

Quick Start Guide for the Linux Hosted Version of the e² studio

1. Overview

This quick start guide describes how to install the Linux version of the e² studio to run under Linux on a PC to serve as a host and to register the related toolchains and 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 Linux environment and who have already learned the basics of operating Ubuntu. This guide explains the steps from installing the Linux host 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"

2. Differences between the e² studio for Linux and the e² studio for Windows

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

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

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

Note: For details on the emulators for each device and family, see "Additional Details" on the product pages of the e² studio for individual families listed in table 2.

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

Family Name	URL for the Product Page of the e ² studio for Individual Families
RA family	https://www.renesas.com/software-tool/e2studio-information-ra-family
RH850 family	https://www.renesas.com/software-tool/e2studio-information-rh850-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
RZ family	https://www.renesas.com/software-tool/e2studio-information-rz-family
DA Devices	https://www.renesas.com/software-tool/e-studio



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3. Operating Environment

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

- e² studio 2024-04 Linux: https://www.renesas.com/software-tool/e-studio
- Ubuntu Desktop 22.04 LTS: <u>https://ubuntu.com/download/desktop</u>

4. Installation

4.1 Downloading an Installer

If you are using a product of the RL78 family, RX family, RZ family, RH850 family or DA devices, download the e² studio for Linux 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 use on the FSP page for the RA family among the Renesas GitHub 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 v5.2.0 Tag Page)



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4.2 Installing the Required Libraries

The following Linux libraries are required for operation of the e² studio for Linux.

- Python library version 2.7
- Python library version 3.10 (when executing the e² studio 2023-07 or a later version under Ubuntu LTS 20.24)
- New curses library version 5

Install the libraries by entering the following commands from a terminal.

sudo add-apt-repository ppa:deadsnakes/ppa sudo apt update sudo apt install libpython2.7 libncurses5 libncurses5:i386 sudo apt install libpython3.10



Figure 3 Installing the Required Libraries



4.3 Running the Installer

Double-click on the downloaded installer file or enter the name of the installer file in the terminal.



Figure 4 Running the Installer in a Terminal under Ubuntu (Example: Entering the Name of the Installer File)

If the installer does not run, confirm that permission for execution has been given for the e² studio installer file. If not, enter the following chmod command to set permission for execution of the installer file.

```
chmod + x <name of the e<sup>2</sup> studio installer file>
```



Figure 5 Confirming the Permission for Execution of the Installer File and Setting it with the 'chmod' Command



4.4 Starting Installation

(1) Selecting an installation type

Launch the e² studio installer. For e² studio 2023-07 and later, there are three (Lite/Standard/Custom) types of new installations. Select any of the items and click [Install].

- Lite installs the minimum functionality required to build and debug your project.
- Standard can install extended functionality.
- Any function can be installed in Custom.

Clicking on the "Click here" link displayed on the first page of the installer will show a list of the functions that will be installed by Lite and Standard, so please confirm it before proceeding.

Activities 🔣 SWT	4月1616:31	•) ()
	Renesas e² studio 2024-04 Setup ×	
	Renesas e' studio 2024-04 Setup	
	Install Type Please select the e ² studio installation type. <u>Click here</u> for help selecting a type and to see what features are included.	
	Select Install Type:	
	Lite Install (Recommended) This installs e ¹ studio in Lite Mode. This mode offers a simplified appreirance focused on simple code editing & debugging with only important features Standard Install	
	Control of the state of th	
	Custom installation of e ³ studio This mode is allows you to select which features are installed	
	v202404151546 User:jongookoh <back next=""> Cancel Install</back>	

Figure 6-1 Selecting an Installation Type (Common Installer)

For users of RA family devices, select "Quick Install".

Activities 🔣 SWT	4月16 16:33 古 🔥 🖑
	Renesas RA Flexible Software Package (FSP) v5.2.0 with e ³ studio 2024-01.1 Setup ×
	Renesas RA Flexible Software Package (FSP) v5.2.0 with e ³ studio 2024-01.1 Setup
and the state of the	Install Type
	Select Install Type:
	Quick Install Dehult installation of e ² studio, FSP, Arm GNU Toolchain & LLVM Embedded Toolchain for Arm Custom Install Custom installation of e ³ studio, FSP, Arm GNU Toolchain & LLVM Embedded Toolchain for Arm
	v202402230120 User:jongookoh <back next=""> Cancel Install</back>

Figure 6-2Selecting an Installation Type (Platform Installer)



(2) [Welcome]

Click on [Change...] if you wish to specify a different installation directory, then click on [Next >].

Note: If you have run the installer of the platform for the RA family, go to "(7) [Licenses]".



Figure 7 [Welcome]

- Notes: 1. If you wish to install multiple versions of the e² studio, click on [Change...] to specify the installation directory.
 - 2. Specify a folder path including English characters, numeric characters, and underscores for the installation directory.

If an account name for Ubuntu includes characters other than English characters, numeric characters, and underscores, the e² studio may malfunction. Accordingly, we also recommend using only English characters, numeric characters, and underscores in the account name for Ubuntu.



(3) [Device Families]

- You can select multiple device families for installation. Select the checkboxes and click on [Next >].
- Note: If you have run the installer of the platform for the RA family, this window will only display the RA family.

Activities 🛛 SWT		4月 16 16 : 48	a 🕫 🖱
	Rene	esas e² studio 2024-04 Setup x	
	Renesas e ² studio 2024-04 Setup Select the device families you wish to install s		
	Licenses CRL7 Shortcuts Summary Installing	Build, Debug & Code Generation support for Renesas RA devices RZ Build, Debug & Code Generation support for Renesas RZ devices RT8 Build, Debug & Code Generation support for Renesas RU 78 devices RW Build, Debug & Code Generation support for Renesas RX devices RW Build, Debug & Code Generation support for Renesas RX devices RW Build & Debug support for Renesas RH850 devices RE Build & Debug support for Renesas RE devices Linux on Renesas RZ Build & Debug support for Linux on Renesas RZ devices DA	
	Select All y202404151546 User:	<back next=""> Cancel Install</back>	

Figure 8 Selecting Device Families

(4) [Extra Features]

Select the additional components to be installed (language packs or support for Git). Click on [Next >].

