

CMOS 32-BIT SINGLE CHIP MICROCONTROLLER

**S1C31 Family**  
**Software Development**  
**Setup Guide Rev.4**

**arm**

## Evaluation board/kit and Development tool important notice

1. This evaluation board/kit or development tool is designed for use for engineering evaluation, demonstration, or development purposes only. Do not use it for other purposes. It is not intended to meet the requirements of design for finished products.
2. This evaluation board/kit or development tool is intended for use by an electronics engineer and is not a consumer product. The user should use it properly and in a safe manner. Seiko Epson does not assume any responsibility or liability of any kind of damage and/or fire caused by the use of it. The user should cease to use it when any abnormal issue occurs even during proper and safe use.
3. The part used for this evaluation board/kit or development tool may be changed without any notice.

## NOTICE

No part of this material may be reproduced or duplicated in any form or by any means without the written permission of Seiko Epson. Seiko Epson reserves the right to make changes to this material without notice. Seiko Epson does not assume any liability of any kind arising out of any inaccuracies contained in this material or due to its application or use in any product or circuit and, further, there is no representation that this material is applicable to products requiring high level reliability, such as, medical products. Moreover, no license to any intellectual property rights is granted by implication or otherwise, and there is no representation or warranty that anything made in accordance with this material will be free from any patent or copyright infringement of a third party. When exporting the products or technology described in this material, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You are requested not to use, to resell, to export and/or to otherwise dispose of the products (and any technical information furnished, if any) for the development and/or manufacture of weapon of mass destruction or for other military purposes.

Arm, Cortex, Keil and  $\mu$ Vision are registered trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere. IAR Systems, IAR Embedded Workbench, C-SPY, I-jet, IAR and the logotype of IAR Systems are trademarks or registered trademarks owned by IAR Systems AB. SEGGER and J-Link are trademarks or registered trademarks of SEGGER Microcontroller GmbH & Co. KG. All rights reserved. All brands or product names mentioned herein are trademarks and/or registered trademarks of their respective companies.

*“Reproduced with permission from Arm Limited. Copyright © Arm Limited”*

©SEIKO EPSON CORPORATION 2021, All rights reserved.

# Table of Contents

<b>1. Overview</b> .....	<b>1</b>
<b>1.1 Software development environment list</b> .....	<b>1</b>
<b>2. Acquisition of Software Development Environment</b> .....	<b>2</b>
<b>2.1 How to Get</b> .....	<b>2</b>
<b>2.2 Documents for Referencing Detailed Information</b> .....	<b>3</b>
<b>3. Setup of Software Development Environment</b> .....	<b>4</b>
<b>3.1 Installation of IDE</b> .....	<b>4</b>
3.1.1 When Using the IAR EWARM .....	4
3.1.2 When Using the MDK-ARM.....	5
<b>3.2 Installing the S1C31SetupTool package</b> .....	<b>6</b>
<b>3.3 Connection of Hardware</b> .....	<b>8</b>
3.3.1 When Using the I-jet.....	8
3.3.2 When Using the J-Link .....	9
<b>3.4 Installation of peripheral circuit sample software package</b> .....	<b>11</b>
<b>Revision History</b> .....	<b>12</b>

# 1. Overview

This document describes the setup procedure of our recommended software development environment for user who are using S1C31 Family \*1 for the first time.

\* 1: S1C31 Family is a microcontroller equipped with ARM® Cortex®-M0+ processor and is a product of Seiko Epson Corporation.

## 1.1 Software development environment list

Figure 1.1.1 shows the software development environment set (toolchain) of the S1C31 Family.

