesas MCUs or MPUs by using the e² studio in a macOS environment and who have already learned the basics of operating macOS. This guide explains the steps from installing macOS through to construction of the environment. The methods for operating the e² studio after having started it are the same as those for the Windows version. For those methods, refer to the quick start guide for the Windows version with the title given below on the product page of the e² studio (https://www.renesas.com/e2studio).

Title: "e² studio Quick Start Guide for RX, RL78, RH850, RISC-V MCU Family"

1.1 Differences between the e² studio for macOS and the e² studio for Windows

The e² studio for macOS and the e² studio for Windows differ in the following ways.

Table 1 Range of Support by the e² studio for Windows and for macOS (Based on the 2024-04 Versions)

	For Windows	For macOS
Supported devices	RA, RL78, RX, RZ, and RH850 families, DA devices, and RISC-V MCU	RA, RL78, and RX families and DA devices
Supported toolchains	• Compilers from Renesas — CC-RH — CC-RL — CC-RX • Open-source toolchains — GCC for RL78 — LLVM for Renesas RL78 — GCC for Renesas RX — ARM GNU for RA family — LLVM Embedded Toolchain for Arm	• Open-source toolchains — LLVM for Renesas RL78 — GCC for Renesas RX — ARM GNU for RA family — LLVM Embedded Toolchain for Arm
Supported emulators*	• Emulators from Renesas — E2 emulator — E2 emulator Lite — E1 emulator — E20 emulator • Emulator from partners — J-Link from SEGGER	• Emulators from Renesas — E2 emulator — E2 emulator Lite • Emulator from partners — J-Link from SEGGER

Note: For details on the emulators for each device and family, see "Additional Details" on the product page of the e² studio for individual families listed in table 2. For detailed information on DA devices supported by the e² studio, see "Target Devices" on the product page of the e² studio.

Table 2 List of Product Pages of the e² studio for Individual Families

Family Name	URL for the Product Page of the e² studio for Individual Families
RA family	https://www.renesas.com/software-tool/e2studio-information-ra-family
RL78 family	https://www.renesas.com/software-tool/e2studio-information-rl78-family
RX family	https://www.renesas.com/software-tool/e2studio-information-rx-family
DA device	https://www.renesas.com/software-tool/e-studio

2. Operating Environment

The following operating environments were used in creating this quick start guide.

- e² studio 2024-04 macOS: https://www.renesas.com/e2studio
- Flexible Software Package (FSP) v5.3.0 for Renesas RA MCU Family: https://github.com/renesas/fsp
- macOS Sonoma 14.2.1

3. Installation

3.1 Downloading an Installer

If you are using a product of the RL78 family, RX family, or DA devices, download the e² studio for macOS from the following product page.

https://www.renesas.com/software-tool/e-studio

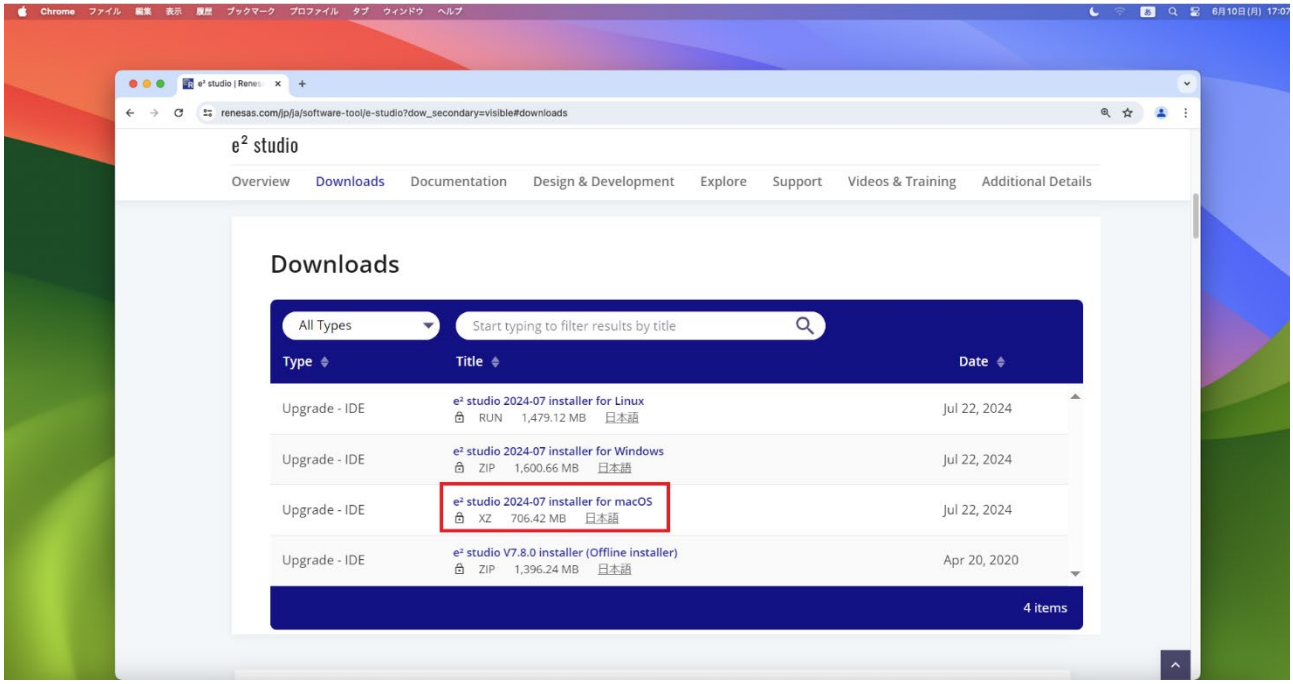

Figure 1 Product Page of the e² studio

For the users of MCUs of the RA family, we recommend downloading the platform installer from the tag page of the Flexible Software Package (FSP) version you will be using on the FSP page for the RA family among the Renesas GitHub Web pages. The page is shown below.