Note: Specify the Japanese language pack if you wish to view the menus in Japanese.

Activities 📓 SWT				4月1617:00 🗼 🚸 🖒
			Renes	esas e² studio 2024-04 Setup ×
	Renesas e ² studio 2024-04 S Select the extra features y		install	RENESAS
	Welcome Device Families		•	Japanese Language Support Chinese (Simplified) Language Support
	Extra Features Customise Features		.	Chinese (Traditional) Language Support
	Additional Software Licenses		P	Git Integration Git SCM Support
	Shortcuts Summary		P	Terminals ANSI/vt102 compatible Terminal support for Serial, ssh and Telnet
	Installing Results			
		Select A	ш	
	<u>v202404151546</u> Us	ser:		< Back Next > Cancel Install

Figure 9 [Extra Features]



(5) Components

All required components for the selections in [Device Families] are automatically selected. Confirm the selected components and click on [Next >].



Figure 10 [Customise Features]

(6) [Additional Software]

In this stage, you can select additional software such as the Renesas FSP, Renesas AI and ARM GNU toolchain (indicated as GCC ARM Embedded in the installer).

In general, the required software for the device family which was selected in "(3) [Device Families]" is selected. Click on [Next >] and go to the next step.

If you will be using the ARM GNU toolchain or another version of the Renesas FSP which is not included in the list, install them. Refer to chapter 6, Custom Installation and Registration of Toolchains.

Activities 📓 SWT	4月 16 17:04	
	Renesas e² studio 2024-04 Setup	×
Renesas e ² studio 2	2024-04 Setup	ENESAS
Select the addition	nal software you wish to install	
Welcome Device Famil Extra Feature Features Additiona Software	≥s CR Renesas Reality Al for RA Renesas Reality Al for RL78 CR Renesas Reality Al for RX CR Renesas Reality Al for RX	23.10.0 23.10.0 23.10.0 1.00.0 1.00.0 1.00.0
Licenses Shortcuts Summary Installing Results	Renesas Toolchains && Utilities GCC Toolchains && Utilities GCC Toolchains && Utilities GNU ARM Embedded 13.2. Rel1 GNU ARM Embedded 10.3 2021.10 ONU ARM Embedded 10.3 2021.10 ONU ARM Embedded 10.3 2021.20 GCC CARM A-Profile (AArch64 bare-metal) 10.3 2021.0 ULVM Embedded Toolchain for Arm 17.0.1 Renesas FSP Renesas FSP Renesas FSP V5.10	17.0.1 636.0 MB 5.2.0 123.5 MB 5.1.0 117.7 MB
v202404151540		697.3 MB download require Cancel Install

Figure 11 [Additional Software]



(7) [Licenses]

After you have read and agreed with the license agreement, click on [Next >].

If you do not agree with the license agreement, you cannot continue with installation.



Figure 12 [Licenses]

(8) [Shortcuts]

Select the [In the application launcher] checkbox and click on [Next >].



Figure 13 [Shortcuts]



(9) [Summary], [Installing], and [Results] Click on [Install] to install the e² studio.

	4月 16 17:10
	Renesas e² studio 2024-04 Setup ×
Renesas e ² studio 2024-04 S	
Welcome Device Families Extra Features Customise Features Additional Software Shortcuts ?? Summary Installing Results	Party to install Subver to install 9. Senses 22 studio Common Components (Life) V24.4.0.820240415-1426 9. Breass 22 studio Common Components (Full) V24.4.0.820240415-1426 9. Breass 28 studio Toolis V24.4.0.820240415-1426 9. Breass 28 studio Toolis V24.4.0.820240415-1426 9. Breass R Staff Smilly Support V24.4.0.820240415-1426

Figure 14 [Summary]

When installation has finished, the results are displayed. Confirm that there are no error messages.

When toolchains such as the FSP or GCC ARM Embedded have been installed, link paths to the folders where they have been installed are displayed.

Clicking on [OK] finishes the installation process.

Welcome Installation of e2 studio is complete. Device Families Please click OK to close. Extra Features Customise Customise Licenses Features View Release Notes? Additional View Release Notes? Software Licenses Licenses CCC ARM Embeddet /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/13_2.Rel1 Summary GCC ARM Embedded: /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gc_arm/13_2.Rel1 Installation GCC ARM Embedded: /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gc_arm/13_2.Rel1 Installing GCC ARM Embedded: /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gc_arm/13_2.Rel1 Installing GCC ARM Embedded: /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gc_arm/13_2.Rel1
Welcome Installation of e2 studio is complete. Device Families Please click OK to close. Extra Features Customise Customise Launch e2 studio? Features View Release Notes? Additional Software Licenses View What's New? Software Userki Links: GCC.RME imbedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/13_2.Rel1 GCC.RME imbedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/13_2.Rel1 GCC.RME imbedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/13_2.Rel1 GCC.RME imbedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/13_2.Rel1 GCC.RME imbedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/13_C.Rel1 GCC.RME imbedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/13_C.Rel1 GCC.RME imbedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/13_C.Rel1 GCC.RME imbedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/10_3_col1 GCC.RME imbedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/10_3_col1 GCC.RME imbedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ <
Device Families Please click OK to close. Device Families Please click OK to close. Customise Customise Features View Release Notes? Additional Software Licenses Software Shortcuts Soc CARM Embedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/13_2-Rel1 Summary GCC ARM Embedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/13_2-Rel1 Swimary GCC ARM Embedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/13_2-Rel1 Swimary GCC ARM Embedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/10_3_30_12_3 GCC ARM Embedded; /home/jongookoh/.local/share/renesas/e2_studio/toolchains/ gcc_arm/10_3_30_30_11_0 GCC ARM AProfile (Arche4 bare-metal): /home/jongookoh/.local/share/renesas/e3_studio/toolchains/ gcc_arm/10_3_30_11_0
e2_studio/toolchains/gcc_arm_aarch64/10_2021_07

Figure 15 [Results]



5. Running the e² studio

Open a terminal window. Go to the path where the e² studio has been installed and enter the command for the executable file.

