RL78/L1C

Renesas Starter Kit Sample Code for e2 studio

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Introduction

Renesas Starter Kits (RSK) is supplied as complete development systems for the selected microcontroller. The kit includes an evaluation board, portable On-Chip Debugger and a set of peripheral sample code.

Target Device

RL78/L1C

Development environment

IDE: e^2 studio
Compiler: GNURL78 v13.02 -ELF
Hardware: Renesas Starter Kit for RL78/L1C

Contents

1. Installation

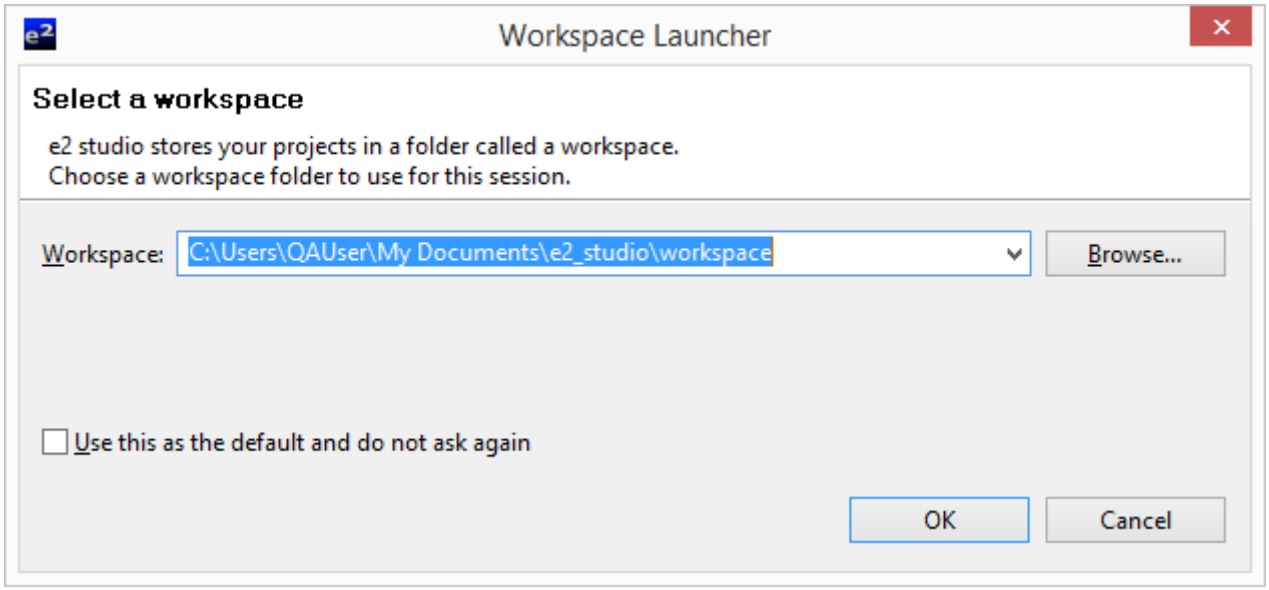
This section assumes e^2 studio IDE is already installed on the user's personal computer (PC). It is also assumed that the following software and versions are installed:

- Renesas e^2 studio Version 2.02.00.13 or later
- Application Leading Tool for RL78 Version 1.01.00
- GNURL78 Version 13.02-ELF

