e² studio Integrated Development Environment

Debugging Linux Applications Running on the R-Car (Connection Edition)

Introduction

This application note introduces the procedure for connecting a debugger and target board for use of the e² studio for R-Car in the debugging of Linux applications which run on an R-Car.

Target Devices

R-Car S4 and R-Car V4H

Contents

1. Environment

The following lists the elements of the environment used in the descriptions in this application note.

Table 1-1 List of Environment Elements

Item	Detail
R-Car S4 Reference Board	Spider [RTP8A779F0ASKB0SP2SA080] [RTP8A779F4ASKB0SP2SA080]
R-Car V4H Reference Board	White Hawk [RTP8A779G2ASKB0F10SA001]
Host PC	Ubuntu 20.04 LTS
e² studio for R-Car	Version 2023-03 and Version 2023-07
R-Car S4 SDK	V3.16.0
R-Car V4H SDK	V3.16.0

This application note describes the procedure for using an environment in which a Linux environment has been set up for the R-Car on the reference board. For the procedure for setting up the Linux environment, refer to the user's manual included in the SDK.

2. Connection Diagram

Figure 2-1 shows a connection between the reference board for the R-Car S4/V4H and a host PC. The IP addresses for use between the host PC and the reference board are set as shown in the figure. Specify the IP addresses which are to be set in the following chapters to suit the environment you are using.

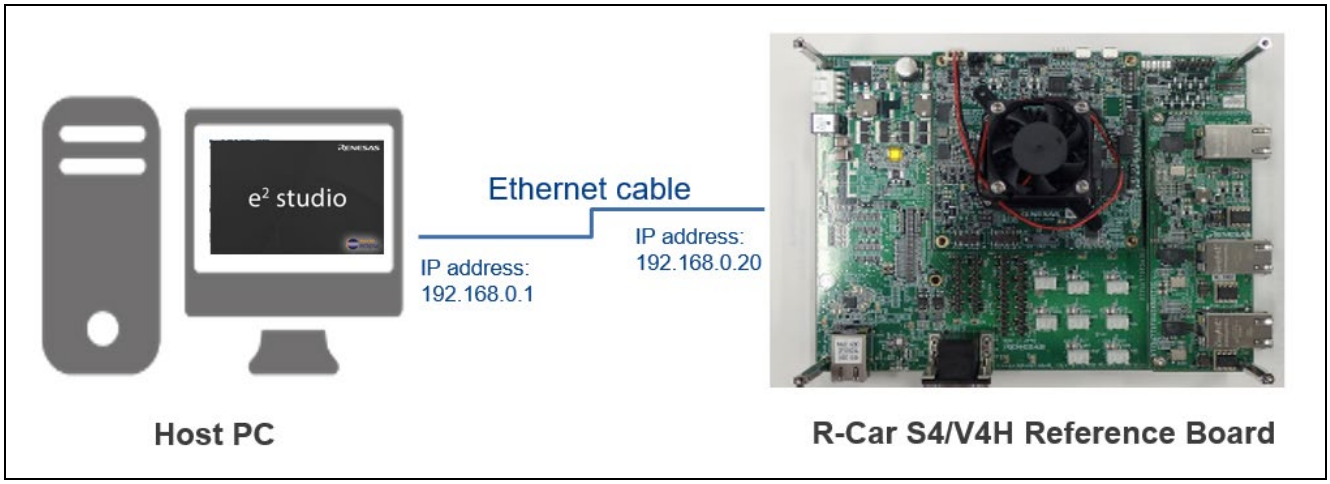

Figure 2-1 Connection between the Host PC and the Reference Board

3. Creating a Project

Start the e² studio and create a new project by using [Renesas Debug Only Project].

Make menu selections in the order [File] -> [New] -> [Renesas C/C++ Project] -> [Renesas Debug].