https://github.com/renesas/fsp

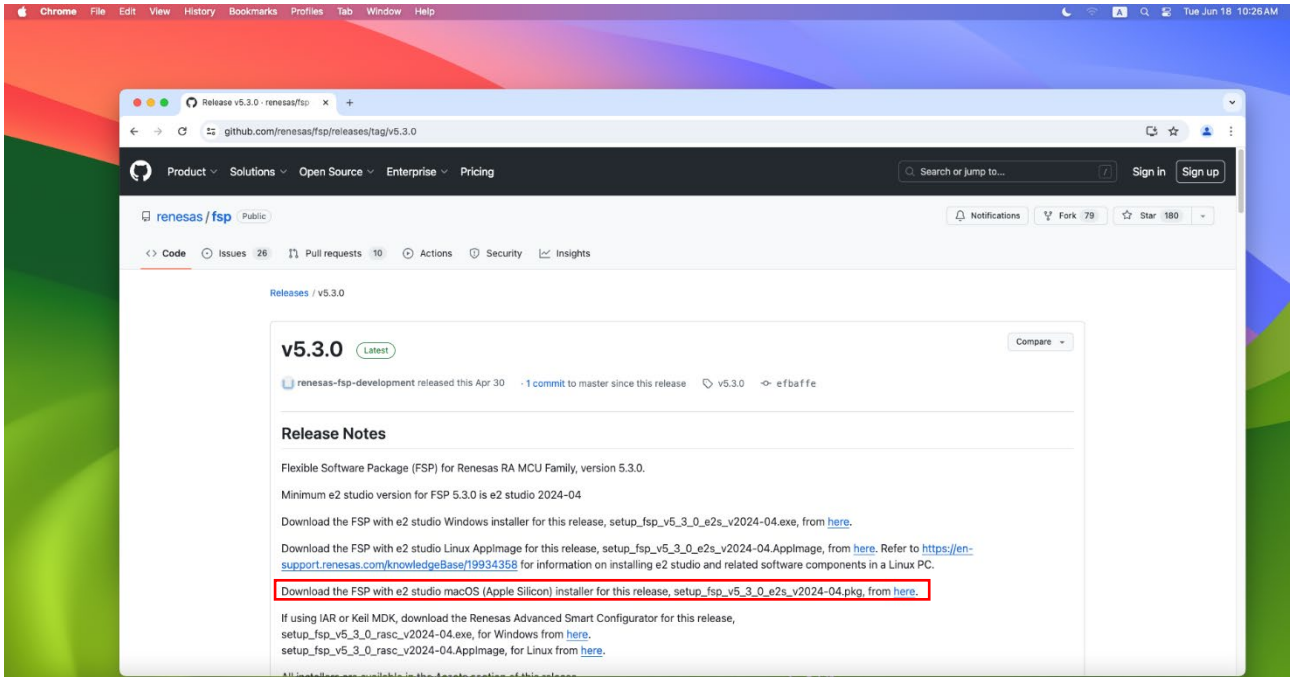

Figure 2 Flexible Software Package (FSP) Page for the RA Family (Example of the v5.3.0 Tag Page)

3.2 Proceeding Installation

If you are using a product of the RL78 family, RX family, or DA devices, extract the E2studio.app file from the downloaded archive and move the file to the application folder.

Double-click on E2studio.app in the application folder to start the e^2 studio.

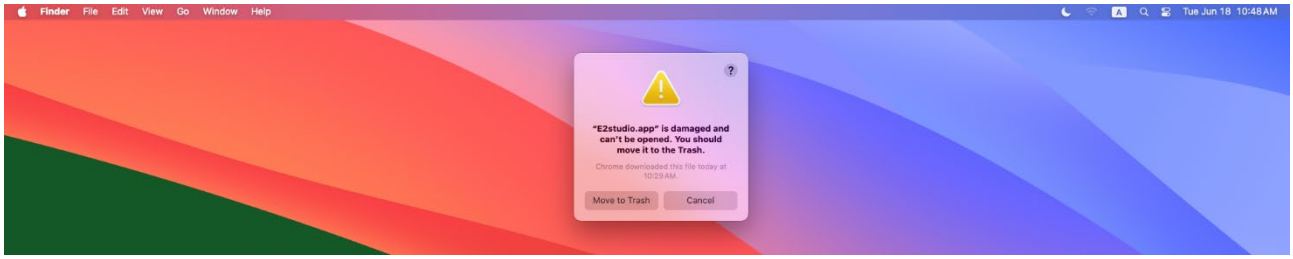

Figure 3 Error in Starting the e² studio

If the [“E2studio.app” is damaged and can’t be opened. You should move it to the Trash.] error message appears when the e^2 studio is started, open the terminal window and run the following command.

```
xattr -d com.apple.quarantine /Applications/E2studio.app
```

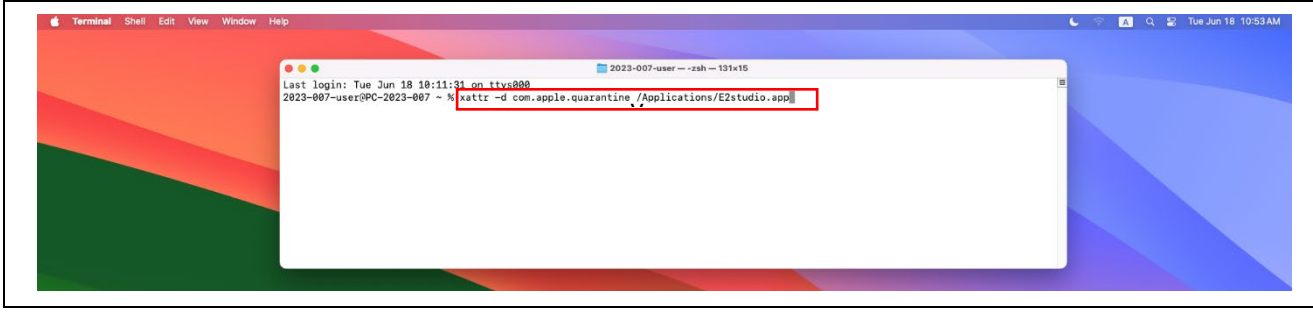

Figure 4 Entering the Terminal Command

If you are using an RA family MCU, enter the following commands from the terminal to change the attribute.

Example:

```
cd /FolderPath
xattr –dr com.apple.quarantine setup_fsp_v5_3_0_e2s_v2024_04.pkg
```

Enter the name of the folder above “setup_fsp_v5_3_0_e2s_v2024_04.pkg” as FolderPath.

Start the installer of which attribute has been changed and proceed installation.

(1) [Introduction]

Click on [Continue] to start the installation.

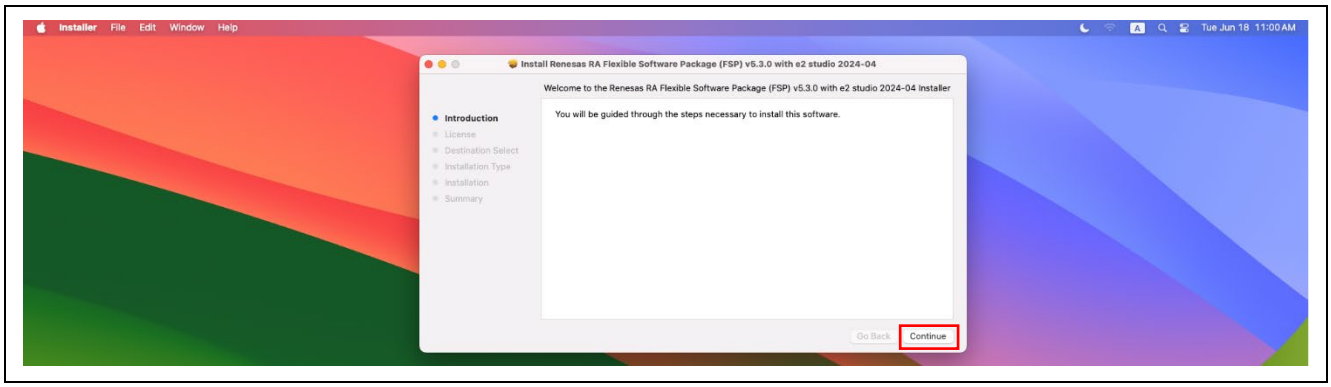

Figure 5 Starting Installation of the FSP

(2) [License]

Click on [Continue] to continue the installation.