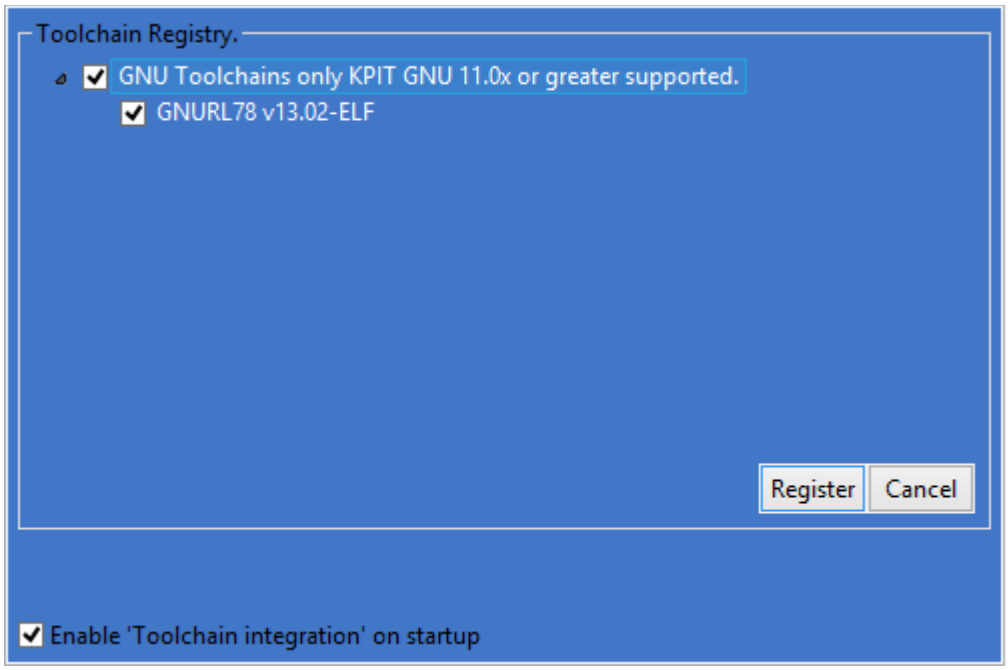
Create a new folder and name it as 'RSKRL78L1C_Workspace'. Copy the zipped file 'an_r01an2016eg0100_rl78l1c_rsk.zip', available in the Application Note package downloaded from the website, to this folder. Extract the 'an_r01an2016eg0100_rl78l1c_rsk.zip' file to the RSKRL78L1C_Workspace folder.

2. Creating the Project Workspace

Open e^2 studio IDE by clicking the Windows Start button, select All Programs > Renesas Electronics e2 studio > Renesas e2 studio.