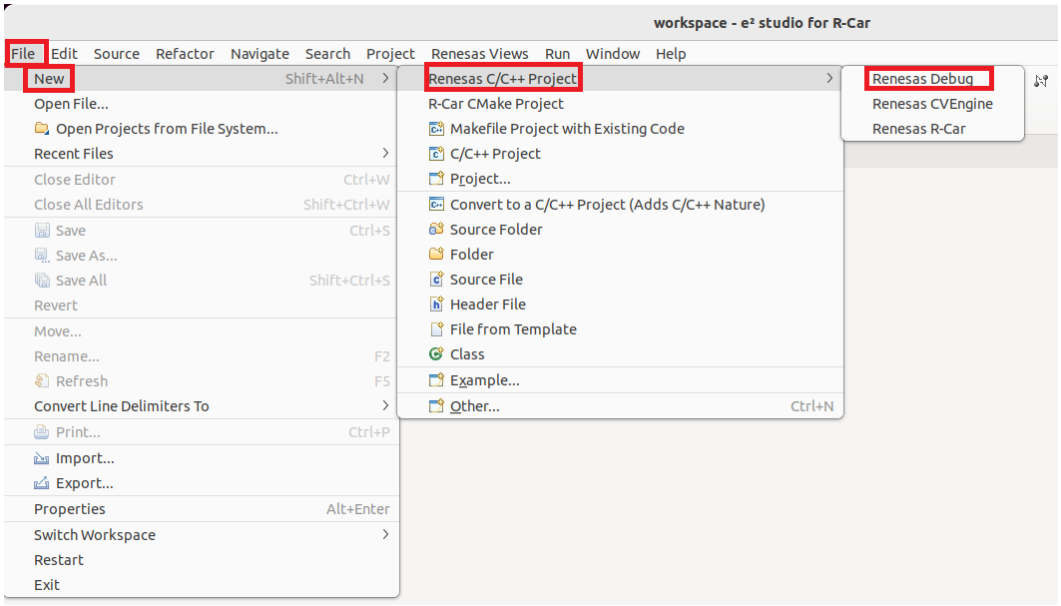

Figure 3-1 Creating a Project (1)

The [New C/C++ Project] dialog box appears. Select [Renesas Debug Only Project].

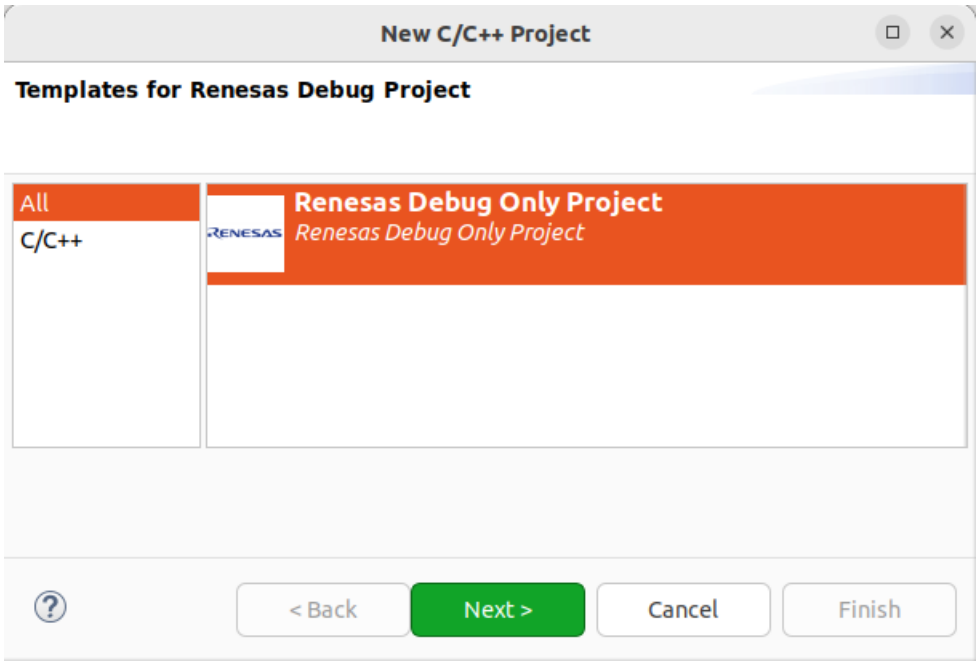

Figure 3-2 Creating a Project (2)

Enter the desired name in [Project name].