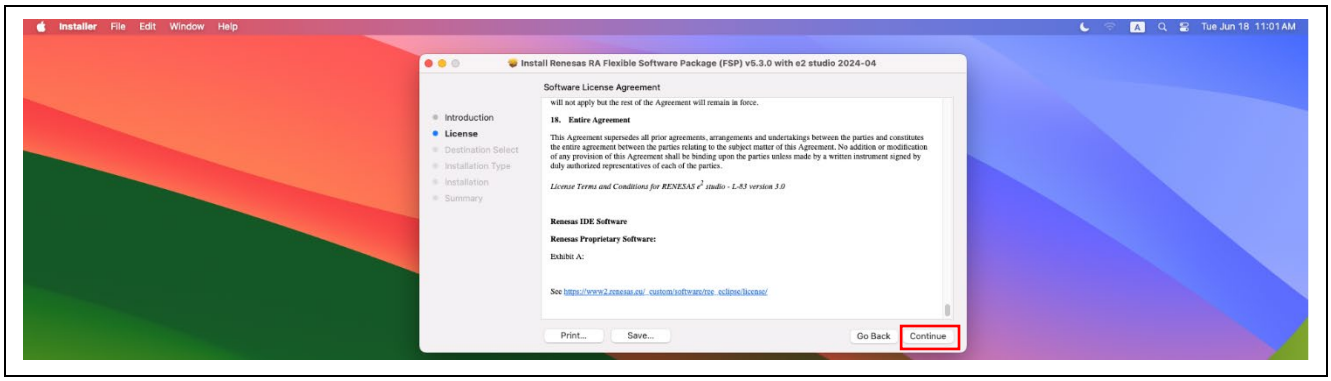

Figure 6 License Agreement for Installation of the FSP

(3) Agreement

Click on [Agree] to continue the installation.

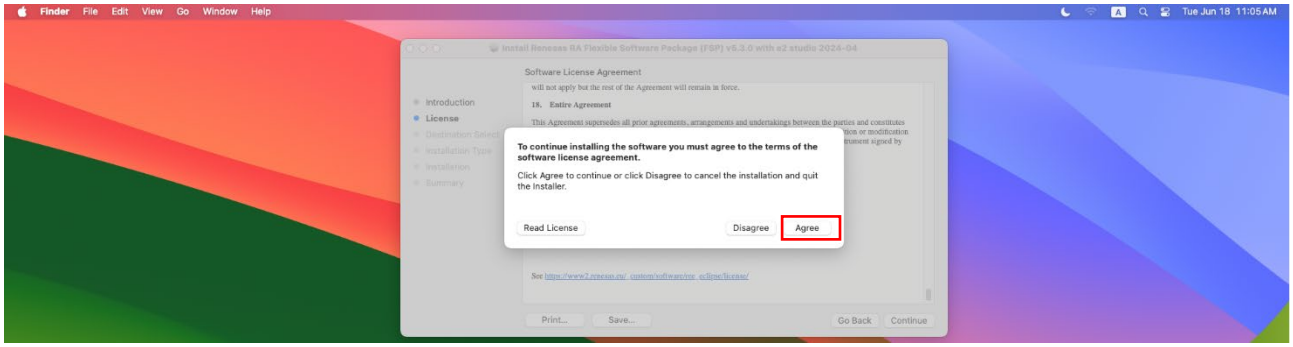

Figure 7 Agreement for Installation of the FSP

(4) Installation location

If you wish to change the installation location, click on [Change Install Location] to specify the desired location.

Click on [Install] to continue the installation.

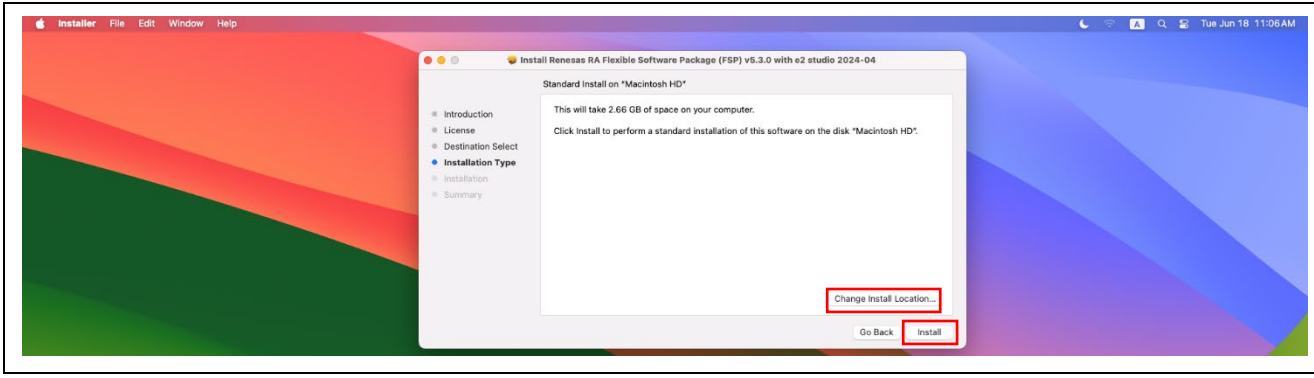

Figure 8 Installation Location for the FSP

(5) Entering a password

Enter the login password. Click on [Install Software] to continue the installation.

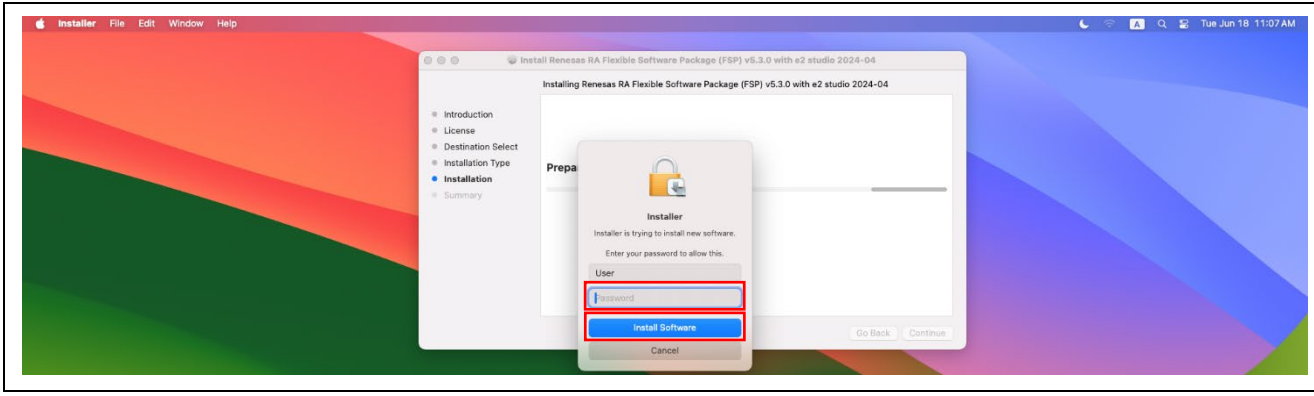

Figure 9 Entering the Password for the FSP

(6) Completion of installation
After installation has been completed, the [The installation was successful.] window will appear. Clicking on [Close] completes the installation.