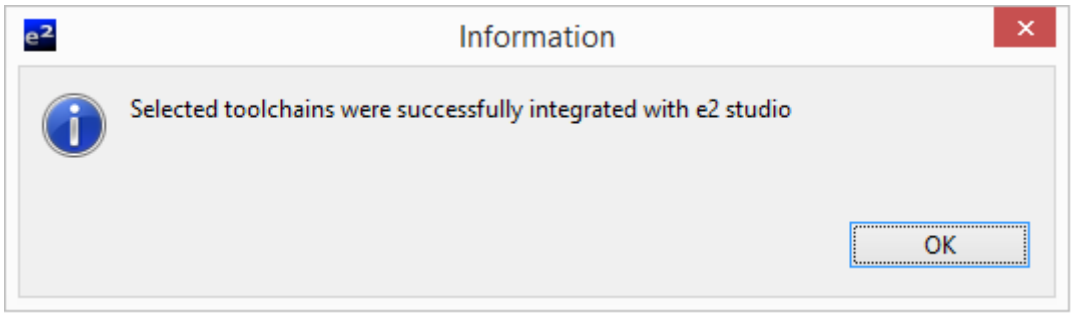


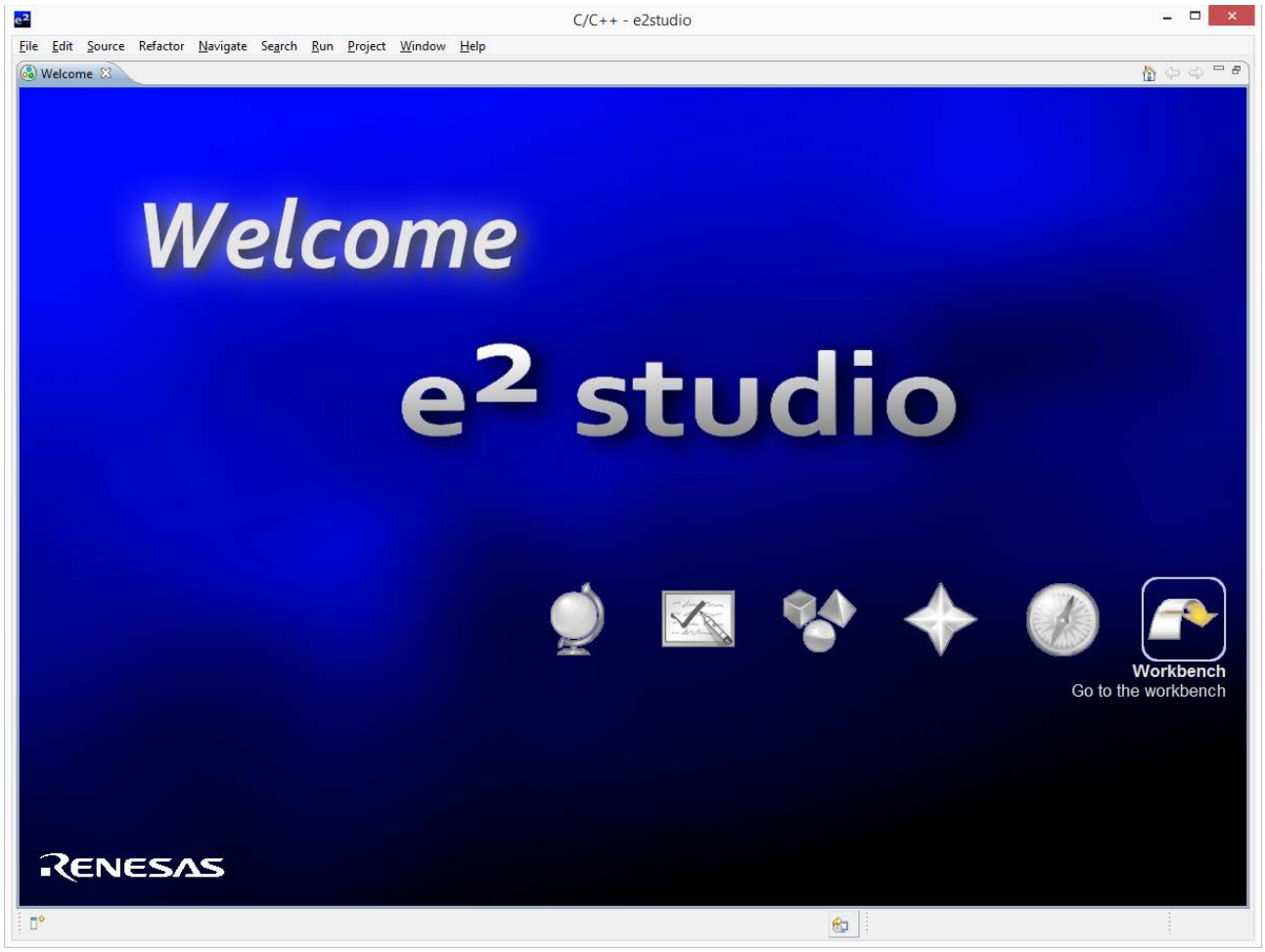
Select <OK>



Select ‘GNU Toolchains only…’ and ‘GNURL78 v13.02-ELF’ checkboxes. Click ‘Register’. A dialog will appear Click <OK>.