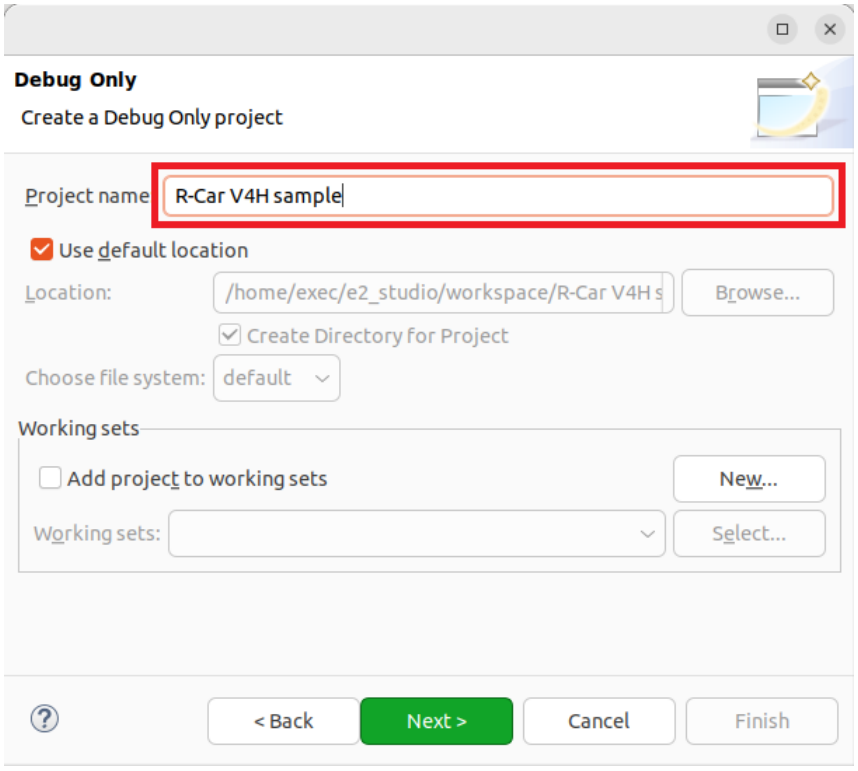

Figure 3-3 Creating a Project (3)

Items [Debug Hardware] and [Device Settings] are not actually used because these settings are for debugging with the use of an emulator. However, make desired selections and enter a path so that you can proceed with the subsequent steps.

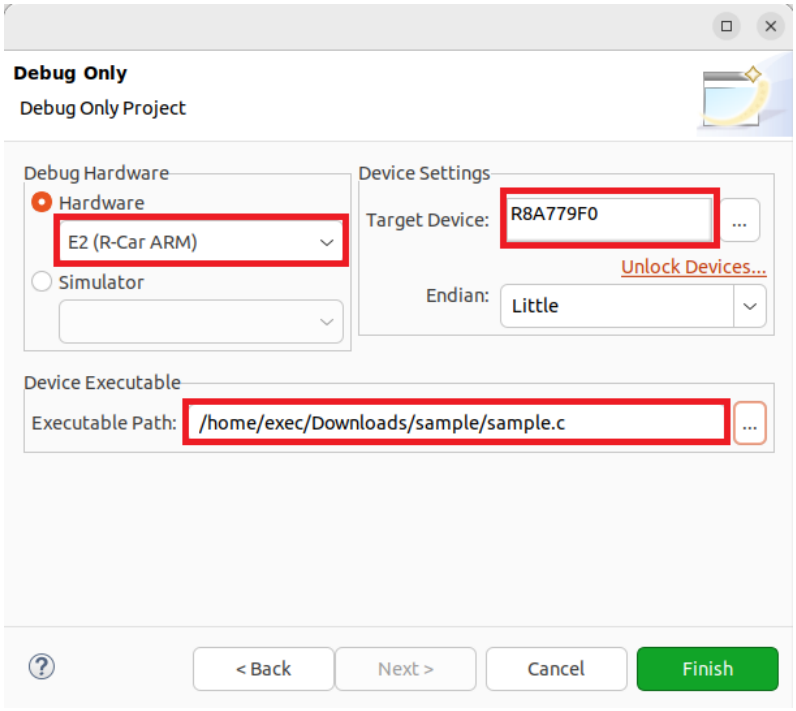

Figure 3-4 Creating a Project (4)

4. Connecting a Debugger

Select [Run] -> [Debug Configurations…] to open the [Debug Configurations] dialog box.

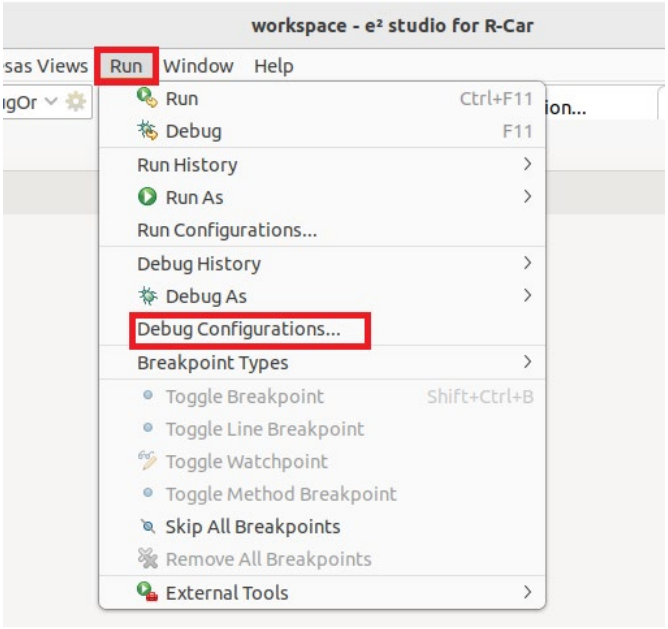

Figure 4-1 Connecting a Debugger (1)

Create a [New_configuration] by double-clicking on [Renesas Linux Application] under the [Debug Type] tree on the left-hand side of the [Debug Configurations] dialog box. Enter desired names for [Name] and [Project] in the created [New_configuration]. Specify the executable file of the application to be debugged in [C/C++ Application].