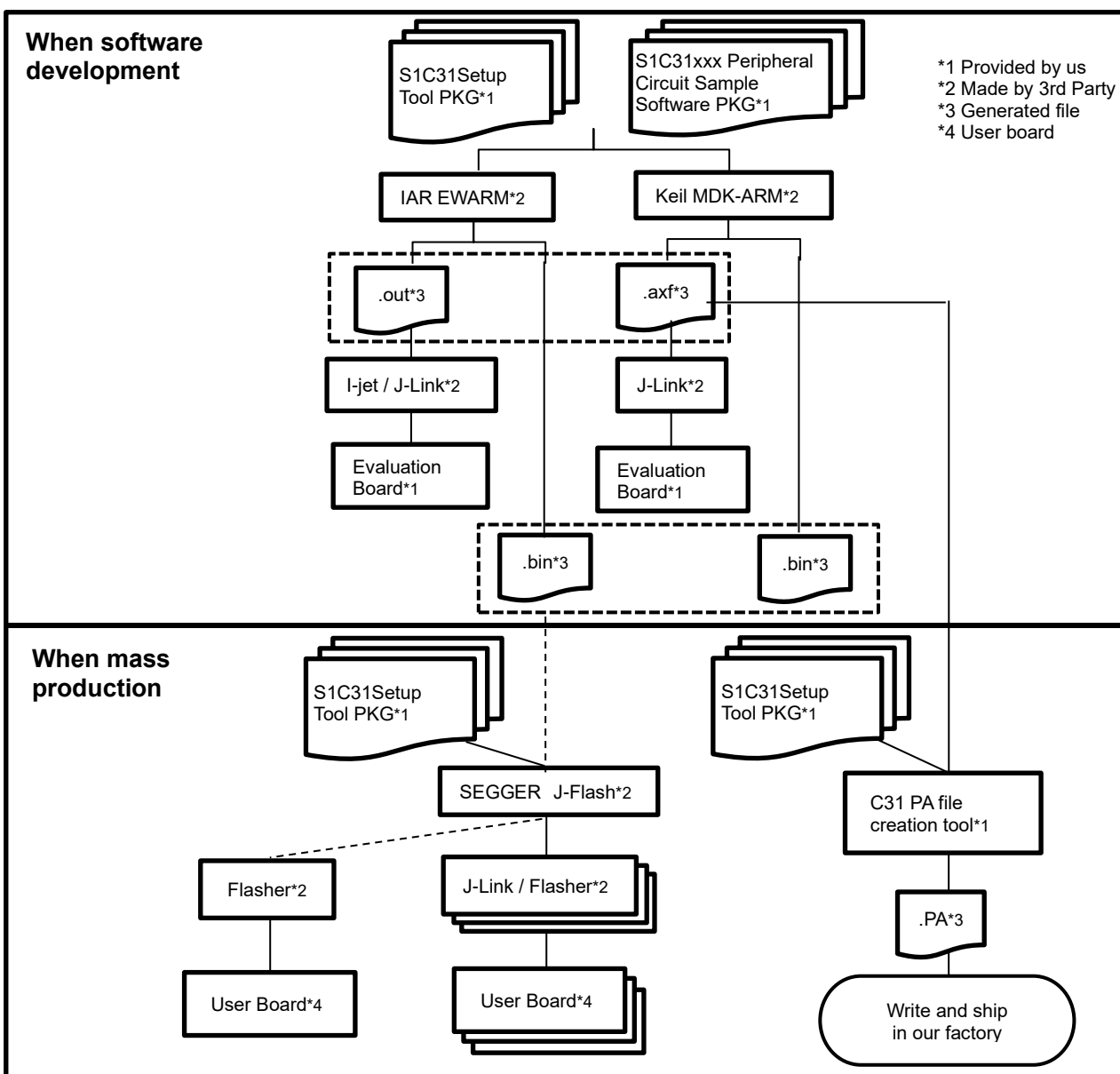


Figure 1.1.1 S1C31 Family Toolchain

This document describes the procedure for setting up the software development environment required for "When software development" in Figure 1.1.1.

## 2. Acquisition of Software Development Environment

## 2. Acquisition of Software Development Environment

This chapter describes how to obtain our recommended software development environment required for software development.

### 2.1 How to Get

The user can use the third-party ARM® development Environment (Integrated Development Environment /IDE and Debug Probe) to development the software for the S1C31 Family.

Table 2.1.1 shows the recommended development Environment for S1C31 Family. Please contact the tool vendors or the tool vendor's distributors to obtain these tools.

Table 2.1.1 Development Environment Needed

Type	Name	Remarks
PC	PC with Windows 10	-
Integrated Development Environment (IDE)	IAR Embedded Workbench for ARM (by IAR Systems)	Please prepare either one.
	MDK-ARM with uVision5 (by ARM)	
Debugging Probe	I-jet (by IAR Systems)	Please prepare either one.
	J-Link (by SEGGER)	

Please prepare either one of IDEs and either one of debug probes in Table 2.1.1. However, please note that some combinations of IDE and debug probe can not be used as shown in Table 2.1.2.

Table 2.1.2 Available Combinations of IDE and Debug Probe

	I-jet	J-Link
IAR Embedded Workbench for ARM (IAR EWARM)	Available	Available
MDK-ARM	Not available	Available

Furthermore, by using the software and evaluation board provided by us, users can start software development smoothly. Table 2.1.3 shows the software development environment provided by us.

Table 2.1.3 Tools Provided by Seiko Epson

Name	Contents
S1C31 Setup Tool package*1	Files required for software development environment. (Flash loader, configuration files (.svd, etc.), etc.)
S1C31xxx Peripheral circuit sample software package*1	Peripheral circuit library and sample software.
S5U1C31xxxTx*2 (SVT Board)	S1C31xxx Evaluation Board.