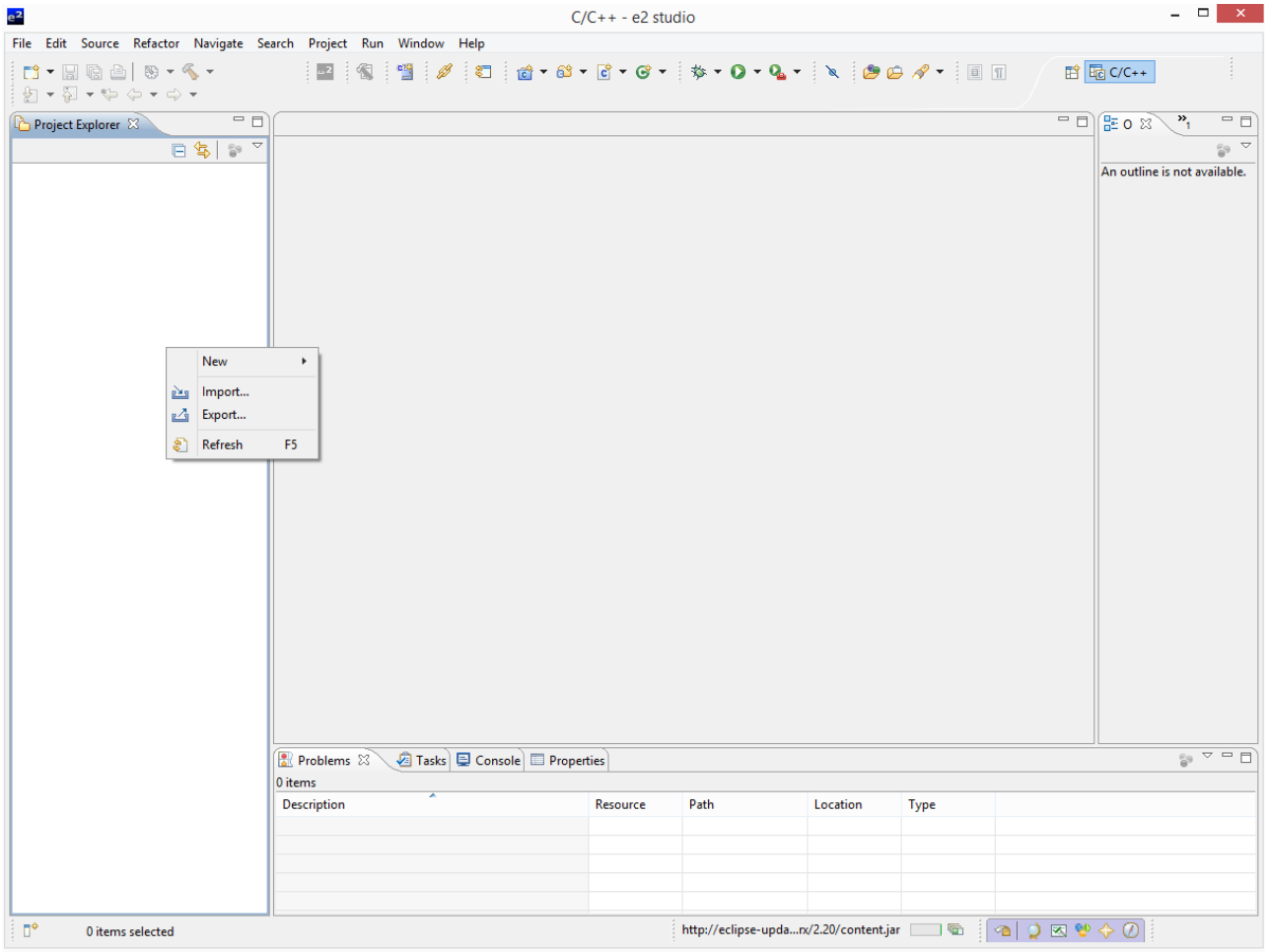
The dialog below appears. “Selected toolchains were successfully integrated with e2 studio”. Click <OK>.