Example:

cd ~/renesas/e2_studio/eclipse ./e2studio



Figure 16 Running the e² studio: Entering the Command

If you created a shortcut during installation, you can also run the e² studio by clicking on the icon for the e² studio in the [Show Applications] menu shown below.



Figure 17 Running the e² studio: Double-clicking on the lcon



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

ctivities 🛛 🖻 E2studio	5月 29 17:09	ŝ •) ()
	Jbuntu: ~/renesas/e2_studio/eclipse Q = ×	
user@Ubuntu:-\$ cd renesas/e2_ user@Ubuntu:-/renesas/e2_stu artifacts.xml dropins e2s configuration e2studio fee user@Ubuntu:-/renesas/e2_stu	idio/eclipse\$ls studio.ini icon.xpm p2 readme stures notice.html plugins	
	e² studio Launcher ×	
	Select a directory as workspace e ² studio uses the workspace directory to store its preferences and development artifacts.	
	Workspace: /home/user/e2_studio/workspace Browse	
	Use this as the default and do not ask again Recent Workspaces	
	Cancel	

Figure 18 Running the e² studio: Selecting a Workspace



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6. 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 e^2 studio.

(1) You will be using RL78, RX, RH850 family devices.

(2) You will be using a version of the FSP that is not included in the installer for the e² studio.

(3) You will be using a version of the ARM GNU toolchain that is not included in the installer for the e² studio.

6.1 Installing Renesas License Manager

To use the Renesas compilers, it is necessary to install the Linux version of Renesas License Manager. It is available from the Renesas compilers product pages below.

- C Compiler Package for RH850 Family [CC-RH] https://www.renesas.com/software-tool/c-compiler-package-rh850-family
- C Compiler Package for RL78 Family [CC-RL] https://www.renesas.com/software-tool/c-compiler-package-rl78-family

Refer to the release notes of the Renesas License Manager or the "Renesas Compiler Installation Guide" web page (<u>https://www.renesas.com/software-tool/compiler_installation_guide</u>) about installation.

```
Ð
                                                                                                                         Q
                                       softgi@softgiUbuntu: /usr/local/renesas-mcutools/bin
                                                                                                                              Ξ
total 155196
drwxr-xr-x 2 softgi softgi
                                     4096 Apr 22 15:39
                                     4096 Apr 22 15:39 .
drwxr-x--- 35 softgi softgi
rw-rw-r-- 1 softgi softgi 17682140 Apr 3 10:02 cc-rh-20601_2.06.01_amd64.deb
-rw-rw-r-- 1 softgi softgi 47017172 Apr 3 10:03 cc-rl-11301_1.13.01_amd64.deb
-rw-rw-r-- 1 softgi softgi 20854700 Apr 3 10:03 cc-rx-30601_3.06.01_amd64.deb
-rw-rw-r-- 1 softgi softgi 73347036 Apr 17 09:32 license-manager_2.07.00_amd64.deb
softgi@softgiUbuntu:~/Downloads$ sudo apt-get update
[sudo] password for softqi:
Hit:1 https://download.docker.com/linux/ubuntu jammy InRelease
Get:2 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Hit:3 http://jp.archive.ubuntu.com/ubuntu jammy InRelease
Get:4 http://jp.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Hit:5 https://ppa.launchpadcontent.net/deadsnakes/ppa/ubuntu jammy InRelease
Hit:6 http://jp.archive.ubuntu.com/ubuntu jammy-backports InRelease
Get:7 http://jp.archive.ubuntu.com/ubuntu jammy-updates/main i386 Packages [616 kB]
Get:8 http://jp.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [1597 kB]
Get:9 http://jp.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1070 kB]
Fetched 3513 kB in 7s (480 kB/s)
Reading package lists... Done
softgi@softgiUbuntu:~/Downloads$ sudo dpkg -i license-manager_2.07.00_amd64.deb
Selecting previously unselected package license-manager.
(Reading database ... 204266 files and directories currently installed.)
Preparing to unpack license-manager_2.07.00_amd64.deb ...
Unpacking license-manager (2.07.00.04)
Setting up license-manager (2.07.00.04)
Processing triggers for man-db (2.10.2-1) ..
softgi@softgiUbuntu:~/Downloads$ cd /usr/local/
bin/
                    games/
                                          lib/
                                                                renesas-mcutools/ share/
etc/
                     include/
                                          man/
                                                                sbin/
                                                                                     src/
softgi@softgiUbuntu:~/Downloads$ cd /usr/local/renesas-mcutools/bin/
softgi@softgiUbuntu:/usr/local/renesas-mcutools/bin$ ls -al
total 196360
                               4096 Apr 22 15:40
drwxr-xr-x 2 root root
drwxr-xr-x 3 root root
                               4096 Apr 22 15:40
rwxr-xr-x 1 root root
                               609 Feb 29 13:09 clear-common-license.sh
                           609 Feb 29 13:09 Ctear-comment
1271 Feb 29 12:22 clear-user-license.sh
-rwxr-xr-x 1 root root
 rwxr-xr-x 1 root root 67006677 Mar 15 06:07 init-license
 rwxr-xr-x 1 root root 67013785 Mar 15 06:07 lc
 rwxr-xr-x 1 root root 67029416 Mar 15 06:08 license-manager
softgi@softgiUbuntu:/usr/local/renesas-mcutools/bin$
```

Figure 19 Installation example of the Renesas License Manager



e² studio

C Compiler Package for RX Family [CC-RX] https://www.renesas.com/software-tool/cc-compiler-package-rx-family



Figure 20 License key registration example of the Renesas License Manager

6.2 Toolchains for the RL78 Family

e² studio

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

The CC-RL installer is available from Renesas product page (<u>https://www.renesas.com/software-tool/c-compiler-package-rl78-family</u>). In addition, the Renesas License Manager is necessary to use CC-RL. Please refer to chapter 6.1 for installation of the Renesas License Manager.