\*1: Please download from the Seiko Epson microcontroller web site.

\*2: Please contact your local distributor or sales office.

## 2. Acquisition of Software Development Environment

### 2.2 Documents for Referencing Detailed Information

For detailed information on each development environment tool, refer to the documents shown in Table 2.2.1.

Table 2.2.1 List of Reference Document

Tool	Reference information	Reference document
IAR EWARM	Installation	Quick Reference *1
	IDE operations	Getting Started with IAR Embedded Workbench for ARM *1 IDE Project Management and Building Guide *1 C-SPY® Debugging Guide *1
MDK-ARM	Installation	Getting Started with MDK *2
	IDE operations	Getting Started with MDK *2 Complete User's Guide Selection *2
I-jet	-	IAR Debugging probes User Guide *1
J-Link	-	J-Link/J-Trace User Guide *3
S1C31 Setup Tool package	-	This document *4
S1C31xxx Peripheral Circuit Sample Software package	-	S1C31 Family Peripheral Circuit Sample Software Manual *4
S1C31xxx Evaluation Board	-	S5U1C31xxxTx Manual *4

\*1: Please download from the IAR Systems web site.

The URL of this web site is as follows: <<https://www.iar.com/>>

\*2: Please download from the ARM KEIL web site.

The URL of this web site is as follows: <<http://www.keil.com/>>

\*3: Please download from the SEGGER web site.

The URL of this web site is as follows: <<https://www.segger.com/>>

\*4: Please download from the Seiko Epson microcontroller web site.

### 3. Setup of Software Development Environment

---

### 3. Setup of Software Development Environment

This chapter describes the procedure for setting up the software development environment obtained in Chapter 2.

#### 3.1 Installation of IDE

This section describes the procedure to install IAR EWARM and MDK-ARM.

##### 3.1.1 When Using the IAR EWARM

Install the IAR EWARM by following the procedure shown below.

- (1) Download the installer of IAR Embedded Workbench for ARM from the web site of IAR Systems.
- (2) Finish all the application on the Windows.
- (3) Double click the installer(exe file) to launch it. Then the installation screen shown below will be displayed. (Figure 3.1.1.1)
- (4) Click [Install IAR Embedded Workbench®] to start the installation wizard. (Figure 3.1.1.1)

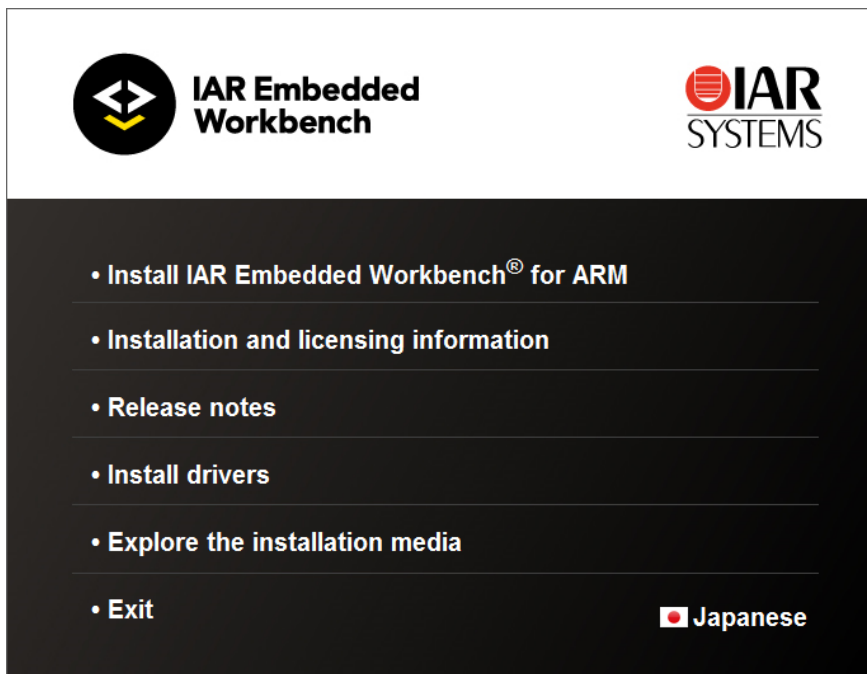


Figure 3.1.1.1 Installation Screen of IAR Embedded Workbench for ARM

- (5) Follow the prompts in the installation wizard to proceed with the installation. The recommended settings are as follows.
  - Installation directory: Default location
  - Installation option: Full installation

If you launch the IAR Embedded Workbench for the first time after installation, license registration will be requested. The procedure of license registration varies depending on the type of license you purchased. For more information on the procedure of license registration, refer to “Quick Reference”(listed in Table 2.2.1).