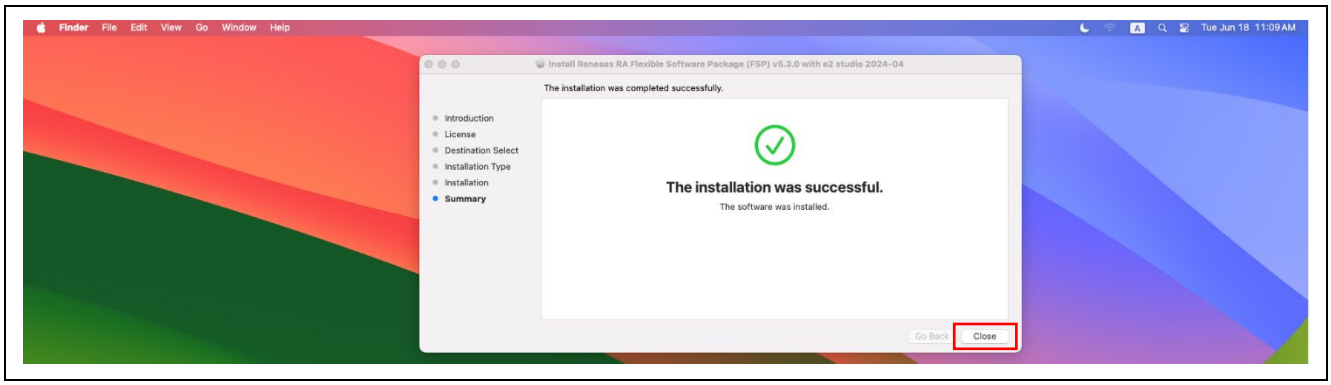

Figure 10 Completion of Installation of the FSP

4. Running the e² studio

(1) Running the e² studio from the terminal

Open a terminal window and go to the path where the e² studio has been installed. Use the open command in the folder where the e² studio has been installed to run the e² studio.

Example:

```
cd /Applications
open e2studio.app
```

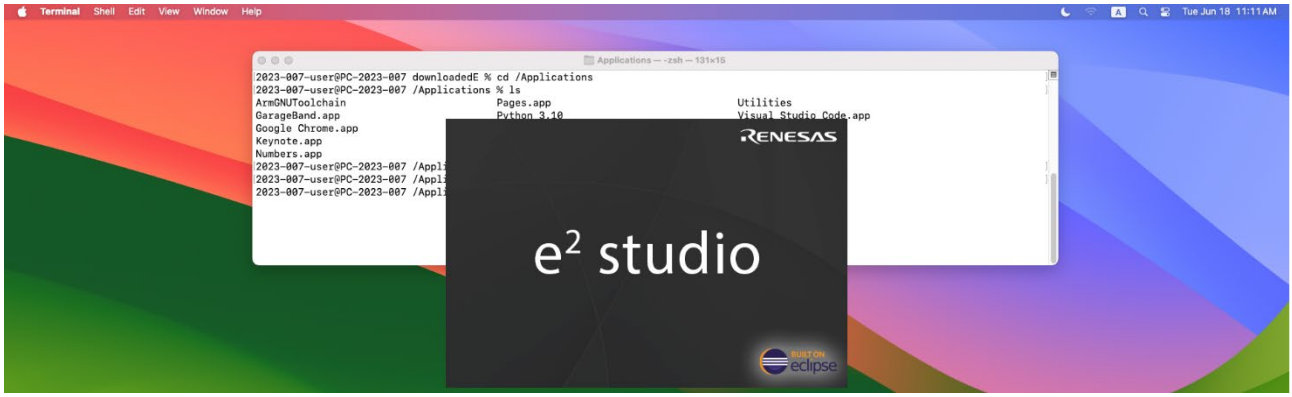

Figure 11 Running the e² studio: Entering the Command

(2) Running the e² studio from the launchpad

You can also run the e² studio by clicking on the icon for the e² studio on the launchpad.

Note: If you installed the e² studio for the RA family and the e² studio for the RL78 and RX families and DA devices, the icon for either the former or latter version of the e² studio may be displayed on the launchpad.

Figure 12 Running the e² studio: Clicking on the Icon

(3) Selecting a workspace

After you run the e² studio, specify the path for the workspace for use in [Workspace] (example: /Users/user/e2_studio/workspace) and click on [Launch].

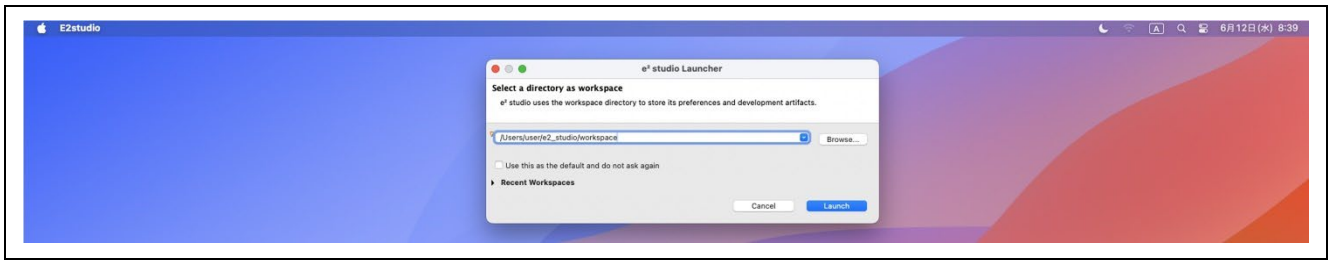

Figure 13 Running the e² studio: Selecting a Workspace

5. Custom Installation and Registration of Toolchains

In the following cases, you will need to obtain an installer for the toolchain and install and register it with the e² studio.

- You will be using RX or RL78 family devices.
- You will be using a version of the ARM GNU toolchain that is not included in the installer for the e² studio.

5.1 Toolchain for RX or RL78 Family Devices

When a software project for use on a device of the RX or RL78 family is to be built in the e² studio, GCC for Renesas RX or LLVM for Renesas RL78 is required.

Installers for each of the toolchains can be obtained from the “Open Source Tools for Renesas” site (https://llvm-gcc-renesas.com/; downloading some toolchains requires user registration).

This quick start guide describes the methods for installing toolchains and registering toolchains with the e² studio, taking GCC for Renesas RX as an example.