Installers of GCC for Renesas RL78 and LLVM for Renesas RL78 are available from the "Open Source Tools for Renesas" site (<u>https://llvm-gcc-renesas.com/</u>, downloading some toolchains requires user registration).

6.2.1 Installing and Registering the CC-RL

Please refer to the "Readme" file enclosed in the CC-RL installer or the "Renesas Compiler Installation Guide" web page (<u>https://www.renesas.com/software-tool/compiler_installation_guide</u>) for CC-RL installation.



Figure 21 Installation example of the CC-RL



After the installation is complete, start e² studio, execute the [Help – Add Renesas Toolchains] menu, and select "Add..."Press the button and enter the path where CC-RL is installed to register.

		workspace - e ² studio	×	
Ed		Preferences		×
type filter text	Renesas Toolchain Management			⇔ ≠ ⇔ ₹ ₿
→ General → C/C++	Toolchain Type	Installation Path		
Help Install/Update Java Language Servers Library Hover Oomph PyDev Remote Developme	✓ GNU ARM Embedded ✓ 13.2.1.arm.13-7 ✓ 12.2.1.arm.12-7 ✓ 12.2.1.arm.12-7 ✓ 10.3.1.20210824 └unar0 Reneasa DSP Assembler KPIT GNURL78-ELF Toolchain Þoky G4bit Embedded Linux KPIT GNUR4.ELF Toolchain	/home/jongookoh/.local/share/renesas/e2_studio/toolchains/gcc /home/jongookoh/.local/share/renesas/e2_studio/toolchains/gcc /home/jongookoh/.local/share/renesas/e2_studio/toolchains/gcc	64-arm-none-eabi/	
 Remote Systems Renesas 	GCC ARM A-Profile (AArch64 bare-metal)	Add New Toolchain	× m 10 2 2021 07	-x86 64-aarch64-none-elf/
Breakpoints Device add-ins Su FSP Launch Settings	LLVM Embedded Toolchain for Arm LLVM for RL78 Renesas CC-RH	Integrate a new toolchain which is not already registered. Found: Renesas CC-RL - v1.13.01		x00_0+ darch0+ none-chy
Logging Module Download Module Download My Renesas Reality AI Authen Renesas QE Renesas Dokhal Smart Browser I Smart Configurat Smart Demo Smart Manual Support Folders Tracealyzer TraceX	MinGW KPIT GNUARM-NONE-EABI Toolchain Linaro 64bit Reneasa CC-RL Reneasa CC-RL CC for Renesas RX GCC for Renesas RX GCC for Renesas RL78	Indextories /usr/local/Renesas/CC-RL/V1.13.01 Image: Transmission of the state of	Cancel	
▶ Run/Debug		Download		
? 1 4 0			Can	cel Apply and Close
		徑 rhg	350test	

Figure 22 Registering CC-RL



6.2.2 Installing and Registering the LLVM for Renesas RL78



Figure 23 Open Source Tools for Renesas: LLVM for Renesas RL78

After downloading the installer, confirm the permission to execute it. Enter the required command and then run the installer.

Example:

cd ~/Downloads chmod +x llvm-10.0.0.202303-rl78-elf.run ./llvm-10.0.0.202303-rl78-elf.run



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Figure 24 Running the Installer for LLVM for Renesas RL78

After the installation has finished, register the installer by starting the e² studio, selecting the [Help] menu and the [Add Renesas Toolchains] item, clicking on the [Add...] button with [LLVM for RL78] selected, and entering the path where LLVM for Renesas RL78 has been installed.

	workspace - e ²	studio	×		
File Edit Source Ref	actor Navigate Search Project Renesas Vie	ews Run Window	Help		
	i & ▼ Q. ▼ i № π		Welcome		
Project Explorer X Project Explorer X Project Explorer X There are no projects in workspace. To add a project: Create a new Make Project in a directo containing existing Create a new C or project Create a new C or project Create a new C or Cr	n your Sfile_ TV_ code	۵	The provide the provided and provided a	Shift+Ctrl+L	
Create a project			🍫 Check for Updates		
		Pre	eferences		×
type filter text	Renesas Toolchain Management				⇔ ≠ ⇔ ≠ §
 General C/C++ Help Install/Update 	Toolchain Type GNU ARM Embedded 10.3.1.20210824 Renesas DSP Assembler	Installation Path	Add New Integrate a new toolchain which is not alrea Found: LLVM for RL78 - 10.0.0.202303	v Toolchain ady registered.	×
 Java Language Servers Library Hover Oomph 	KPIT GNURL78-ELF Toolchain KPIT GNURX-ELF Toolchain GCC ARM A-Profile (AArch64 bare-metal)		Location: /home/user/toolchains/llvm_10.0.0	0.202303_rl78-elf	Browse
 Language Servers Library Hover 	KPIT GNURX-ELF Toolchain	/home/user/renesas		0.202303_r178-elf	Browse e-elf/

Figure 25 Registering LLVM for Renesas RL78

In the case of GCC for Renesas RL78, also download the installer from the "Open Source Tools for Renesas" site and register it by following the same procedure as that described above.

e² studio



6.3 Toolchains for the RX Family

When a software product for use on a device of the RX family is to be built in the e² studio, CC-RX or GCC for RX is required.