#### 3.1.2 When Using the MDK-ARM

Install the MDK-ARM by following the procedure shown below.

- (1) Download the installer of MDK-ARM from the ARM web site.
- (2) Finish all the application on the Windows.
- (3) Double click the installer(exe file) to launch it. Then the installation wizard shown below will be displayed. (Figure 3.1.2.1)

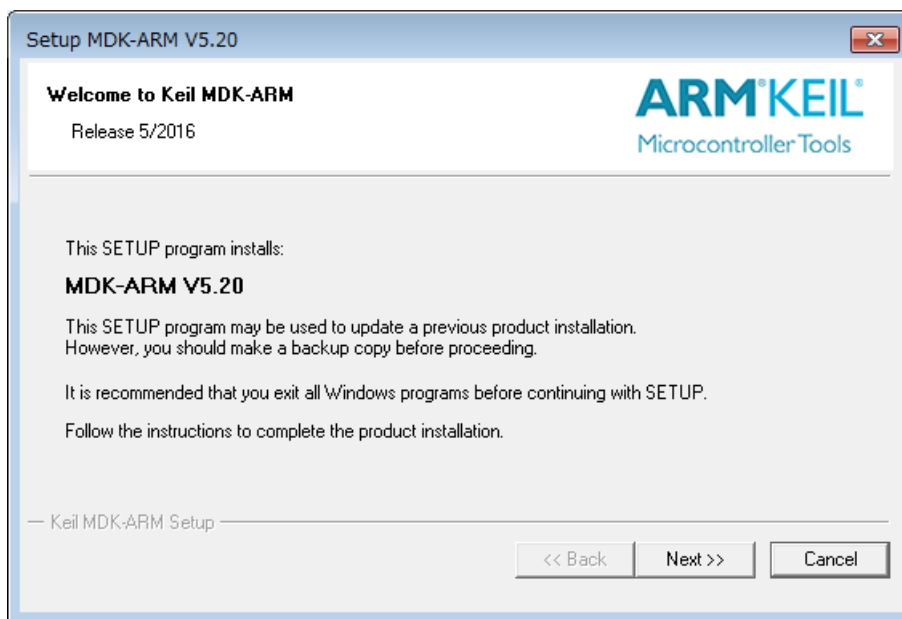


Figure 3.1.2.1 Installation Screen of MDK-ARM

- (4) Follow the prompts in the installation wizard to proceed with the installation of MDK Core. The recommended settings are as follows.
  - Installation directory: Default location
- (5) Pack Installer is started automatically after the installation MDK Core, select [cortex-M0 plus] to install the software pack for “cortex-M0 plus”.

If you use MDK-ARM without code size limits after installation, license registration is required. The procedure of license registration varies depending on the type of license you purchased. For more information on the procedure of license registration, refer to “Getting Started with MDK”(listed in Table 2.2.1).