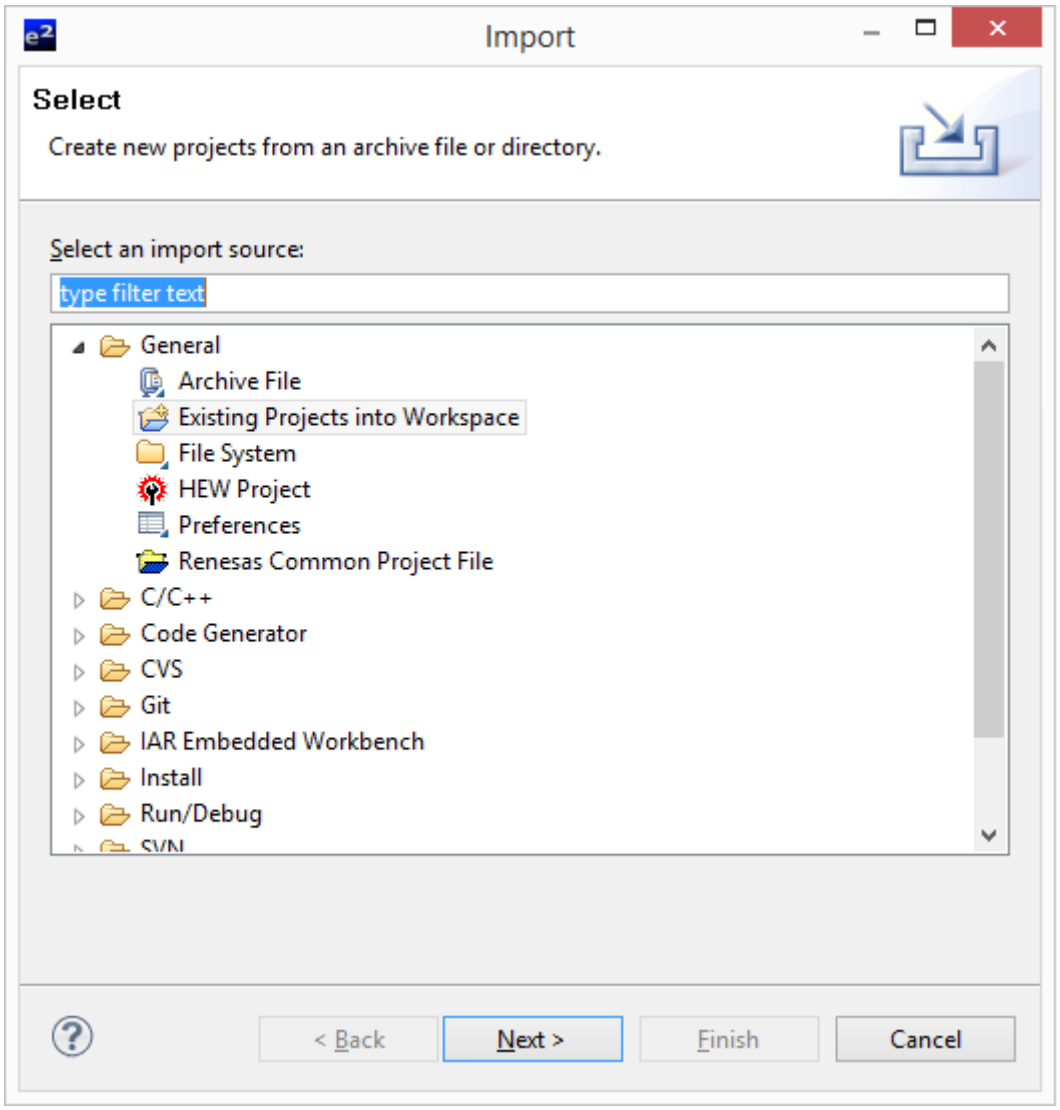

C/C++ - e2studio
File Edit Source Refactor Navigate Search Run Project Window Help
Welcome
Welcome
e2 studio
Workbench
Go to the workbench
RENESAS

On the welcome screen select ‘Go to the Workbench’ icon as shown above.