The CC-RX installer is available from Renesas product page (<u>https://www.renesas.com/software-tool/cc-compiler-package-rx-family</u>). In addition, the Renesas License Manager is necessary to use CC-RX. Please refer to chapter 6.1 for installation of the Renesas License Manager.

Installer of GCC for RX is available from the "Open Source Tools for Renesas" site (<u>https://llvm-gcc-renesas.com/</u>, downloading some toolchains requires user registration).

6.3.1 Installing and Registering the CC-RX

Please refer to the "Readme" file enclosed in the CC-RX installer or the "Renesas Compiler Installation Guide" web page (<u>https://www.renesas.com/software-tool/compiler installation guide</u>) for CC-RX installation.



Figure 26 Installation example of the CC-RX



Quick Start Guide for the Linux Hosted Version of the e2 studio

After the installation is complete, start e² studio, execute the [Help – Add Renesas Toolchains] menu, and select "Add..."Press the button and enter the path where CC-RX is installed to register.

rile er					
File Ec			Preferences		
	type filter text	Renesas Toolchain Management			⇔ ≠ ⇔ ≠
	General	Toolchain Type	Installation Path		
To add	C/C++	GNU ARM Embedded	instanation Path		
· · · · · ·	Help Install/Update	✓ 13.2.1.arm-13-7	/home/jongookoh/.local/share/renesas/e2_st	tudio/toolchains/gcc_arm/13_2-Rel1/a	arm-gnu-toolchain-13.2.Rel1-x86_64-arm-none-eabi/
	Java	✓ 12.2.1.arm-12-24			arm-gnu-toolchain-12.2.rel1-x86_64-arm-none-eabi/
12 🖆	Language Servers	10.3.1.20210824 Linaro	/home/jongookoh/.local/share/renesas/e2_st	tudio/toolchains/gcc_arm/10_3_2021_	_10/gcc-arm-none-eabi-10.3-2021.10/
5 June 1	Library Hover Oomph	Renesas DSP Assembler			
	PyDev	C KPIT GNURL	Add New Toolchain	×	
	Remote Developme	Poky 64bit E KPIT GNURA	hain which is not already registered.		
	Remote Systems Renesas	✓ ✓ GCC ARM A. Found: Renesas CC-R	X - v3.06.01		
	Breakpoints	LLVM Ember Location: /usr/local/Re	apacac/CC-RXA/2.06.01	Browse arm_aarch64/10	0_2021_07/gcc-arm-10.3-2021.07-x86_64-aarch64-none-
	Device add-ins St	LLVM Ember Education. Just Jocal Ac	nesas/ce-tx/v5.00.01	DIOWSC	
	FSP Launch Settings	Renesas CC			
	Logging	MinGW			
	Module Download	KPIT GNUAF			
	My Renesas Reality AI Authen	xPack GNU			
	Renesas QE	Renesas CC ?	Cancel	ок	
	Renesas Toolchai	GCC for Renesas RX			
	Smart Browser Smart Configurat	Renesas SMS Assembler			
	Smart Demo	GCC for Renesas RL78			
	Smart Manual				
	Support Folders Tracealyzer				
	TraceX				
	Run/Debug		Download Scan	Add Remove	
- ·					
	? 迠 🖆 🖲				Cancel Apply and Cl

Figure 27 Registering CC-RX



6.3.2 Installing and Registering the GCC for Renesas RX

In the case of GCC for Renesas RX, also download the installer from the "Open Source Tools for Renesas" site and register it with the e² studio by following the same procedure as that described in section 6.1.

	atest Toolci × +		~
\rightarrow C	🔿 🔒 https://IIvm-gcc-renesas.com/rx-download-toolchains/		\ ♥ £
	HOME LOG IN REGISTER ABOUT US CONTACT US SITEMAP LANGUAGE: 🎛		
	Open Source Tools	Search	
	for RENESAS		
	GENERAL » SERVICES » PRODUCTS » SUPPORT » HELP » LINKS » DOCU	MENTATION »	
	Download Latest Toolchains	Language:	
	Renesas RX	➡ 器 English ➡ ● 日本語	
	GCC for Renesas 8.3.0.202204-GNURX Toolchain ?		
		News Calendar	
	Release Description Download File Date Description	Search	
	30-11-2022 GCC for Renesas 8.3.0.202204-GNURX Windows U Download 147 MB	MAY 2023 M T W T F S S	

Figure 28 Open Source Tools for Renesas: GCC for Renesas RX

After downloading the installer, confirm the permission to execute it. Enter the required command and then run the installer.

Example:

cd ~/Downloads chmod +x gcc-8.3.0.202204-GNURX-ELF.run ./gcc-8.3.0.202204-GNURX-ELF.run



Figure 29 Running the Installer for GCC for Renesas RX



Quick Start Guide for the Linux Hosted Version of the e2 studio



Figure 30 Registering GCC for Renesas RX



6.4 Toolchain for RH850 Family

When a software product for use on a device of the RH850 family is to be built in the e² studio, CC-RH is required.

The CC-RH installer is available from Renesas product page (<u>https://www.renesas.com/software-tool/c-compiler-package-rh850-family</u>). In addition, the Renesas License Manager is necessary to use CC-RH. Please refer to chapter 6.1 for installation of the Renesas License Manager.

6.4.1 Installing and Registering the CC-RH

Please refer to the "Readme" file enclosed in the CC-RH installer or the "Renesas Compiler Installation Guide" web page (<u>https://www.renesas.com/software-tool/compiler_installation_guide</u>) for CC-RH installation.