Click on the [New…] button in the [Connection] group to open the [New Connection] dialog box.

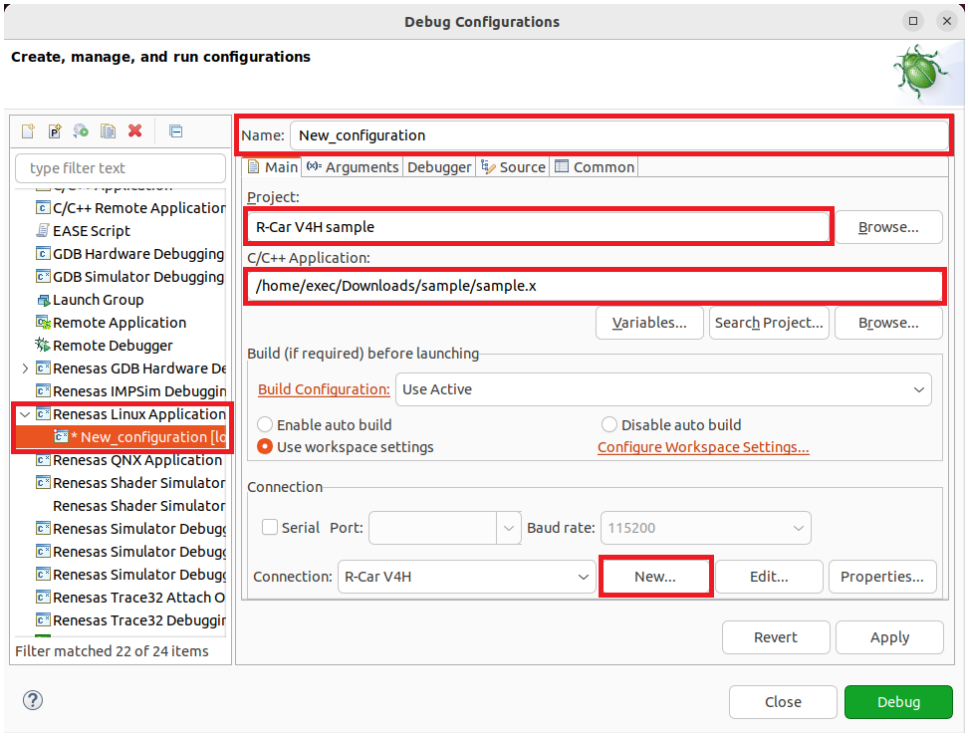

Figure 4-2 Connecting a Debugger (2)

Select [SSH Only] and click on the [Next] button in the [New Connection] dialog box.

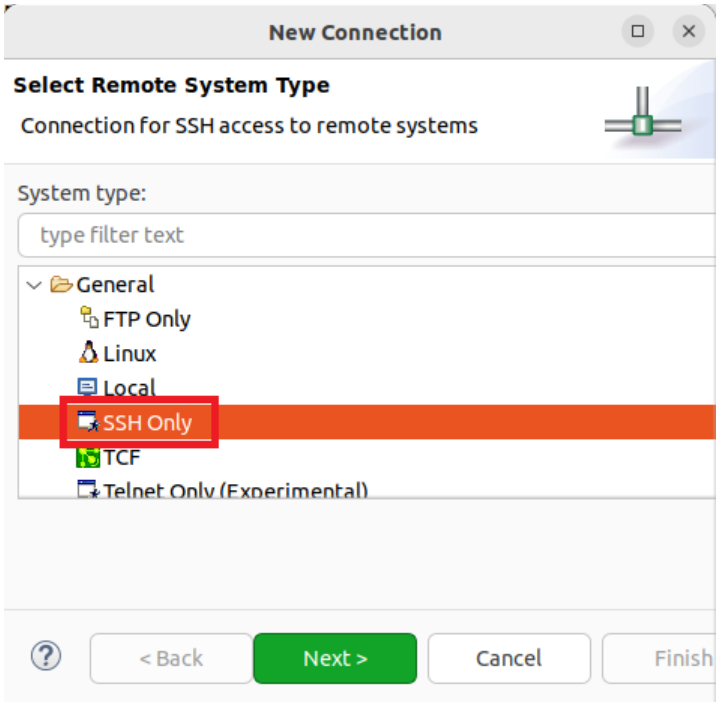

Figure 4-3 Connecting a Debugger (3)

Specify the IP address for the reference board of the R-Car S4/V4H as [Host name]. Enter desired names in [Connection name] and [Description] and click on the [Finish] button.