1. Once the e^2 studio environment has initialised, right click in the project explorer window and click <Import…>



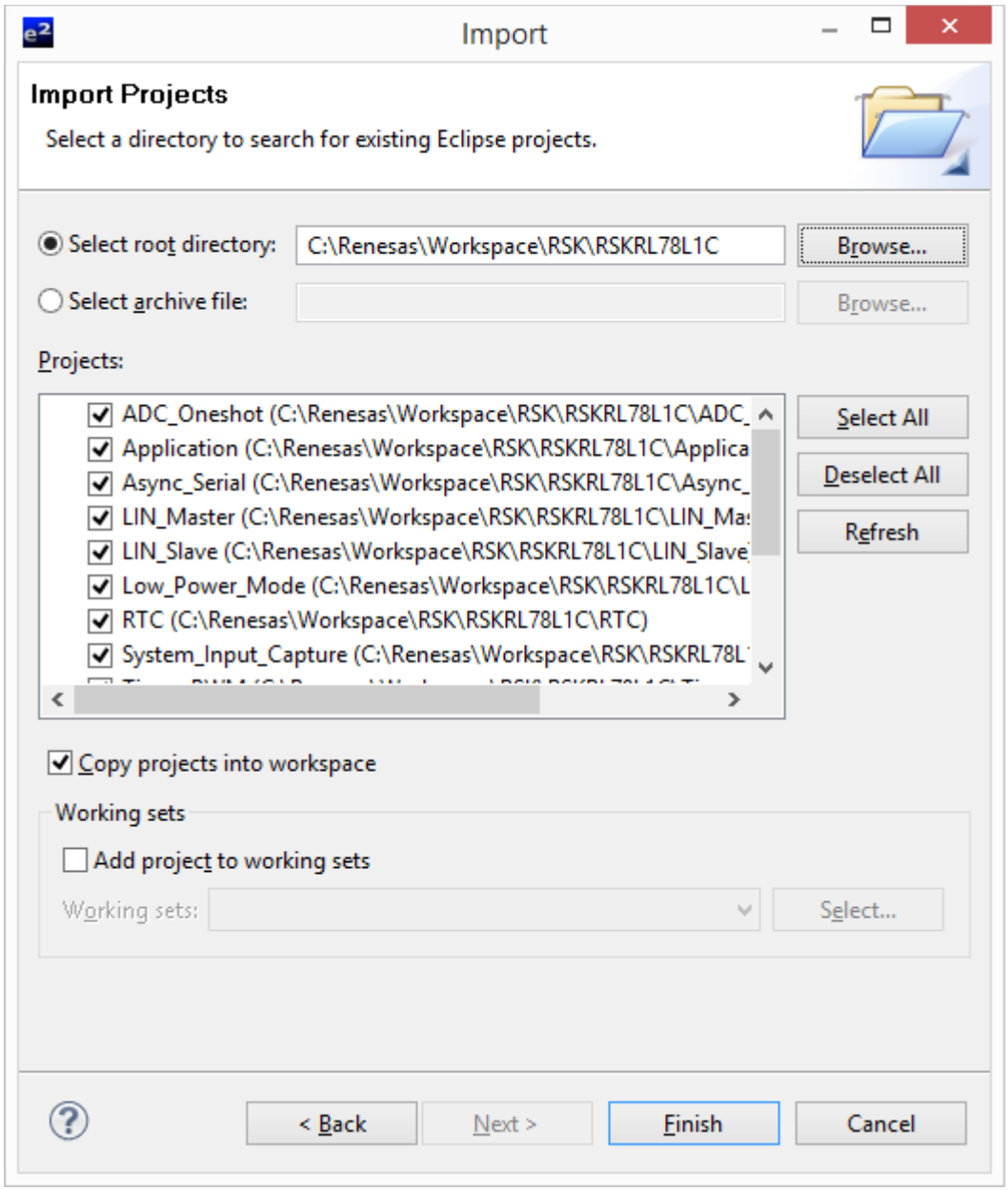
2. The Import dialog will now appear. Expand the “General” folder icon, and select “Existing Projects into Workspace”, then click ‘Next’.



3. The Import Dialog will now appear and specify the project to import. Click the “Browse” button and locate the directory: C:\Renesas\Workspace\RSK\RSKRL78L1C.