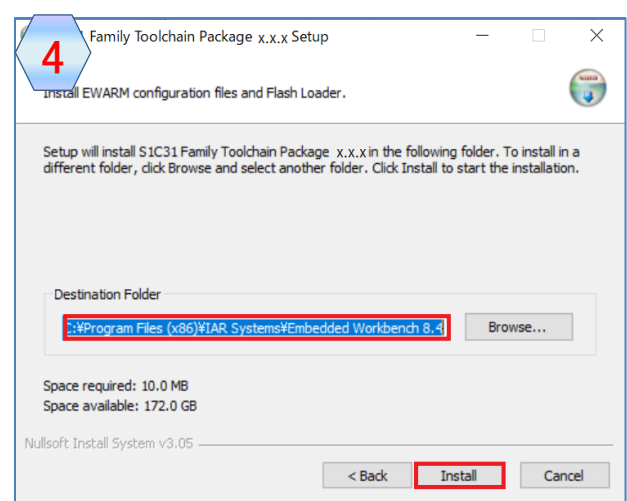
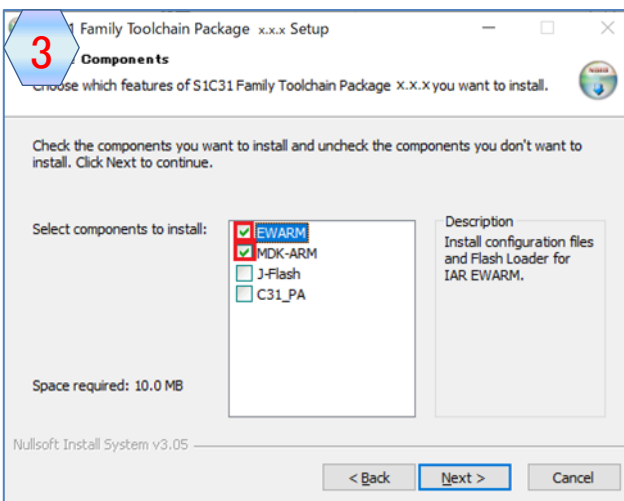
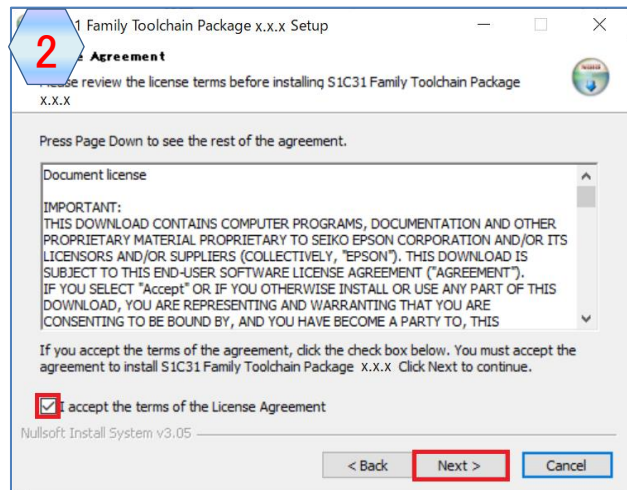
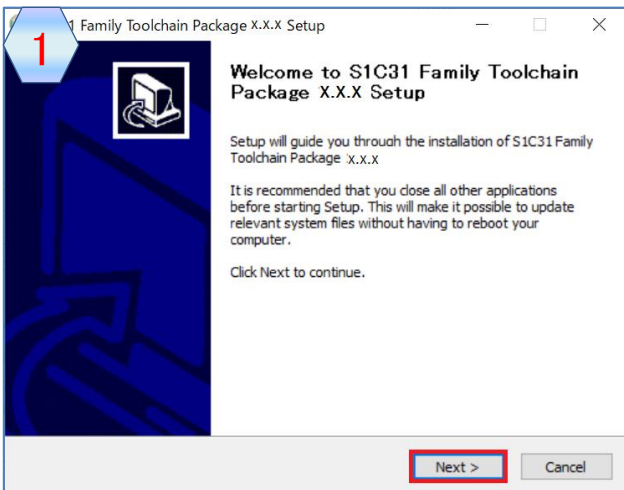


### 3. Setup of Software Development Environment

#### 3.2 Installing the S1C31SetupTool package

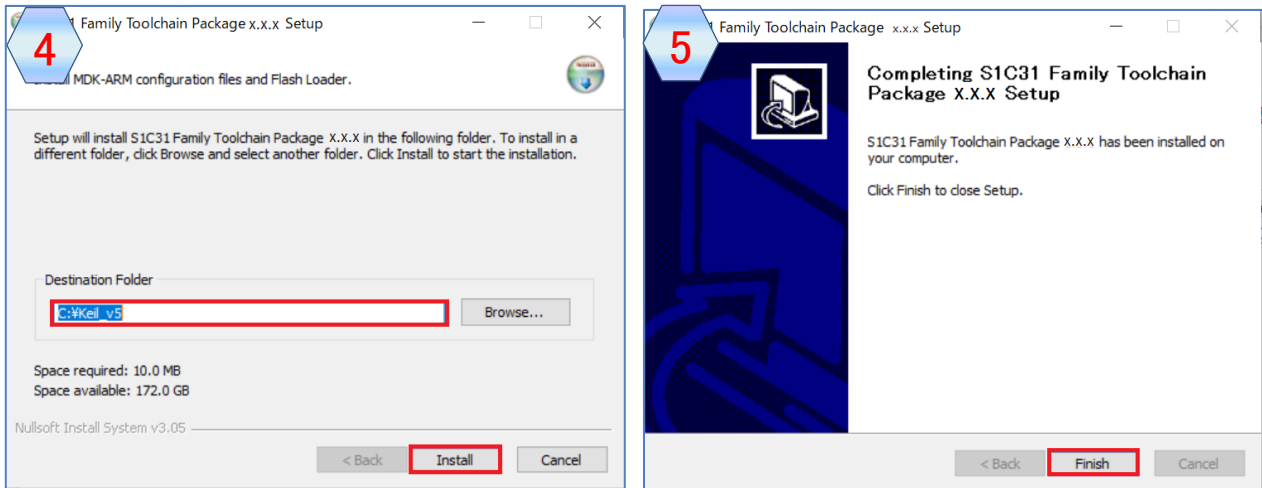
This section describes the installation procedure for the S1C31SetupTool package, which includes the flash loader and configuration files (such as .svd).