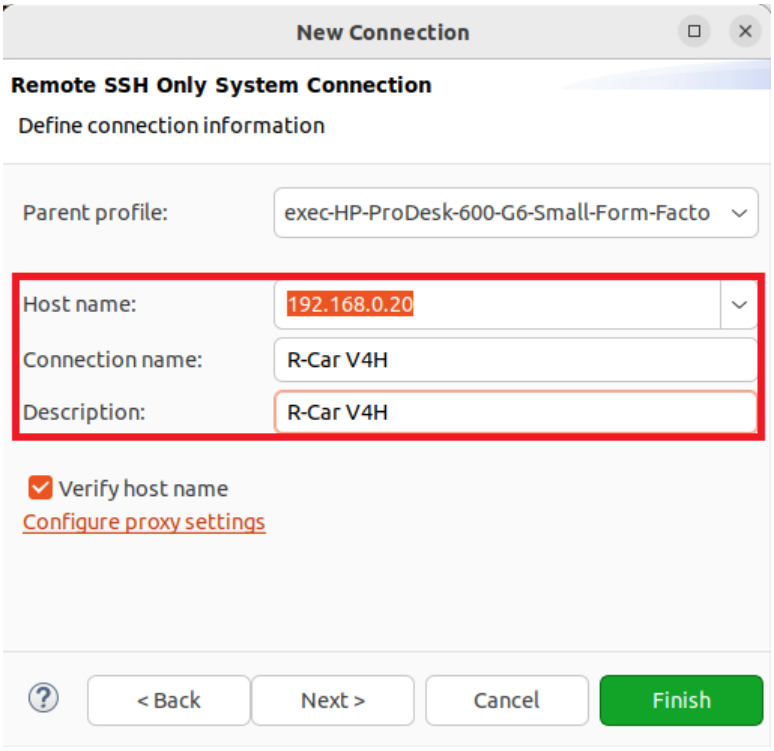

Figure 4-4 Connecting a Debugger (4)

Select the [Browse…] button for [Remote Absolute File Path for C/C++ Application] on the [Main] tabbed page in the [Debug Configuration] dialog box to display the [Select Remote C/C++Application File] dialog box.