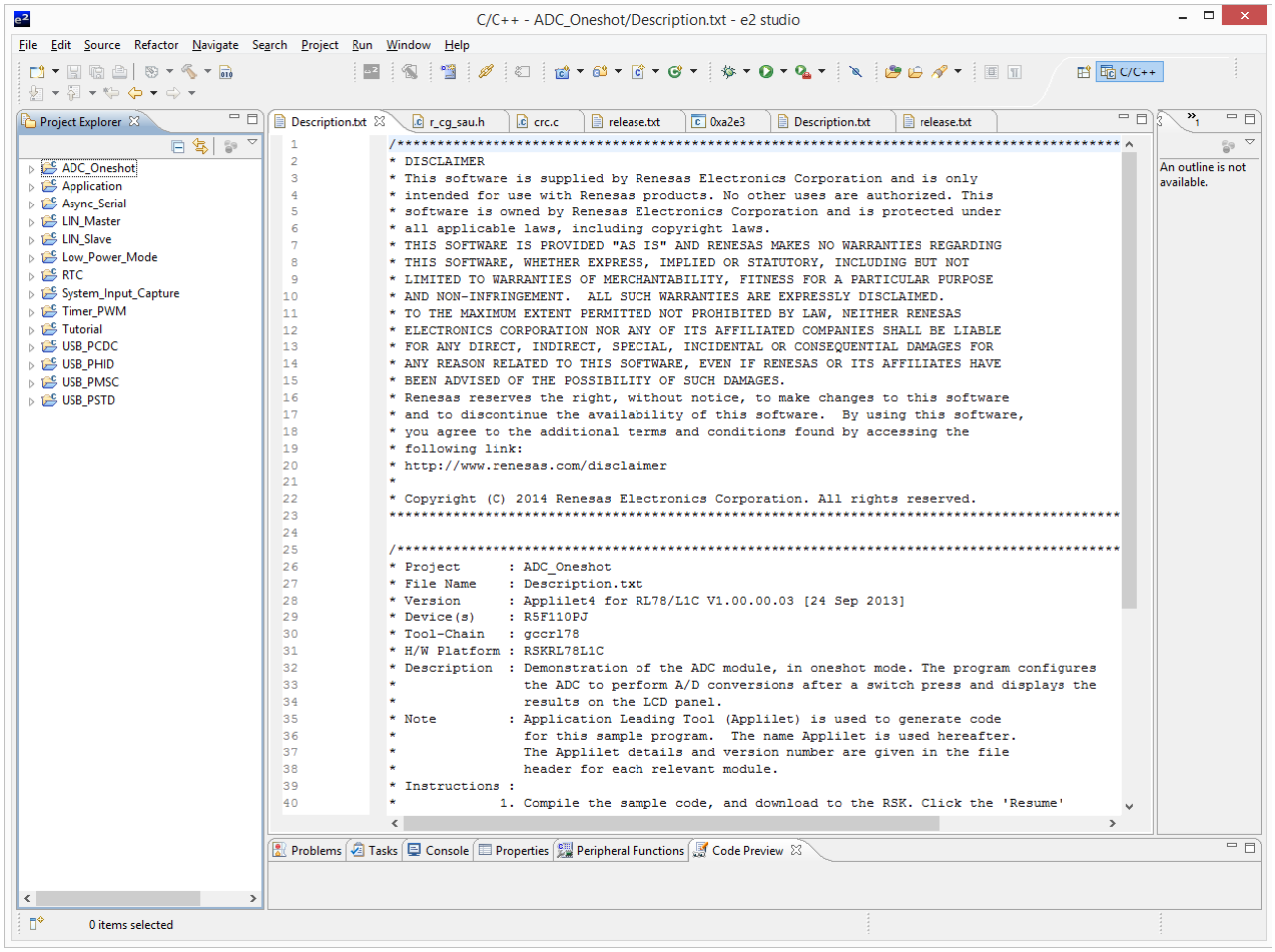
   And also ensure that the ‘Copy projects into workspace’ option is ticked, and then click <Finish>

   The IDE e^2 studio will load the project.