(1) Downloading toolchains

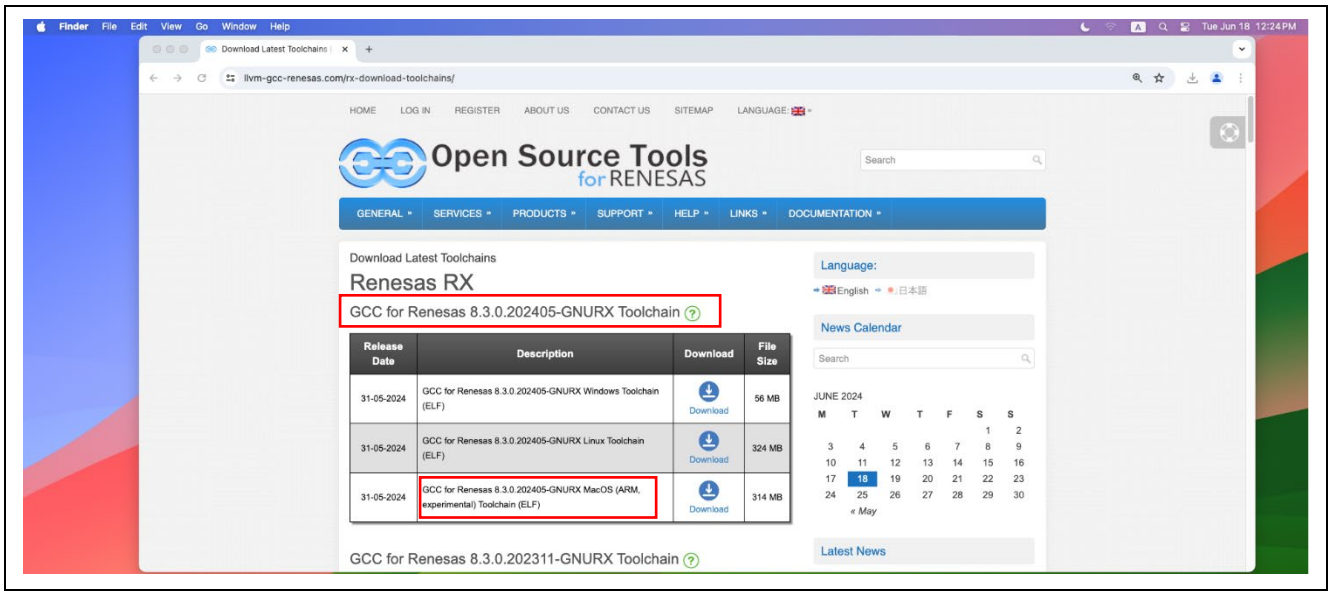

Figure 14 Open Source Tools for Renesas: GCC for Renesas RX

(2) Installing toolchains

Extract the downloaded archive and move the result to an appropriate folder.
Enter the command from the terminal to change the attribute of the folder.
If you download LLVM for Renesas RL78 and extract the archive, the name of the folder will include spaces. Change the name to one which does not include spaces.

Example:

```
cd /FolderPath
xattr –dr com.apple.quarantine gcc-for-renesas-rx-mac
```

Enter the name of the folder above “gcc-for-renesas-rx-mac” as FolderPath.

(3) Registering toolchains

Register toolchains with the e² studio when an e² studio project is created or by using the menu bar. The following describes how to register toolchains with the e² studio by using the menu bar.

Select [Help – Add Renesas Toolchains] from the menu bar of the e² studio.

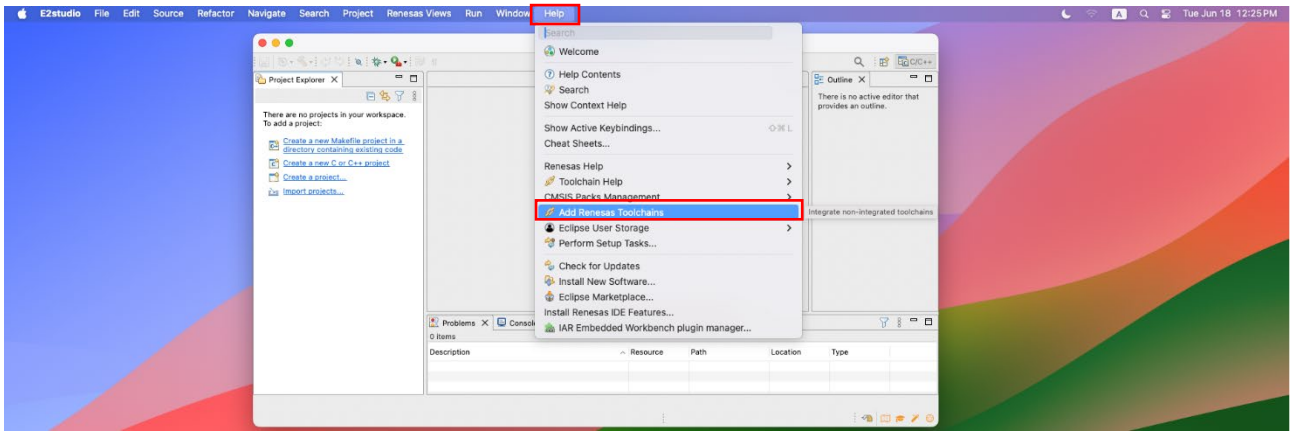

Figure 15 Registering Toolchains: Menu Bar

Select [GCC for Renesas RX] under [Toolchain Type] and click on [Add].

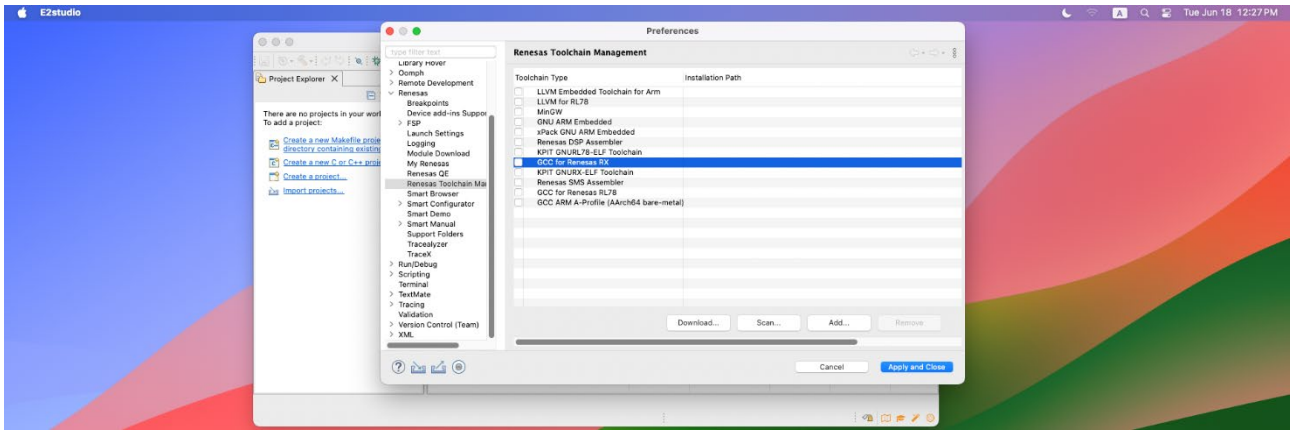

Figure 16 Registering Toolchains: [Renesas Toolchain Management]

Register the gcc-for-renesas-rx-mac folder which has been extracted from the archive in [Location] by using [Browse].

