

# BDE-SG1311P3 USER GUIDE

## 1. Introduction

This user guide is for BDE-SG1311P3, a Wireless Module based on TI CC1311P3. It is a quick start guide for how to connect the module with the evaluation board BDE-EVB07, and how to build the first application. It also shows a demo for how BDE-SG1311P3 receives a data packet that is sent from another BDE-SG1311P3.

## 2. Get Ready

The following tools are recommended to develop with BDE-SG1311P3.

Hardware tools:

- Two modules of BDE-SG1311P3([BDE-SG1311P3-BDE Technology Inc. \(bdecomm.com\)](http://www.bdecomm.com))
- PC or Laptop
- Two Evaluation boards of BDE-EVB07 ([BDE-EVB07-BDE Technology Inc. \(bdecomm.com\)](http://www.bdecomm.com))
- USB cable for power supply and debugging

Software tools:

- Terminal software such as CCS, IAR.
- [CCS download](#)
- [Software Development Kit \(SDK\)](#)

## 3. Build Your First Application

Once have the Hardware and Software tools in place, please following the following steps.

### 3.1. Connect the Hardware

Connect the EVB07 to a PC or laptop using a USB cable. As shown in Figure 1, plug BDE-SG1311P3 with adapter board into the development board and connect all pins with jumper caps. Note that TXD and RXD need to be connected to DIO13 and DIO12 with jumpers. Users can connect according to the mapping in Table 1.

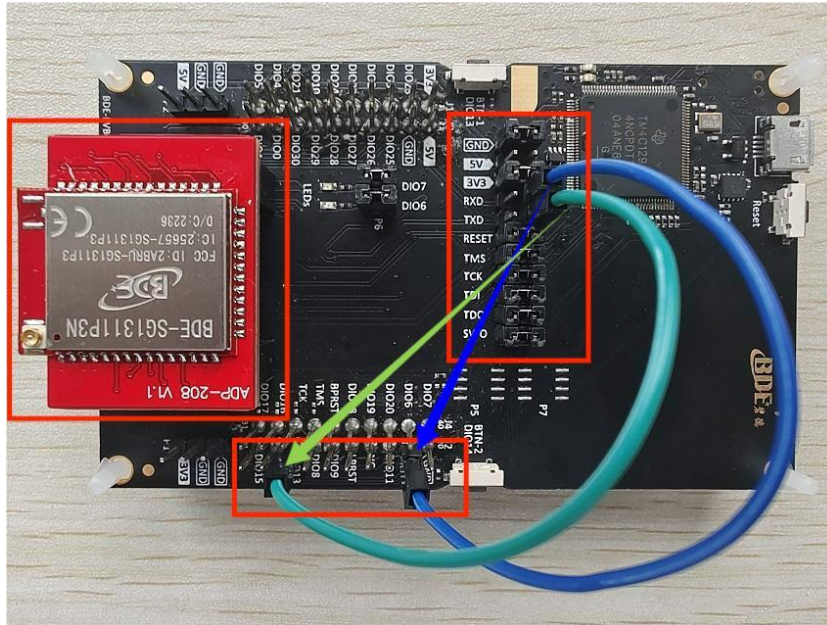


Figure 1. Diagram of pin connection

Table 1. Pin mapping between BDE-EVB07 and BDE-SG1311P3

Connection Designator	BDE-SG1311P3
3V3 Power	VDD
Ground	GND
RXD	DIO12
TXD	DIO13
RST	RST
TMS	TMS
TCK	TCK
TDO	DIO16
TDI	DIO17

### 3.2. Download and install the CCS and SDK

From the above links, follow the instructions in the following steps to download and install the CCS and SDK.