- (1) Download S1C31SetupTool.zip from our microcontroller website and unzip it to any folder.
- (2) Execute “s1c31ToolchainSetup.exe” from the extraction destination folder.
- (3) After starting the installer, execute the installation according to the instructions of the installer.
  1. Check the installation contents
  2. Confirmation of the terms of the license agreement
  3. Select the software development environment to use
  4. Select the installation folder and execute the installation  
If the software development environment to be used is not installed, "Destination Folder" will be displayed in an empty state.
  5. Exit the installer



\* When IAR EWARM is selected in [3]

### 3. Setup of Software Development Environment



\* When KEIL MDK-AMR is selected in [3]

### 3. Setup of Software Development Environment

---

#### 3.3 Connection of Hardware

This section describes how to connect the hardware of the software development. The debug probe recommended for the S1C31 Family is I-jet or J-Link.

##### 3.3.1 When Using the I-jet

- (1) Connect I-jet to the PC with IAR EWARM installed using the USB micro cable included with I-jet. This enables the PC to automatically install the device driver.
- (2) Connect I-jet to the evaluation board(ex. S5U1C31xxxTx) using the cable and adapter included with I-jet. (see Figures 3.3.1.1)

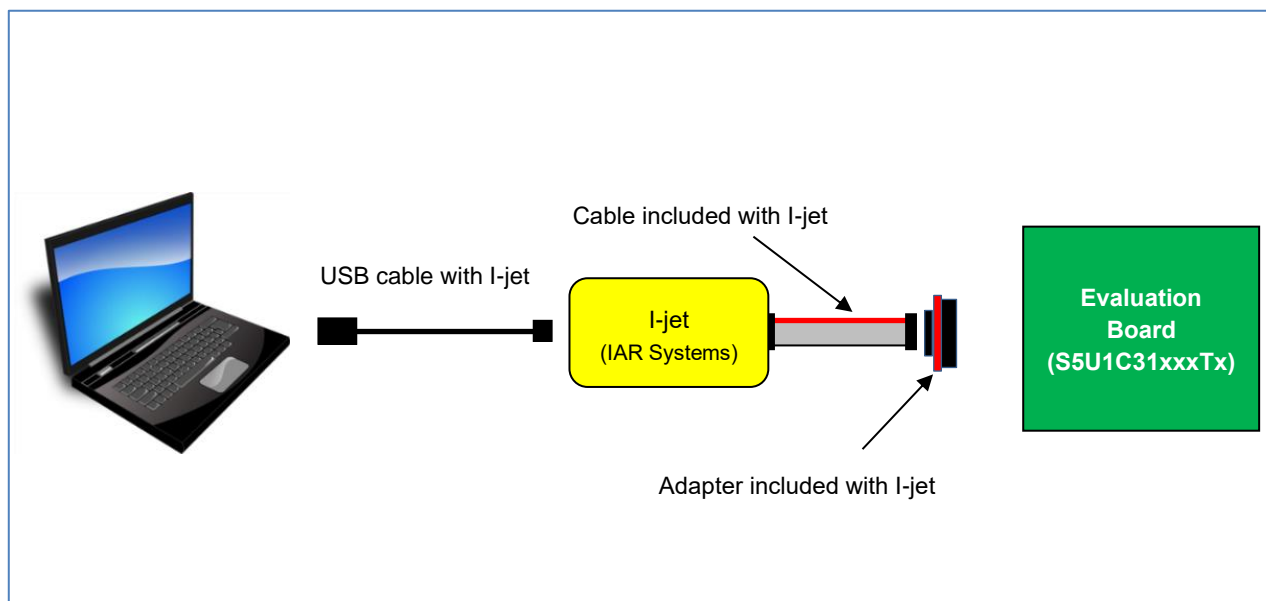


Figure 3.3.1.1 Hardware Connection using I-jet\*1

\*1: Figure 3.3.1.1 shows an example when the evaluation board (S5U1C31xxxTx) works using 5V power supply supplied from a debug probe (I-jet).

For more information on the connection of hardware with I-jet, refer to the “IAR Debugging probes User Guide”, “S5U1C31xxxTx Manual” (listed in Table 2.2.1) as necessary.