After the file has been registered, click on [OK].

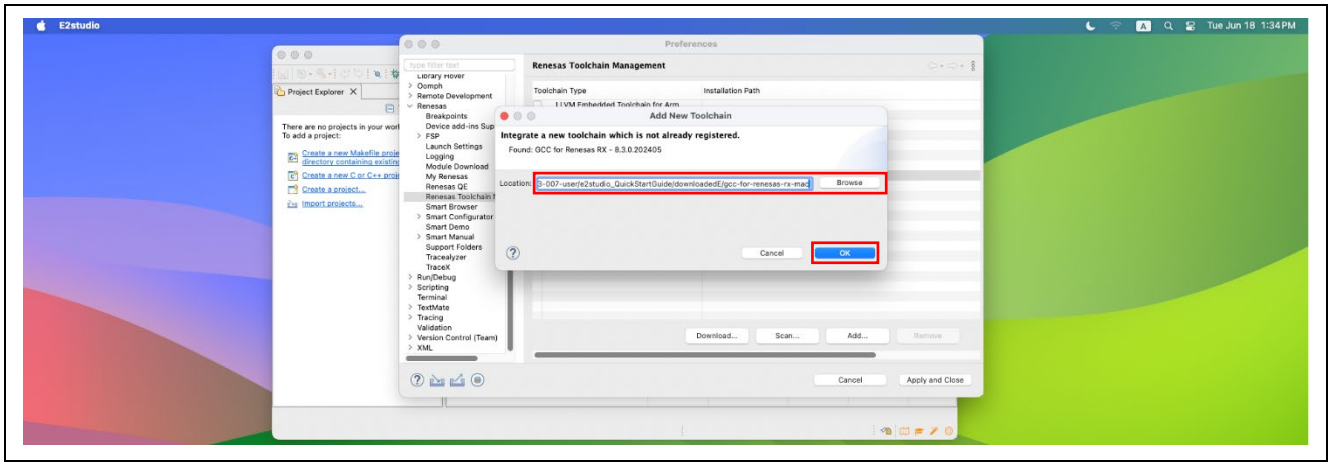

Figure 17 Registering Toolchains: [Add New Toolchain]

When the item [GCC for Renesas RX] under [Toolchain Type] has been selected, registration of the toolchain is completed.

Click on [Apply and Close] to complete the registration.

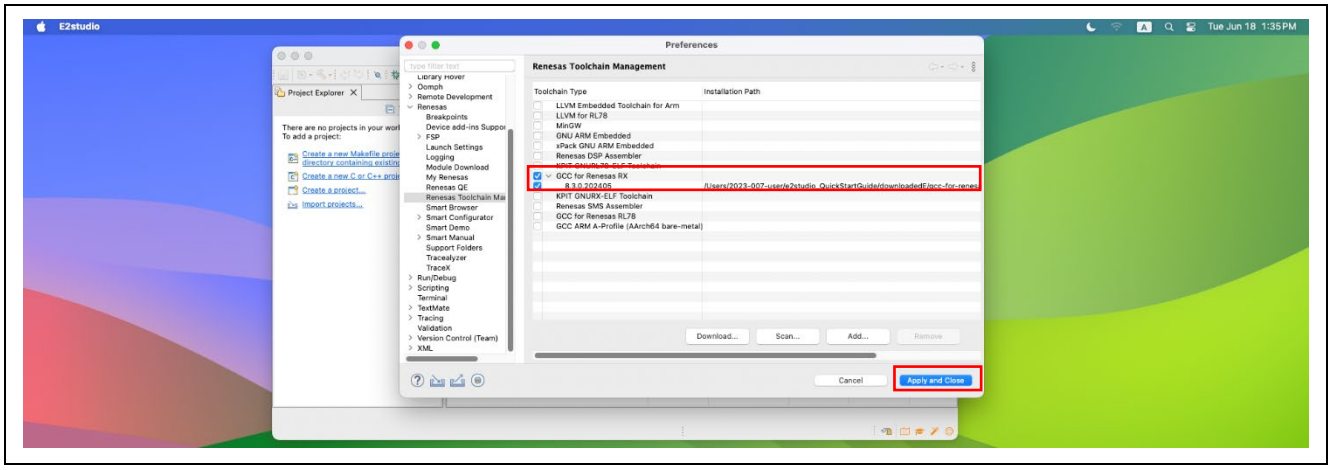

Figure 18 Registering Toolchains: Completion of Registration of [GCC for Renesas RX]

5.2 Installing and Registering the ARM GNU Toolchain

When a version of the ARM GNU toolchain that is not included in the installer for the e² studio is to be installed, register it through the following method.

(1) Downloading the ARM GNU toolchain

Download the ARM GNU toolchain obtained from the Web page of ARM (https://developer.arm.com/downloads/-/arm-gnu-toolchain-downloads). This quick start guide describes the methods for installing the downloaded .pkg file and registering it with the e² studio. For downloading a compressed file such as ".tar.xz", refer to section 5.1.

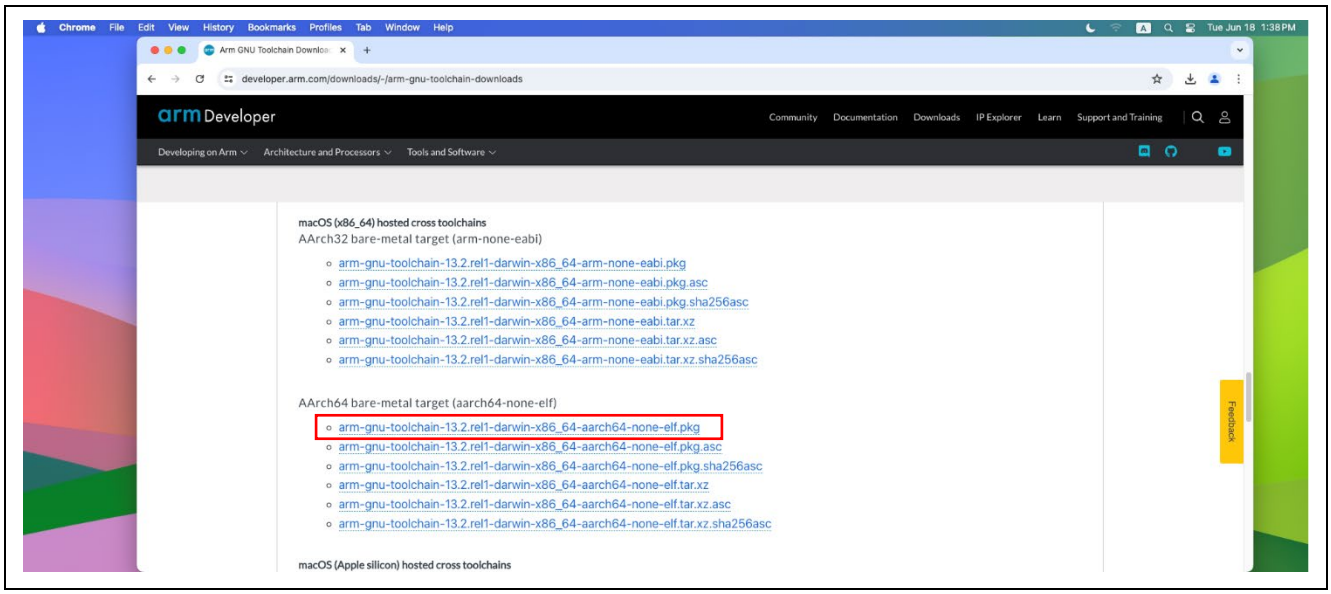

Figure 19 ARM GNU Toolchain Page (Example of 13.2.rel1 and .pkg Files)

(2) Installing the ARM GNU toolchain

Start the downloaded installer and proceed the installation.