- **CCS Installation**

Step 1: Click the “Download options” option

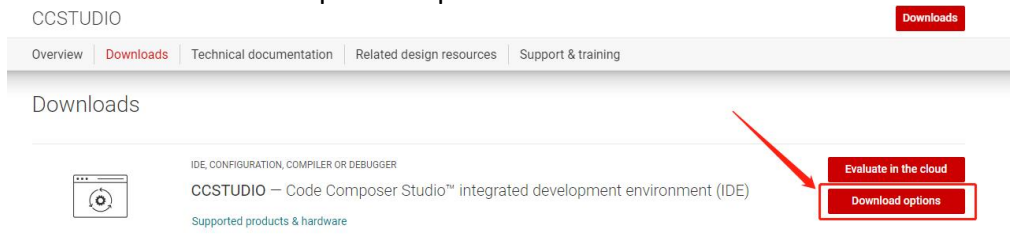


Figure 2. Download CCS

### Step 2: Select an option to download CCS

Version: 11.0.0.00012 Release date: 11 Oct 2021

Release notes View software details

Downloads Supported products & hardware

Windows single file installer for CCS IDE - 1105996 K	Link to Windows single file (offline) installer for Code Composer Studio IDE (all features, devices)
MD5 checksum 3fc1fabe5645715e0f90d27ed92c8b15	
Linux single file installer for CCS IDE - 1072049 K	Link to Linux single file (offline) installer for Code Composer Studio IDE (all features, devices)
MD5 checksum 8d0d4d77d83bc357ae704f062efb3ea5	
macOS single file installer for CCS IDE - 1070739 K	Link to macOS single file (offline) installer for Code Composer Studio IDE (all features, devices)
MD5 checksum fc3f8582e2ada4c74904bfe16a18e35c	
Windows on-demand installer for CCS IDE - 39204 K	Link to Windows on-demand (web) installer for Code Composer Studio IDE (all features, devices)
MD5 checksum 73f4131c31dc663a6c10eaabb9e8939d	

Figure 3. Download the appropriate version for CCS

### Step 3: Unzip the package to a local disc

CCS11.0.0.00012_win64	2021/10/12 14:24
CCS11.0.0.00012_win64.zip	2022/11/18 9:56

Figure 4. Unzip the CCS package

### Step 4: Double-click the setup of CCS

binary	2021/10/12 14:24
components	2021/10/12 14:24
features	2021/10/12 14:24
artifacts.jar	2021/10/12 14:24
ccs_setup_11.0.0.00012.exe	2021/10/12 14:23
content.jar	2021/10/12 14:24
README_FIRST_win64.txt	2021/10/12 14:24
timestamp.txt	2021/10/12 14:24

Figure 5. Setup CCS

Step 5: Click "Next"