## 3. Setup of Software Development Environment

### 3.3.2 When Using the J-Link

- (1) Connect J-Link to the PC with either IAR EWARM or MDK-ARM installed, using the USB cable included with J-Link. This enables the PC to automatically install the device driver.
- (2) Connect J-Link to the evaluation board(ex. S5U1C31xxxTx) using ribbon cable included with J-Link. (see Figure 3.3.2.1)
- (3) When supply the 5V power supply from J-Link to the evaluation board, set up J-Link in the following procedure. When supplying the power to the evaluation board with the external power supply, the following procedure is unnecessary.
  - (3.1) Download “J-Link Software and Documentation Pack” of Ver.6.xx or later from the SEGGER website.
  - (3.2) Click “J-Link Software and Documentation Pack (\*.exe)” to install it.
  - (3.3) Click [SEGGER – J-Link V6.xx > J-Link Commander V6.xx] in the start menu on Windows. Then the console screen will be displayed. (see Figure 3.3.2.2)
  - (3.4) Enter the following commands into the console screen.

```
J-Link> power on perm  
J-Link> exit
```

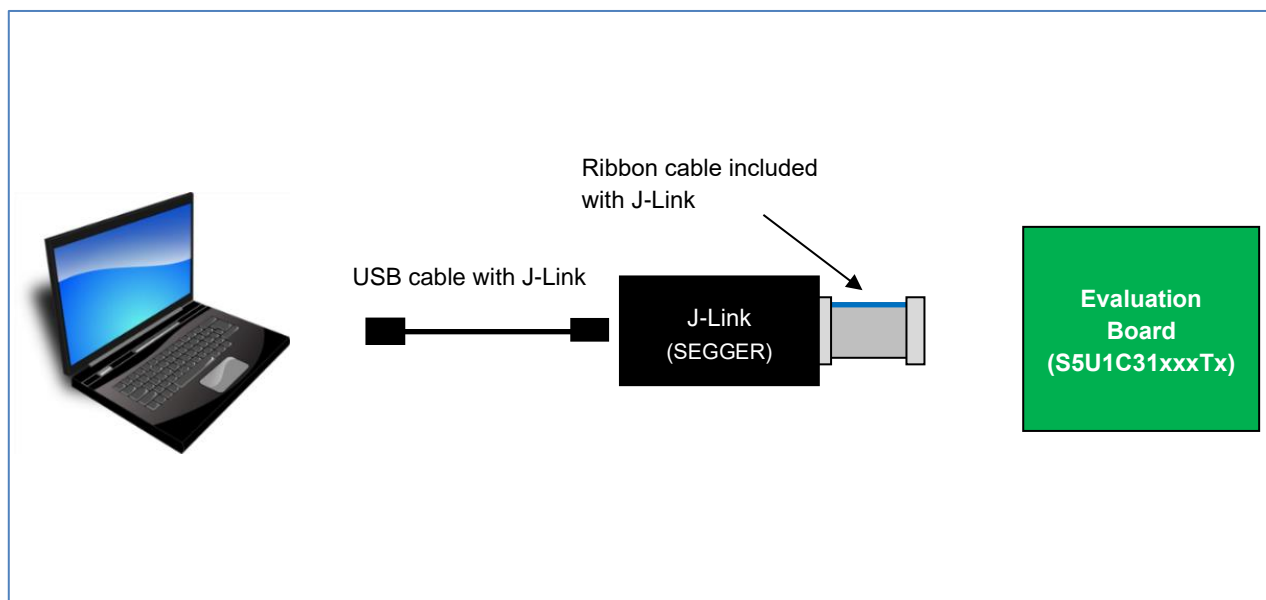


Figure 3.3.2.1 Hardware Connection using J-Link\*1

\*1: Figure 3.3.2.1 shows an example when the evaluation board (S5U1C31xxxTx) works using 5V power supply supplied from a debug probe (J-Link).