Ð	softgi@softgiUbuntu: ~/Downloads	Q =	×
softgi	@softgiUbuntu:~/Downloads\$ ls		
cc-rh-	20601_2.06.01_amd64.deb cc-rx-30601_3.06.01_amd64.deb license-manager_2.07.00_amd64.de	eb	- 1
cc-rl-	11301_1.13.01_amd64.deb e2studio_installer-2024-04_linux_host.run		- 1
	@softgiUbuntu:~/Downloads\$ sudo apt-get update		- 1
	https://download.docker.com/linux/ubuntu jammy InRelease		- 1
Hit:2	http://jp.archive.ubuntu.com/ubuntu jammy InRelease		- 1
Hit:3	http://security.ubuntu.com/ubuntu jammy-security InRelease		
Hit:4	http://jp.archive.ubuntu.com/ubuntu jammy-updates InRelease		
	http://jp.archive.ubuntu.com/ubuntu jammy-backports InRelease		- 8
	https://ppa.launchpadcontent.net/deadsnakes/ppa/ubuntu jammy InRelease		- 8
	ng package lists Done		- 1
softgi	.@softgiUbuntu:~/Downloads\$ sudo apt-get install ./cc-rh-20601_2.06.01_amd64.deb		- 1
Readin	ng package lists Done		- 1
	ng dependency tree Done		- 1
	ng state information Done		- 1
	selecting 'cc-rh-20601' instead of './cc-rh-20601_2.06.01_amd64.deb'		- 1
	ollowing NEW packages will be installed:		- 1
	h-20601		- 1
0 upgr	aded, 1 newly installed, 0 to remove and 436 not upgraded.		- 1
Need t	o get 0 B/17.7 MB of archives.		- 1
After	this operation, 0 B of additional disk space will be used.		- 1
Get:1	/home/softgi/Downloads/cc-rh-20601_2.06.01_amd64.deb cc-rh-20601 amd64 2.06.01 [17.7 MB]		- 1
Precon	ifiguring packages		- 1
Select	ing previously unselected package cc-rh-20601.		- 1
(Readi	ng database 204936 files and directories currently installed.)		- 1
	ing to unpack/cc-rh-20601_2.06.01_amd64.deb		
	cing cc-rh-20601 (2.06.01)		- 1
	ng up cc-rh-20601 (2.06.01)		- 1
	nload is performed unsandboxed as root as file '/home/softgi/Downloads/cc-rh-20601_2.06.01_amd64.det،)' couldn't	be
	sed by user '_apt' pkgAc <u>q</u> uire::Run (13: Permission denied)		- 8
softgi	@softgiUbuntu:~/Downloads\$		
1			

Figure 31 Installation example of the CC-RH



After the installation is complete, start e² studio, execute the [Help – Add Renesas Toolchains] menu, and select "Add..."Press the button and enter the path where CC-RH is installed to register.

File Ec			Preferences		
type	e filter text	Renesas Toolchain Management			$\langle \gamma = c \rangle$
Proje	neral	Technic Tree	Installation Path		
There > C/C To add		Toolchain Type	Installation Path		
▶ He	lp tall/Update	✓ 13.2.1.arm-13-7	/home/jongookoh/.local/share/renesas/e2_studio/toolchain	s/gcc_arm/13_2-Rel1/arm	gnu-toolchain-13.2.Rel1-x86_64-arm-none-eabi/
[™] dir		✓ 12.2.1.arm-12-24	/home/jongookoh/.local/share/renesas/e2_studio/toolchain	s/gcc_arm/12_2-Rel1/arm	gnu-toolchain-12.2.rel1-x86_64-arm-none-eabi/
C Lar	nguage Servers	2 10.3.1.20210824	/home/iongookoh/.local/share/renesas/e2_studio/toolchain		gcc-arm-none-eabi-10.3-2021.10/
	rary Hover	Linaro	Add New Toolchain	×	
<u>≥ Im</u> → Oo		Renesas DSP Assembler	te a new toolchain which is not already registered.		
▶ PyI		Poky 64bit Embedded Linux	Renesas CC-RH - v2.06.01		
	mote Developme mote Systems	KDIT CHURK FLF Tralabaia			
	nesas	✓ GCC ARM A-Profile (AArch64 Location	/usr/local/Renesas/CC-RH/V2.06.01	Browse	
	Breakpoints	2 10.3.1.20210621		_20	21_07/gcc-arm-10.3-2021.07-x86_64-aarch64-none
	Device add-ins Sı	LLVM Embedded Toolchain fo			
→ 1	FSP	LLVM for RL78			
	Launch Settings	Renesas CC-RH MinGW			
	Logging	KPIT GNUARM-NONE-EABI TO			
	Module Downloac My Renesas	Linaro 64bit	Cancel	ок	
	Reality Al Authen	xPack GNU ARM Embedded	Calicer		
	Renesas QE	Renesas CC-RL			
	Renesas Toolchai	Renesas CC-RX			
	Smart Browser	GCC for Renesas RX			
→ :	Smart Configurat	Renesas SMS Assembler			
	Smart Demo	GCC for Renesas RL78			
	Smart Manual				
	Support Folders				
	Tracealyzer TraceX				
	n/Debug		Download Scan Add		
P Ru	····				
0	bi 🖆 🛞				Cancel Apply and
	ک تک تک				Cancer Apply and C

Figure 32 Registering CC-RH



Quick Start Guide for the Linux Hosted Version of the e2 studio

6.5 Installing and Registering the FSP

When a version of the FSP that is not included in the installer for the e² studio Linux is to be installed, unzip the zip-format package file obtained from the FSP page, copy the folder "internal" and its contents to the installation directory of the e² studio, and restart the e² studio.

Example:

cd ~/Downloads unzip FSP_Packs_v5.2.0.zip cp ./internal ~/renesas/e2_studio/ -rf



6.6 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.

Download the ARM GNU toolchain obtained from the Web page of ARM (https://developer.arm.com/downloads/-/arm-gnu-toolchain-downloads).