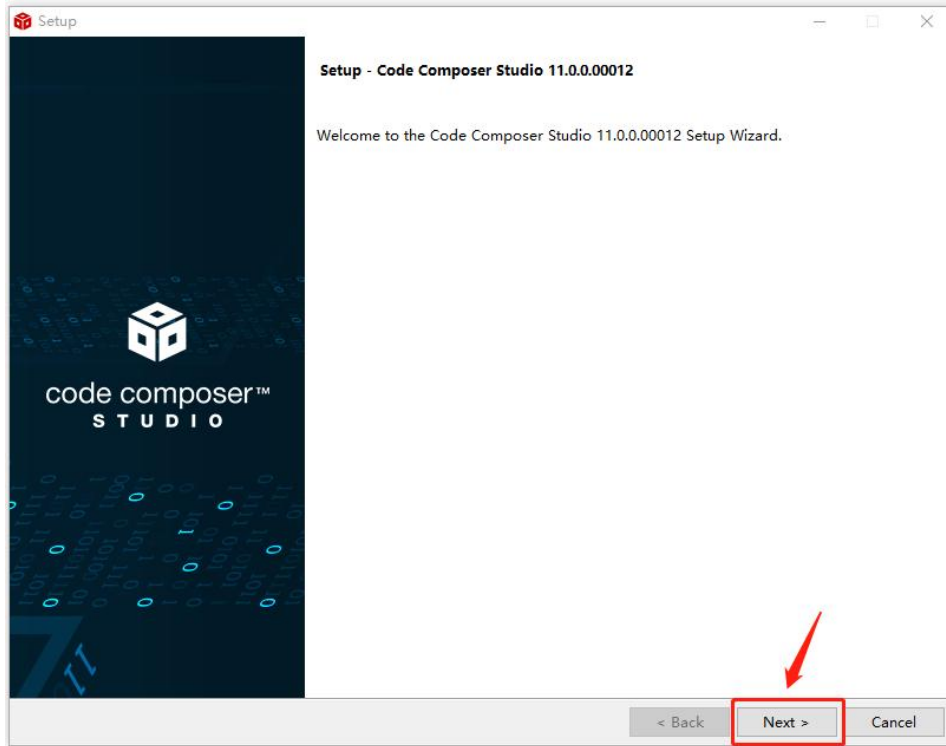


Figure6. Welcome screen for setup CCS

Step 6: Select the default option

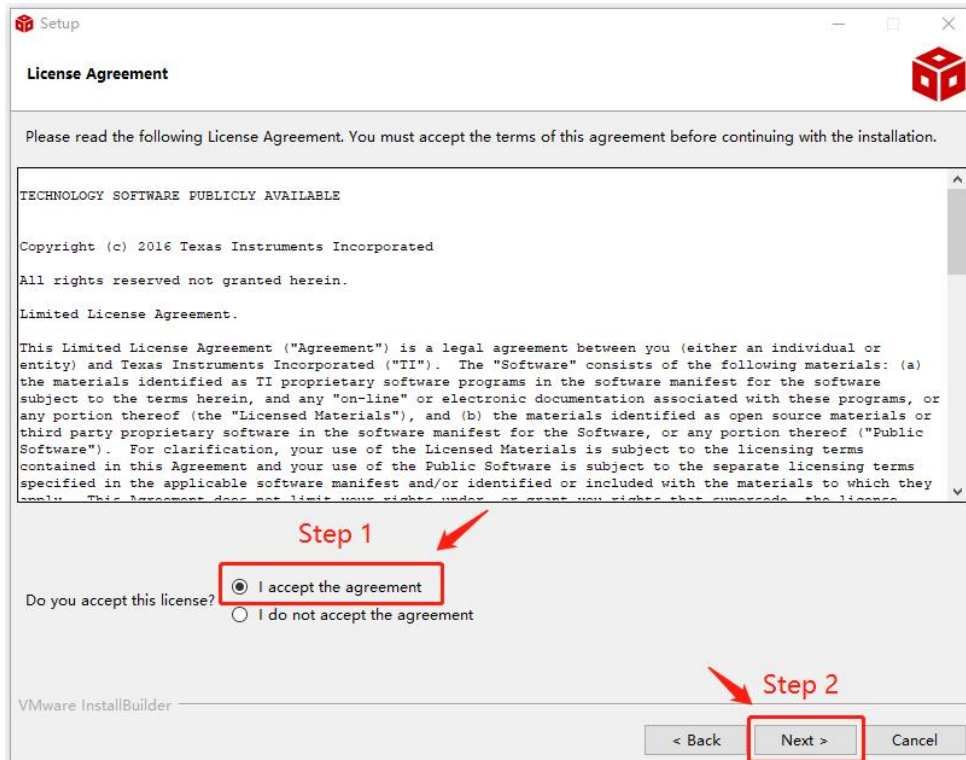


Figure7. Accept the agreement for CCS

Step 7: Click "Next"