Import
Import Projects
Select a directory to search for existing Eclipse projects.
Select root directory:
C:\Renesas\Workspace\RSK\RSKRL78L1C
Browse...
Select archive file:
Browse...
Projects:
ADC_Oneshot (C:\Renesas\Workspace\RSK\RSKRL78L1C\ADC_
Application (C:\Renesas\Workspace\RSK\RSKRL78L1C\Applica
Async_Serial (C:\Renesas\Workspace\RSK\RSKRL78L1C\Async_
LIN_Master (C:\Renesas\Workspace\RSK\RSKRL78L1C\LIN_Ma
LIN_Slave (C:\Renesas\Workspace\RSK\RSKRL78L1C\LIN_Slave
Low_Power_Mode (C:\Renesas\Workspace\RSK\RSKRL78L1C\L
RTC (C:\Renesas\Workspace\RSK\RSKRL78L1C\RTC)
System_Input_Capture (C:\Renesas\Workspace\RSK\RSKRL78L
Select All
Deselect All
Refresh
Copy projects into workspace
Working sets
Add project to working sets
Working sets:
Select...
< Back
Next >
Finish
Cancel

3. Opening Sample Code and Source Files

Once the project has been opened, the source code and all dependent files can be opened in the editor by expanding the folders in the Project Tree window and double clicking the files listed. All files have been grouped according to their file type.



4. Source Code Functionality

The source code project is specifically written to run on the appropriate RSK. However this source code can be useful as an example even without the RSK.

The project was written using source files containing API functions generated using Code Generator. The project will contain a C source file ‘r_cg_main.c’. This source file includes the C function main(). All source files and dependent files whose filenames are prefixed with ‘r_cg_’ were generated using Applilet4 (Application Leading Tool). For more information, refer to Description.txt.

5. Data Flash Library

The sample code for the “System Input Capture” includes the RL78 Pico Data Flash Library T04. This library is **NOT** to be used for production purposes. For more information and the latest updates please refer to the following website:

Europe:
http://www.renesas.eu/products/tools/flash_prom_programming/flash_libraries/data_flash_lib/index.jsp

America:
http://am.renesas.com/products/tools/flash_prom_programming/flash_libraries/data_flash_lib/index.jsp

Japan:
http://www.renesas.com/products/tools/flash_prom_programming/flash_libraries/data_flash_lib/index.jsp

6. Appendix

Example of comment block with code functionality.

```
/***********************************************************************************************
* Project      : ADC_Oneshot
* File Name    : Description.txt
* Version      : Applilet4 for RL78/L1C V1.00.00.03 [24 Sep 2013]
* Device(s)    : R5F110PJ
* Tool-Chain   : gccrl78
* H/W Platform : RSKRL78L1C
* Description  : Demonstration of the ADC module, in oneshot mode. The program configures
*              the ADC to perform A/D conversions after a switch press and displays the
*              results on the LCD panel.
* Note         : Application Leading Tool (Applilet) is used to generate code
*              for this sample program.  The name Applilet is used hereafter.
*              The Applilet details and version number are given in the file
*              header for each relevant module.
* Instructions :
*            1. Compile the sample code, and download to the RSK. Click the 'Resume'
*               button to start program execution. Click again if the program stops at main().
*            2. Observe the LCD panel. The RL78L1C will take an ADC reading of the potentiometer,
*               RV1, after pressing SW3. The 12-bit Hexadecimal value result is displayed on the LCD panel.
*            3. Adjust the setting of the potentiometer, press SW3 to observe the change in the value.
*            4. The user may examine the ADC conversion result in the global variable g_adc_result.
*            NOTE: If the power supply in use is not filtered enough, you may notice some variations
*                in the displayed ADC result when the application is executed more than once.
*
***********************************************************************************************/
```

7. Website and Support

Renesas Electronics Website
http://www.renesas.com/

Inquiries
http://www.renesas.com/contact/

Support
http://www.renesas.com/rskrl78l1c

Revision History

		Description	
Rev.	**Date**	**Page**	**Summary**
1.00	March 07, 2014	-	First edition issued

General Precautions in the Handling of MPU/MCU Products

The following usage notes are applicable to all MPU/MCU 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. 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 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. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

   The state of the product is undefined at the moment 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 moment 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 moment 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 moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

   Access to reserved addresses is prohibited.

   — The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals

   After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has 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. Moreover, 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.

5. Differences between Products

   Before changing from one product to another, i.e. to a product with a different part number, confirm that the change will not lead to problems.

   — The characteristics of an MPU or MCU in the same group but having a different part number may differ in terms of the 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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