Figure 33 Example: Linux Installer for the x86_64 Architecture of the 9-2020-q2-update ARM GNU Toolchain

Extract the downloaded compressed file to the appropriate path.

Example:

```
cd ~/Downloads
tar -xvf gcc-arm-none-eabi-9-2020-q2-update-x86_64-linux.tar.bz2 -C ~/toolchains/
```

😆 💿 Downloads GNU Ar	m× +									~	×
← → C 🕀	u	ser@Ubuntu: ~/Downloads	Q	= ×			8 €	7	⊌	<u>*</u> £	=
UT TT Develo _{user@L}	/buntu:~\$ cd ~/Downloads/ /buntu:~/Downloads\$ tar - bz2 -C ~/toolchains/	, xvf gcc-arm-none-eabi-9-2020	q2-update-x86_	64-linu	orer Documei	ntation	Downloads	Community	Support	Q	Do
	m-none-eabi-9-2020-q2-up windres.1	date/share/doc/gcc-arm-none-e	abi/man/manl/a	rm-none						0 🦻	
Home / Downloads / gcc-ar -eabi-	m-none-eabi-9-2020-q2-up dlltool.1	date/share/doc/gcc-arm-none-									
-eabi- gcc-ar	gdb.1-py m-none-eabi-9-2020-q2-up	odate/share/doc/gcc-arm-none- odate/share/doc/gcc-arm-none-									
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-eabi-	gcov.1)date/share/doc/gcc-arm-none-)date/share/doc/gcc-arm-none-			*	*	+	*	÷	*	*
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-eabl- gcc-ar gcc-ar	gdbinit.5 m-none-eabi-9-2020-q2-up m-none-eabi-9-2020-q2-up	odate/share/doc/gcc-arm-none- odate/share/doc/gcc-arm-none-	eabi/man/man7/ eabi/man/man7/g	fdl.7							*
gcc-ar ing.7	m-none-eabi-9-2020-q2-up	odate/share/doc/gcc-arm-none- odate/share/doc/gcc-arm-none-									Feed
user@L	<pre>/buntu:~/Downloads\$ cd ~/ /buntu:~/toolchains\$ ls 3.0.202204 rx elf</pre>	'toolchains/ llvm 10.0.0.202303 rl7	3-elf	_ I	*	*	*	*	*	*	fback
gcc-ar	m-none-eabi-9-2020-q2-up buntu:~/toolchains\$			- 1							

Figure 34 Example of Extraction of a Compressed File: 'tar' Command



Quick Start Guide for the Linux Hosted Version of the e2 studio

After having extracted the compressed file, register the toolchain by starting the e² studio, selecting the [Help] menu and the [Add Renesas Toolchains] item, clicking on the [Add...] button with [GNU ARM Embedded] selected, and entering the path where the GNU ARM toolchain has been extracted.

	works	pace - e² studio	×		
File Edit Source Re	efactor Navigate Search Project Re	nesas Views Run Window Help			
🗑 🛛 🐨 🔨 🕶 🗄 🗙	: ** ▼ 9 <u>•</u> ▼ : ®' 11	8	Welcome		
Project Explorer ×		-	Help Contents Search		
E 4	₽ 7 8	Sh	ow Context Help		
There are no projects	in your	Sh	ow Active Keybindings	Shift+Ct	rl+L
workspace.		Ch	leat Sheets		
To add a project:		Re	nesas Help		
Create a new Ma		CM	ISIS Packs Management		
containing existin		ß	Add Renesas Toolchains		
Create a new C o project		4	Eclipse User Storage Integrate non-integrated toolchains Perform Setup Tasks		
Create a project Import projects	±	0	Check for Updates		
		Preferen	ces		×
type filter text	Renesas Toolchain Management				⇔ ≠ ⇔ ₹ 8
General	Toolchain Type	Installation Path			
C/C++	🔻 🔽 GNU ARM Embedded				
Help	✓ 10.3.1.20210824	/home/user/renesas/e2_st	udio/toolchains/gcc arm/10 3 2021 10	/gcc-arm-none-eat	pi-10.3-2021.10/
Install/Update	Renesas DSP Assembler			-	
Java Language Servers	KPIT GNURL78-ELF Toolchain	1	Add New Toolchain	×	
Library Hover	KPIT GNURX-ELF Toolchain	Integrate a new toolchain which is not already registered. Found: GNU ARM Embedded - 9.3.1.20200408			
 Oomph 	GCC ARM A-Profile (AArch64 ba				
Remote Developme	✓ 10.3.1.20210621				.3-2021.07-x86_64-aarch64-none-elf/
Renesas	LLVM for RL78	Location: /home/user/toolchains/gc	c-arm-none-eabi-9-2020-q2-update	Browse	
Breakpoints	✓ 10.0.0.202303 Renesas CC-RH				
Device add-ins Su	KPIT GNUARM-NONE-EABI Toolo				
FSP	xPack GNU ARM Embedded				
Launch Settings Logging	Renesas CC-RL				
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My Renesas	👻 🗹 GCC for Renesas RX				
Reality AI Authen	8.3.0.202204	?	Cancel	ок	
Renesas QE	Renesas SMS Assembler				
Renesas Toolchai	GCC for Renesas RL78				
Smart Browser					
Smart Configurat		Download	Scan Add Remove		
? 占 🛆 😑					Cancel Apply and Close

Figure 35 Registering the ARM GNU Toolchain



6.7 Installing Libgen Update

We provide "Libgen Update for GNU ARM Embedded Toolchains" for the building of newlib by users of the ARM GNU toolchain. It can be obtained from the "Open Source Tools for Renesas" site (<u>https://llvm-gcc-renesas.com/</u>; downloading some toolchains requires user registration).



Figure 36 Open Source Tools for Renesas: Libgen Update for GNU ARM Embedded Toolchains

After downloading the installer, confirm the permission to execute it. Enter the required command and then run the installer.