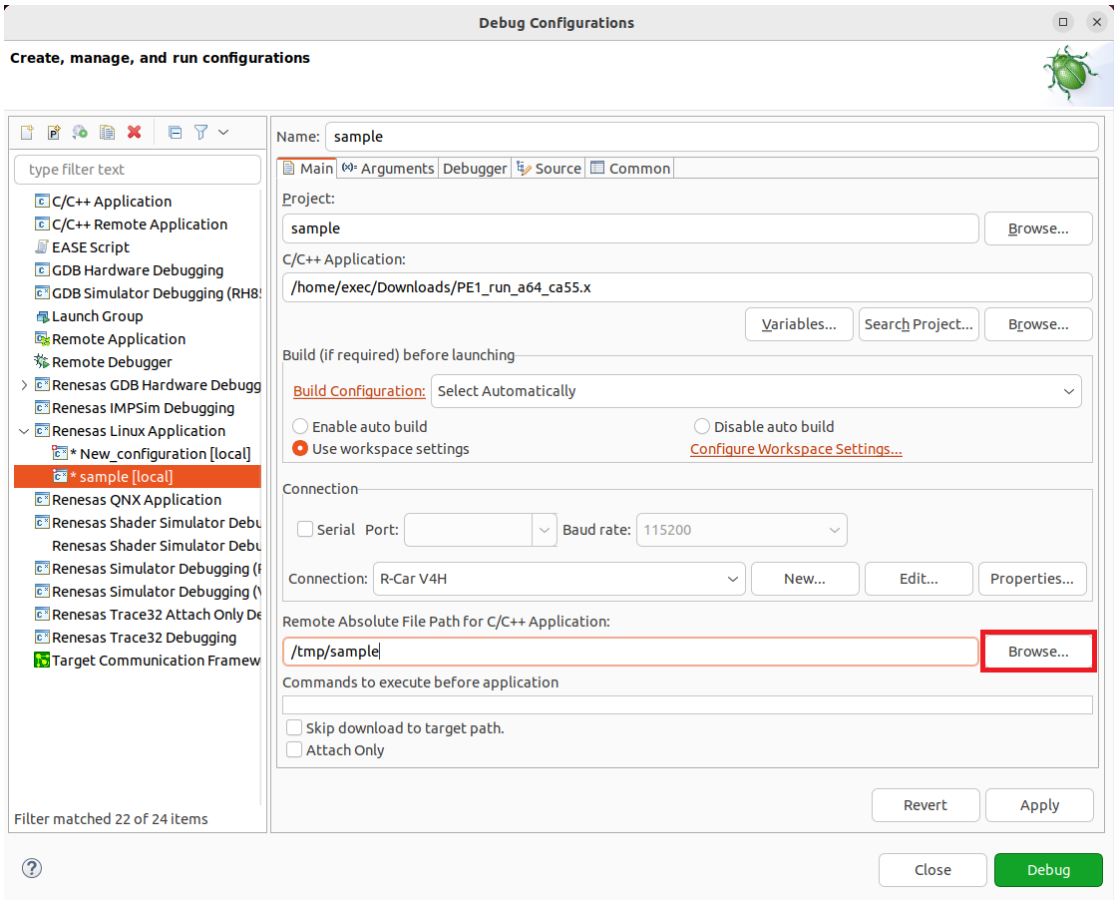

Figure 4-5 Connecting a Debugger (5)

Expand “Root” in the file tree of the [Select Remote C/C++Application File] dialog box.

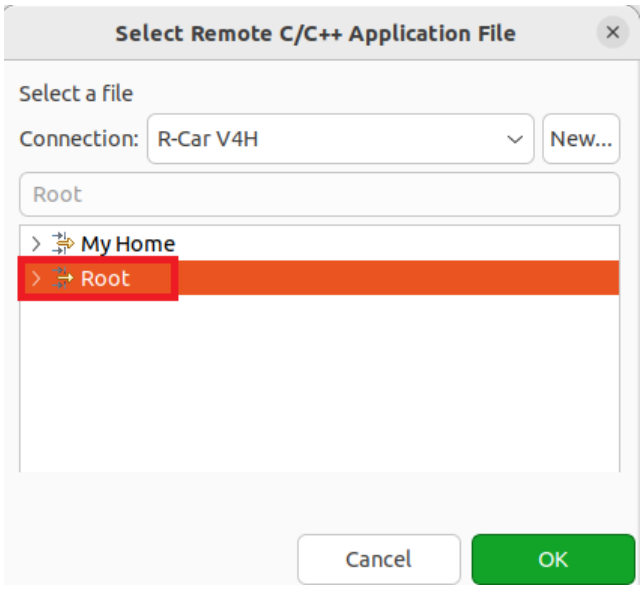

Figure 4-6 Connecting a Debugger (6)

The [Enter Password] dialog box appears. Enter the [User ID] and [Password] for the R-Car S4/V4H Reference Board and click on the [OK] button.

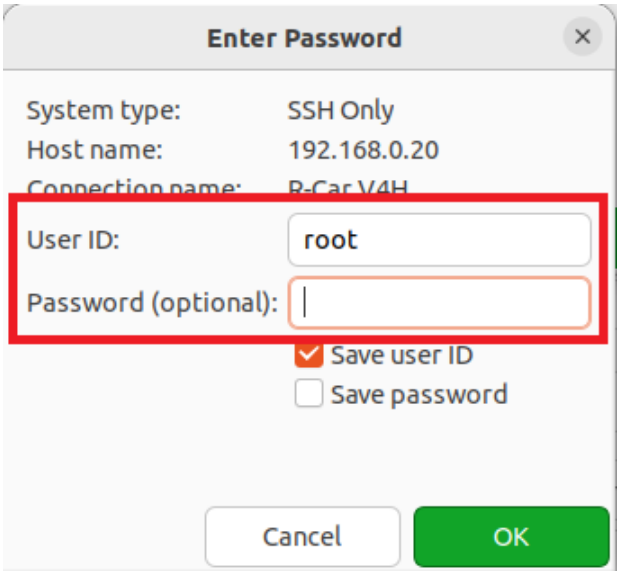

Figure 4-7 Connecting a Debugger (7)

A file tree for the Linux which runs on the R-Car S4/V4H is displayed. Select the desired folder and click on the [OK] button.