### 3. Setup of Software Development Environment

---

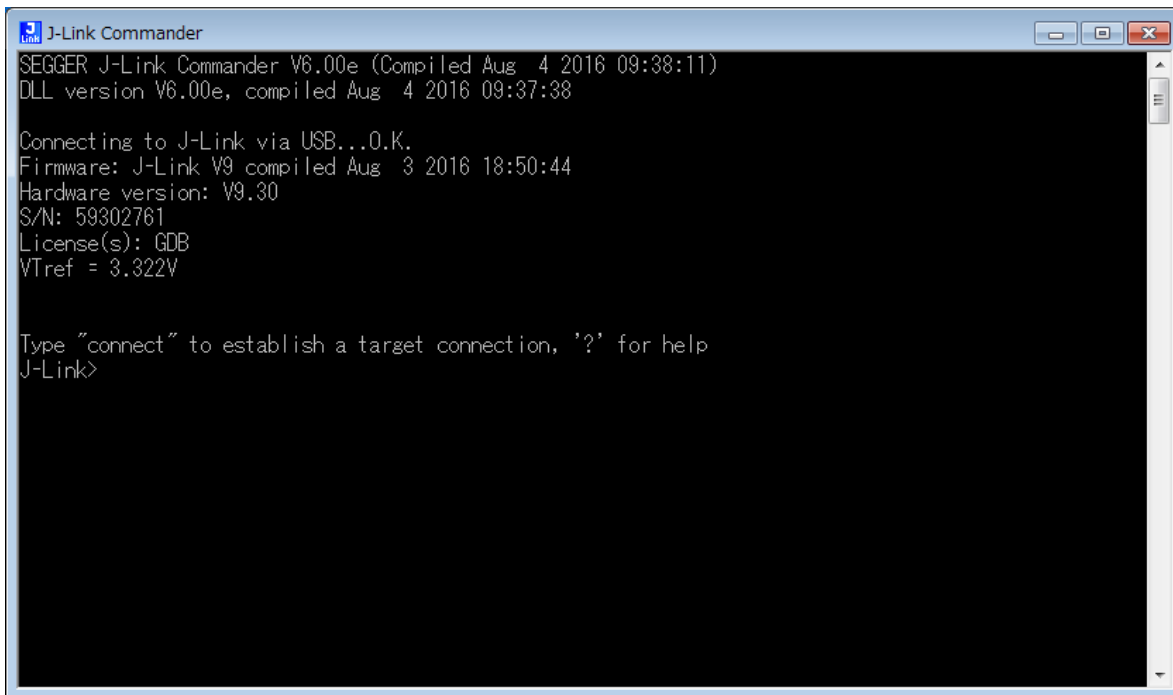


Figure 3.3.2.2 Starting J-Link Commander

For more information on the connection of the hardware with J-Link, refer to the “J-Link/J-Trace User Guide”, “S5U1C31xxxTx Manual” and “S5U1C31001L1100 (Bridge Board Ver.2) Manual” (listed in Table 2.2.1) as necessary.

---

### **3.4 Installation of peripheral circuit sample software package**

All kind of sample software and demo software for the S1C31 are included in the S1C31xxx peripheral circuit sample software package. About the S1C31xxx peripheral circuit sample software package, refer to "S1C31 Family Peripheral Circuit Sample Software Manual".



### America

---

#### Epson America, Inc.

Headquarter:  
3131 Katella Ave., Los Alamitos, CA 90720, USA  
Phone: +1-562-290-4677

San Jose Office:  
214 Devcon Drive  
San Jose, CA 95112 USA  
Phone: +1-800-228-3964 or +1-408-922-0200

### Europe

---

#### Epson Europe Electronics GmbH

Riesstrasse 15, 80992 Munich,  
Germany  
Phone: +49-89-14005-0      FAX: +49-89-14005-110

### Asia

---

#### Epson (China) Co., Ltd.

4th Floor, Tower 1 of China Central Place, 81 Jianguo Road, Chaoyang  
District, Beijing 100025 China  
Phone: +86-10-8522-1199      FAX: +86-10-8522-1120

#### Shanghai Branch

Room 1701 & 1704, 17 Floor, Greenland Center II,  
562 Dong An Road, Xu Hui District, Shanghai, China  
Phone: +86-21-5330-4888      FAX: +86-21-5423-4677

#### Shenzhen Branch

Room 804-805, 8 Floor, Tower 2, Ali Center, No.3331  
Keyuan South RD(Shenzhen bay), Nanshan District, Shenzhen  
518054, China  
Phone: +86-10-3299-0588      FAX: +86-10-3299-0560

#### Epson Taiwan Technology & Trading Ltd.

15F, No.100, Songren Rd, Sinyi Dist, Taipei City 110. Taiwan  
Phone: +886-2-8786-6688

#### Epson Singapore Pte., Ltd.

438B Alexandra Road,  
Block B Alexandra TechnoPark, #04-01/04, Singapore 119968  
Phone: +65-6586-5500      FAX: +65-6271-7066

#### Epson Korea Co.,Ltd

10F Posco Tower Yeoksam, Teheranro 134 Gangnam-gu,  
Seoul, 06235, Korea  
Phone: +82-2-3420-6695

---

#### Seiko Epson Corp. Sales & Marketing Division

#### Device Sales & Marketing Department

29th Floor, JR Shinjuku Miraina Tower, 4-1-6 Shinjuku,  
Shinjuku-ku, Tokyo 160-8801, Japan