Example:

cd ~/Downloads chmod +x LibgenUpdateInstall_v1.2022.09.run sudo ./LibgenUpdateInstall_v1.2022.09.run < Enter the path where the ARM GNU toolchain has been installed. Example: /home/user/toolchains/gcc-arm-none-eabi-9-2020-q2-update/ >

Activities 🕟 Terminal	6月 1 15:21	÷ ∎0) (*
Ŧ	user@Ubuntu: ~/Downloads	Q = ×
user@Ubuntu:~/Downloads\$ su	udo ./LibgenUpdateInstall_v1.2022.09.run	
Launch date: 4th of Septemb Copyright (c) 2015-2022 by	Embedded Toolchains Installer (version v1.2022.09) per, 2022 CyberTHOR Studios Ltd. All Rights Reserved. at https://llvm-gcc-renesas.com	
The Libgen update will be i	e to install the Libgen update to: /home/user/toolchains/gcc-arm-none-eabi-9- installed in: /home/user/toolchains/gcc-arm-none-eabi-9-2020-q2-update/ nave permissions to write to the "/home/user/toolchains/gcc-arm-none-eabi-9-2 allation process.	
	ontinue? [y/n] (default 'n') y en update in "/home/user/toolchains/gcc-arm-none-eabi-9-2020-q2-update/" fied.	
Please wait, extracting fil Detecting Libgen version Please wait, decompressing Cleaning up leftover files.	. version 3.3.0 detected data	
	 mbedded Toolchains has been installed successfully!	

Figure 37 Running Libgen Update



7. Installing Emulator Drivers

When you are using an emulator for debugging, install a Linux driver for the emulator.

7.1 E2 emulator and E2 emulator Lite

Download the E2 emulator driver for Linux from the product page of the E2 emulator.

	Interfox Web Browser 5月 30 19:19	() () () ∨ ×
← → C	○ A https://www.renesas.com/us/en/software-tool/e2-emulator-rte0t00020kce00000r#overview I ☆	ල දු ≡
	Overview Downloads Documentation Design & Development Product Options Support Videos & Training Additional Details	
	* Downloads	
	Type to filter results by title Q All types	
	E2 emulator Self Check Program V.1.02.00 創 ZIP 3.47 MB 日本語 Software & Tools - Other Feb 6, 2021	
	E2 emulator, E2 emulator Lite Linux driver Software & Tools - Other Oct 1, 2020	
	USB Driver for Renesas MCU Tools V2.77.00 (for 64-bit version of Windows OS) Upgrade - IDE Jan 21, 2019 會 ZIP 3.25 MB 日本語	
	USB Driver for Renesas MCU Tools(E2,E2 Lite,IE850,IE850A,PG-	
	FP5) V2.77.00(for 32-bit version of Windows OS) Upgrade - IDE Jan 21, 2019 ・ロンド スIP 3.09 MB 日本語	

Figure 38 Downloading an Emulator Driver

Unzip the downloaded zip file and register the driver with Linux, referring to the user's manual (.md file). Example:



After the emulator has been connected to the PC, run the lsusb command to confirm the state of the emulator having been recognized.



Figure 39 Confirming the State of the Emulator Having been Recognized



7.2 Segger J-Link

Download the J-Link driver for Linux from the product page of Segger.

- → C O A https://www.segger.com/downloads/jlink/		■ ☆	© ± £] ≡
	@ Conta	act Us 🗣 Forum W Wiki 🏋 Web Shop	-
Products + Downloads + Purchase + Support + About Us	•	Q 🚔 Jobs 🖆 Videos 🎜	🖞 Blog 🛛 Sustainability
J-Link Software and Documentation Pack			
	Version	÷	
 J-Link Software and Documentation pack All-in-one debugging solution Can be downloaded and used free of charge by any owner of a SEGGER J-Link, J-Trace or Flasher model. Not all features of it may be available on all J-Link / J-Trace / Flasher models. Updated frequently Release Notes More information 	V7.88d ~ [2023-05-24]	Windows ARM \$\$64-bit Installer Linux \$\$4-bit DEB Installer \$\$32 \$\$64-bit TGZ Archive \$\$32 Linux ARM \$\$64-bit TGZ Installer \$\$32 Linux ARM \$\$64-bit TGZ Archive \$\$32 macOS	-bit Installer -bit DEB Installer -bit RPM Installer -bit TGZ Archive -bit TGZ Archive -bit Apple M1 Installer

Figure 40Downloading a J-Link driver for Linux

After downloading the installer, confirm the permission to execute it. Enter the required command and then run the installer.

Example:

cd ~/Downloads chmod +x JLink_Linux_V788d_x86_64.deb sudo apt install ./JLink_Linux_V788d_x86_64.deb

After the emulator has been connected to the PC, run the lsusb command to confirm the state of the emulator having been recognized.

Ð	user@Ubuntu: ~/Downloads	Q = ×
<pre>user@Ubuntu:~/Downloads\$ user@Ubuntu:~/Downloads\$ ls</pre>	ush	
	:0003 Linux Foundation 3.0 root	hub
	:0a2a Intel Corp. Bluetooth wir	eless interface
Bus 001 Device 002: ID 31b2 Bus 001 Device 004: ID 1366		
	:0002 Linux Foundation 2.0 root	hub
user@Ubuntu:~/Downloads\$		

Figure 41 Confirming the State of the Emulator Having been Recognized



e² studio

Quick Start Guide for the Linux Hosted Version of the e2 studio

Revision History

		Descript	ion
Rev.	Date	Page	Summary
1.0	Jun.30.23		First Edition issued
1.01	Oct.11.23	—	Fixed Page Layout (No correction of contents)
1.02	Apr.25.24		Revised based on e ² studio 2024-04 (addition of DA devices, etc.)
			Added how to install CC-RL, RX, RH



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 is supplied until the 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. 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

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