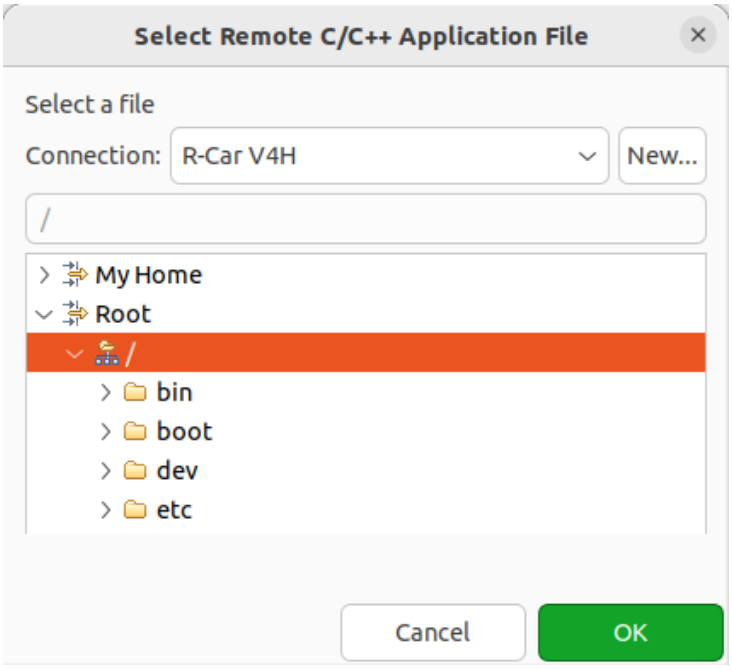

Figure 4-8 Connecting a Debugger (8)

Select the device to be connected for [Device] on the [Debugger] tabbed page of the [Debug Configuration] dialog box.

e.g.

- R-Car S4 : R8A779F0
- R-Car V4H : R8A779G0

Finally, click on the [Debug] button to connect the debugger to the target device.

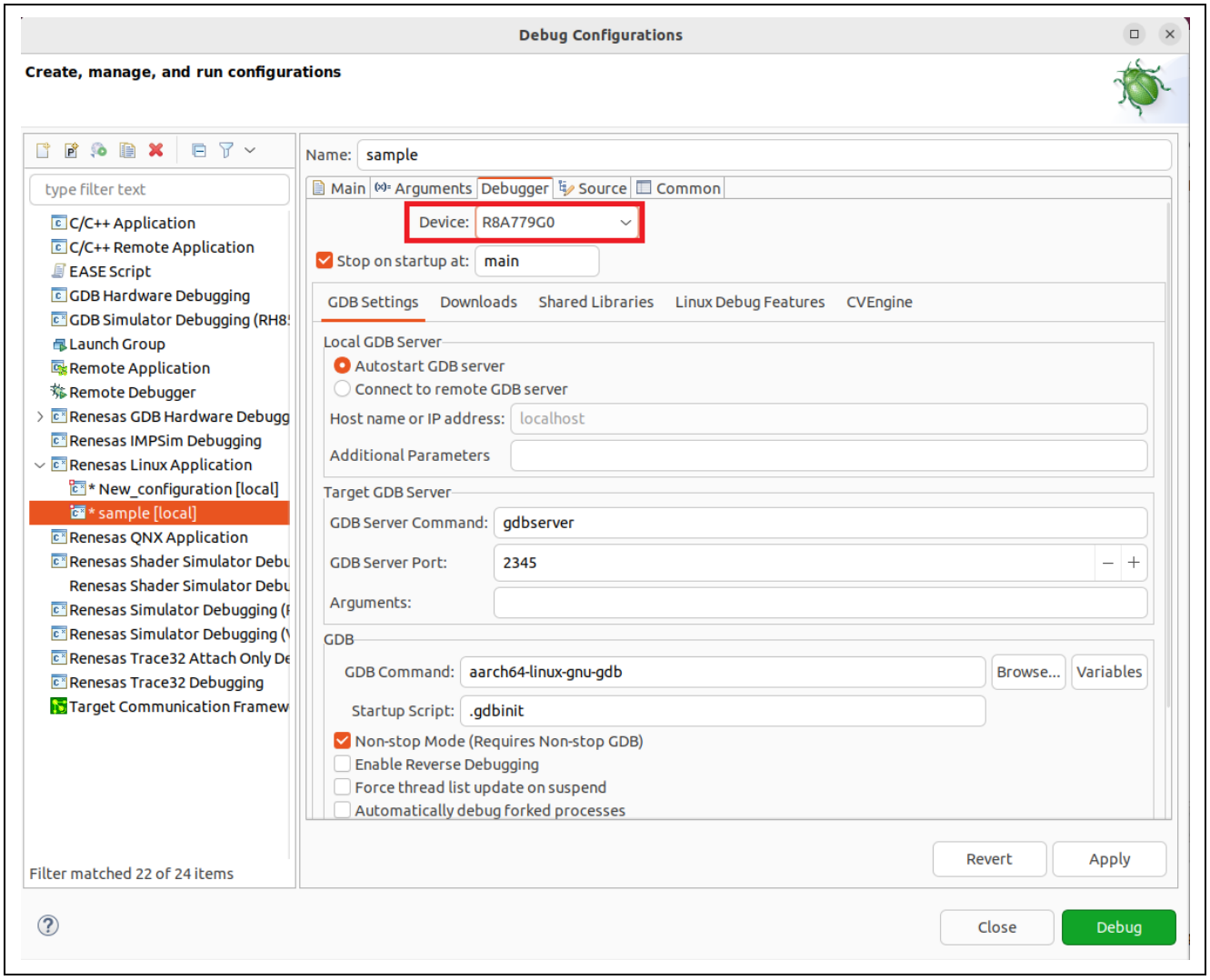

Figure 4-9 Connecting a Debugger (9)

When the debugger has been successfully connected to the target device, the debugger window appears as shown below.