Confirm that the installer has started and click on [Continue].

Figure 20 Installing the ARM GNU Toolchain: [Introduction]

If you wish to change the installation location, click on [Change Install Location] to specify the desired location.

Click on [Install] to continue the installation.

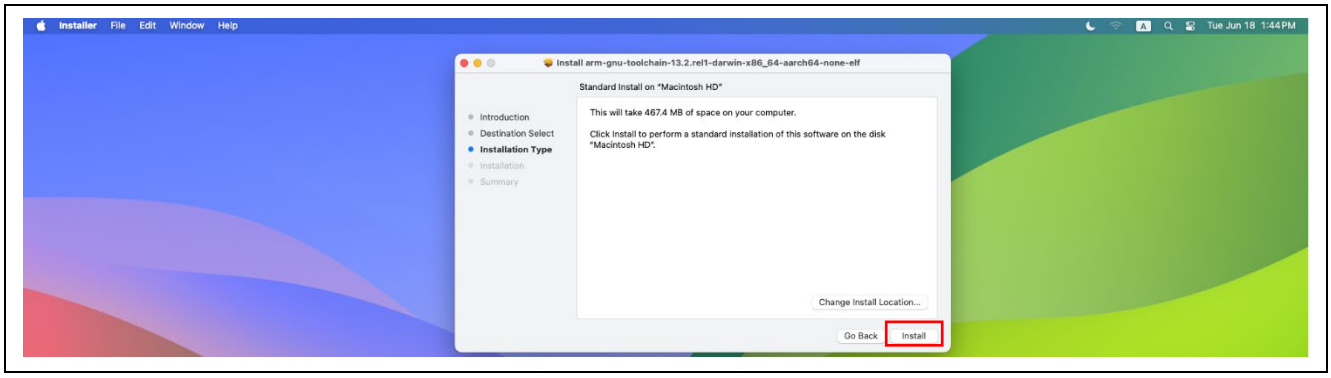

Figure 21 Installing the ARM GNU Toolchain: Starting Installation

Enter the login password. Click on [Install Software] to continue the installation.

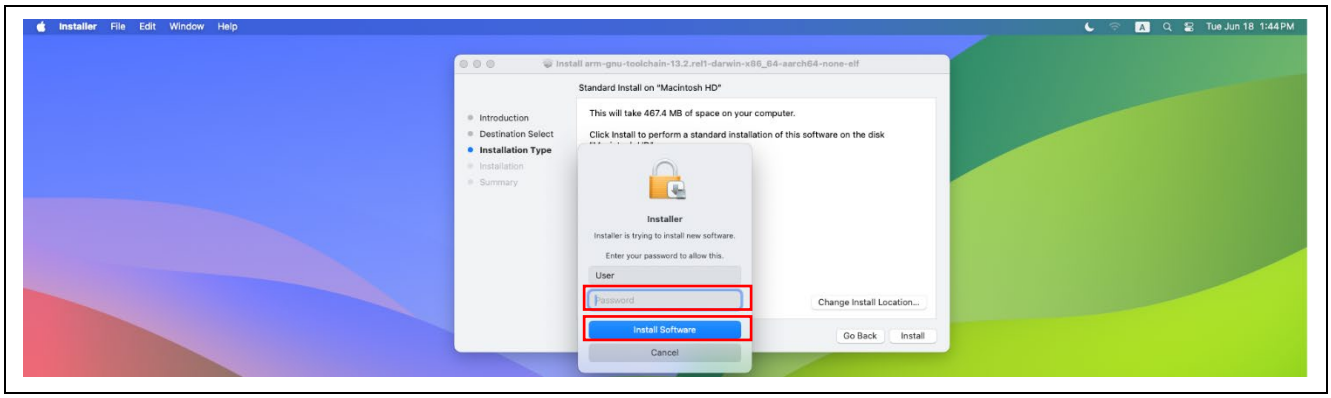

Figure 22 Installing the ARM GNU Toolchain: Entering the Password

After installation has been completed, the [The installation was successful.] window will appear.

Clicking on [Close] completes the installation.

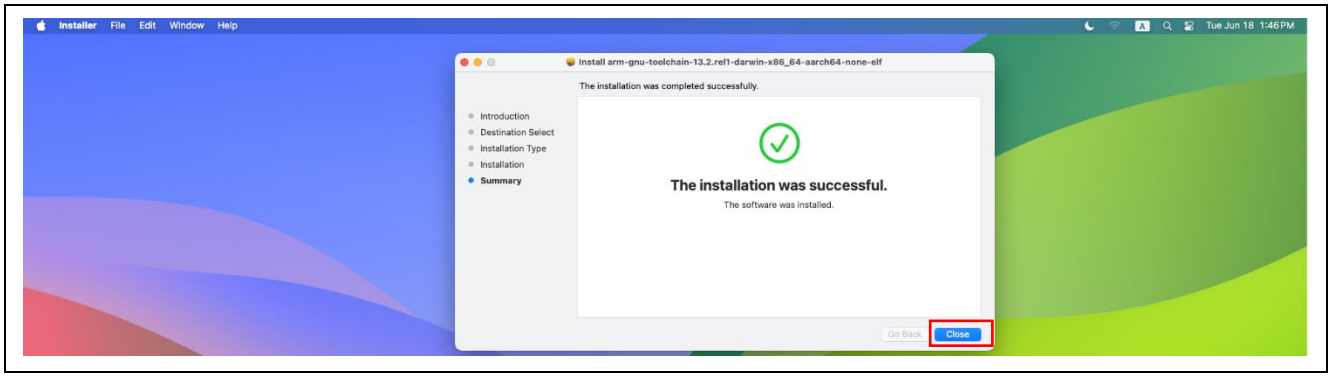

Figure 23 Installing the ARM GNU Toolchain: Completion of Installation

6. Installing Required Libraries

Using the e² studio to debug software requires Python library version 3.10.

You can download this library from a Web page on the Python site (http://www.python.org/downloads/macos).

Start the downloaded installer to complete the installation.

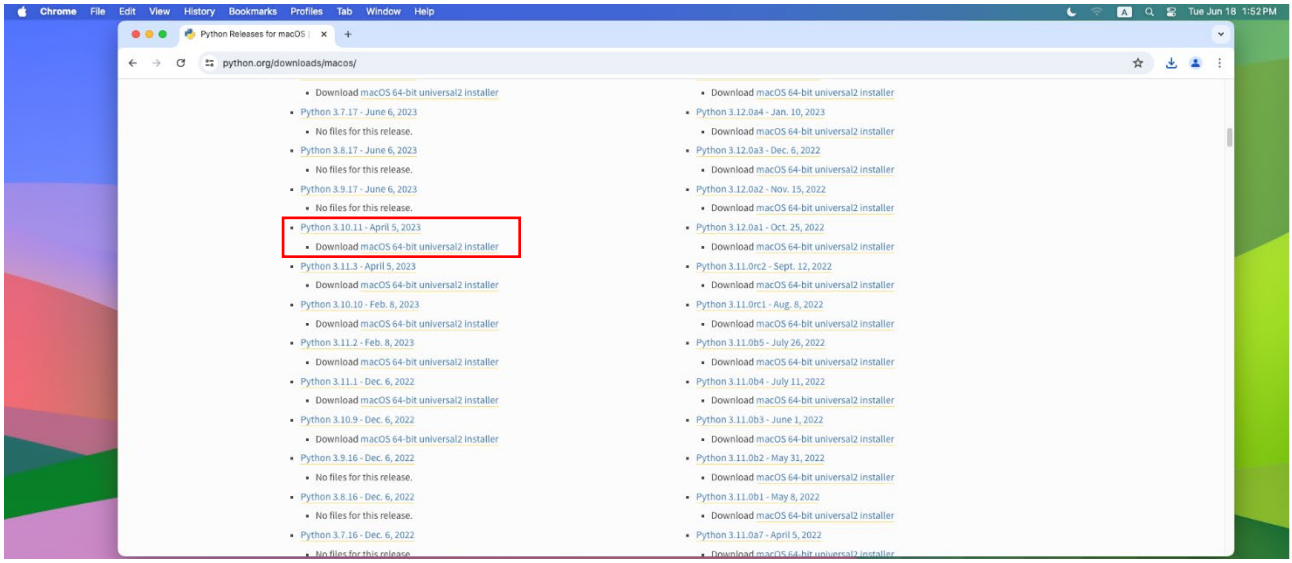

Figure 24 Example of the Page for Downloading Python Library Version 3.10

7. SEGGER J-Link

Download the J-Link driver for macOS from the product page of SEGGER (https://www.segger.com/downloads/jlink/).

Start the downloaded installer to complete the installation.

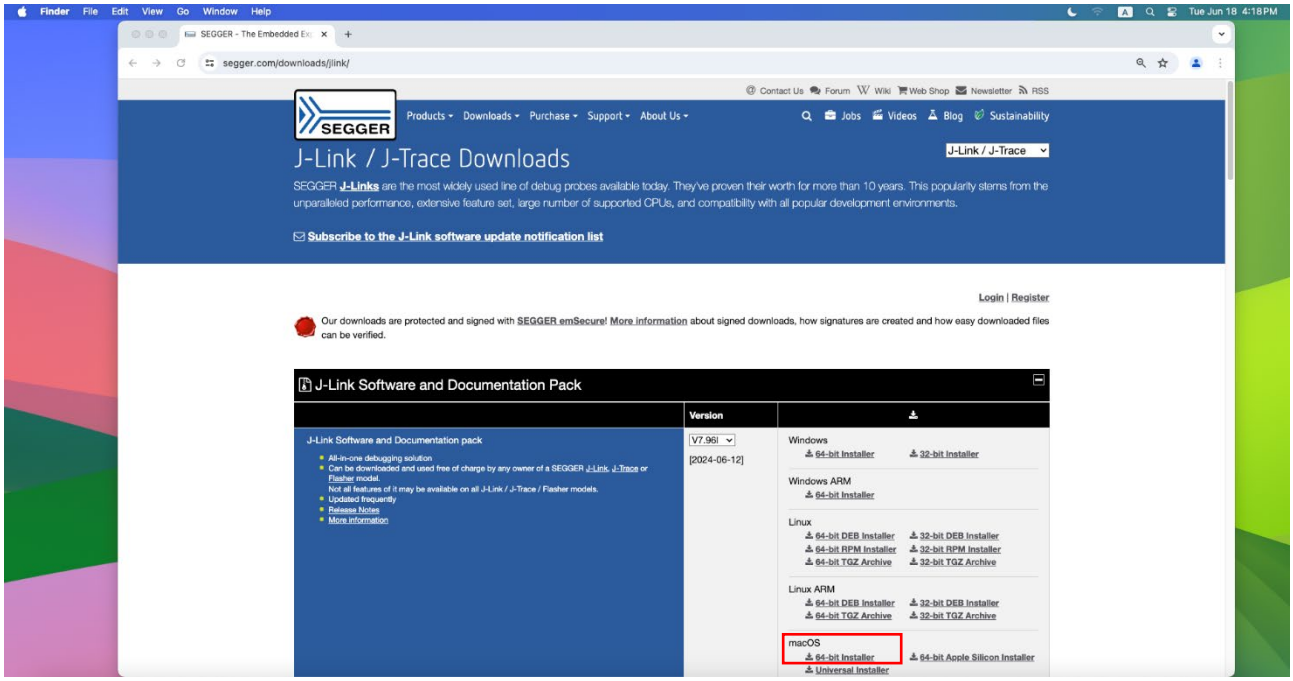

Figure 25 Example of the Page for Downloading the J-Link USB Driver

After the emulator has been connected, display the system information to confirm the state of the J-Link USB driver having been recognized.

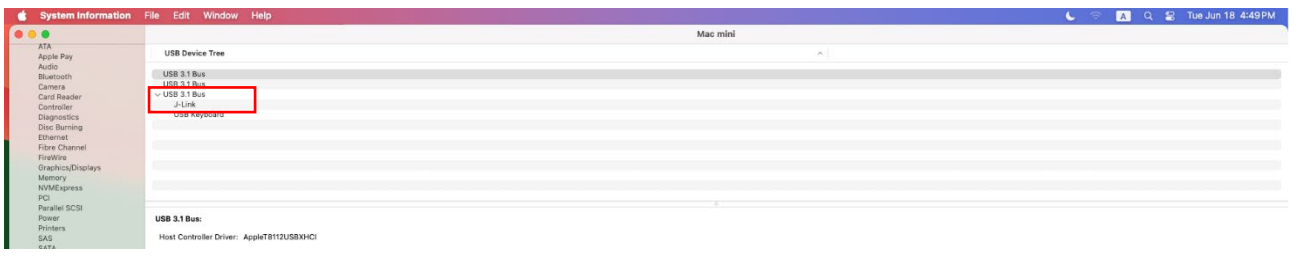

Figure 26 Confirming the State of the J-Link USB Driver Having been Recognized

Revision History

Rev.	Date	Description	
		Page	Summary
1.0	Sep.30.24	—	First Edition issued

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Precaution against Electrostatic Discharge (ESD)

   A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.
2. Processing at power-on

   The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.
3. Input of signal during power-off state

   Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.
4. Handling of unused pins

   Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.
5. Clock signals

   After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.
6. Voltage application waveform at input pin

   Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).
7. Prohibition of access to reserved addresses

   Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.
8. Differences between products

   Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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   "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc.

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