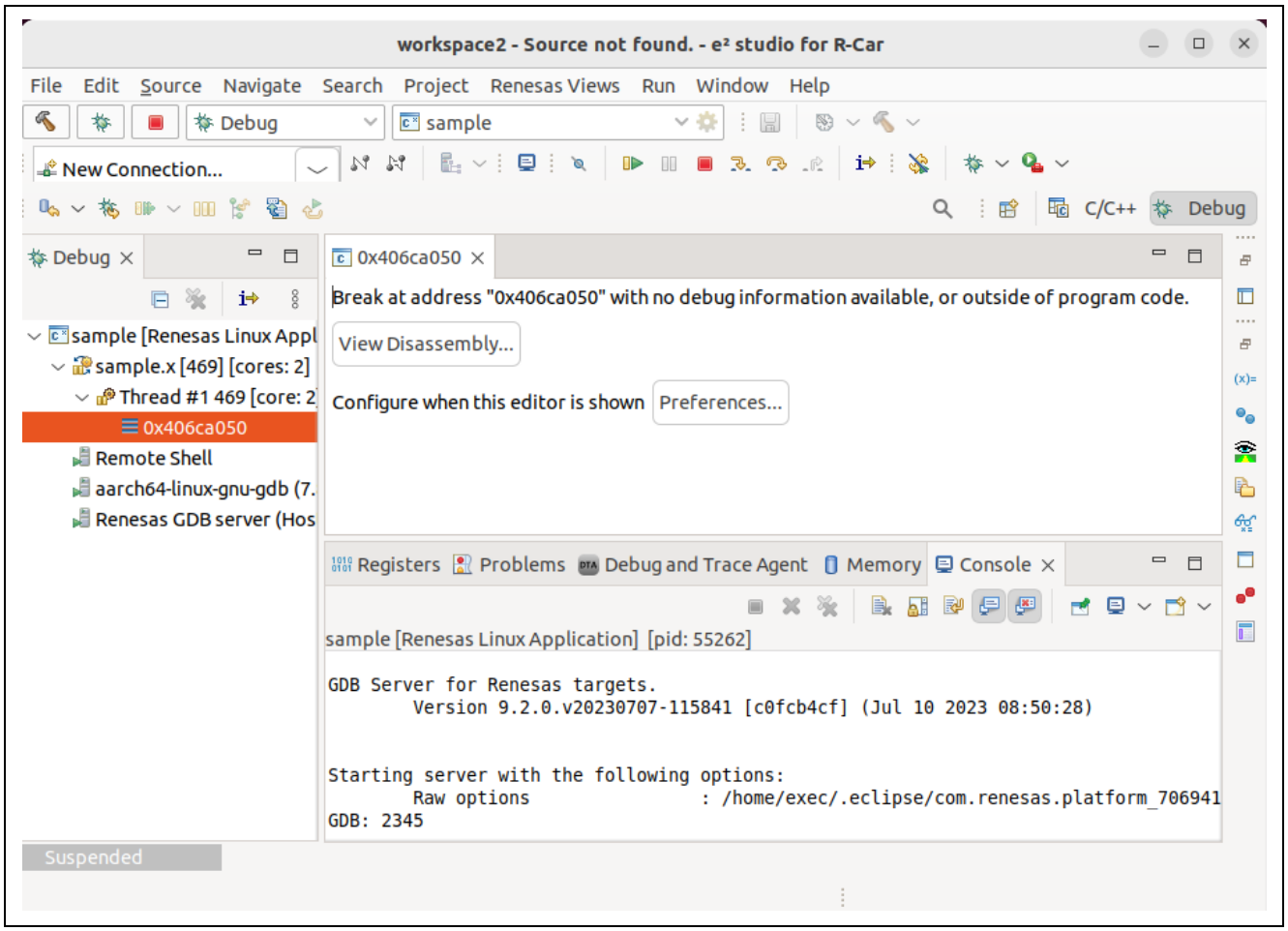

Figure 4-10 Connecting a Debugger (10)

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Sep.29.23	-	First Edition issued

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   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.
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   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.).
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TOYOSU FORESIA, 3-2-24 Toyosu,
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