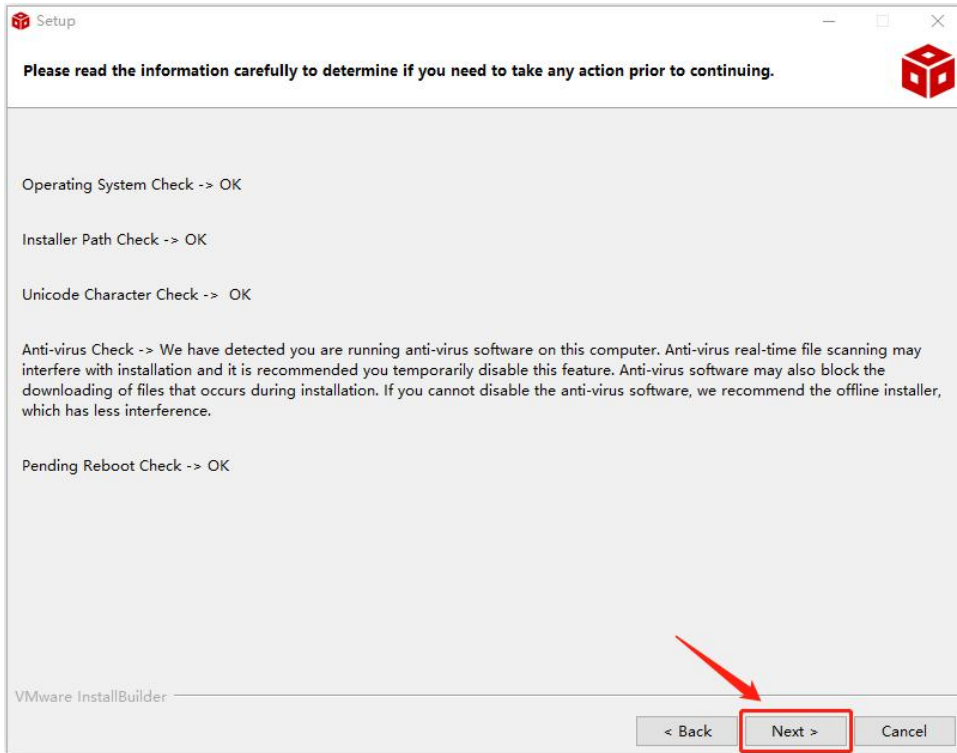


Figure8. Check the installation for CCS

Step 8: Select the Installation Directory (Usually by default)

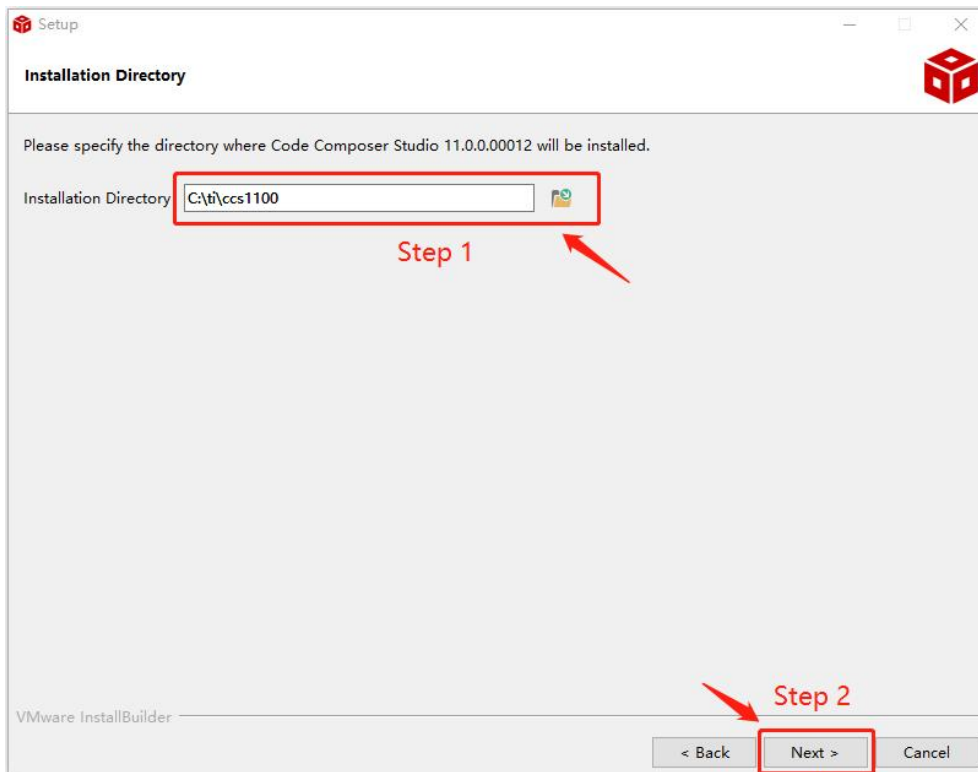


Figure9. Specify the directory for CCS



Step 9: Select the default option

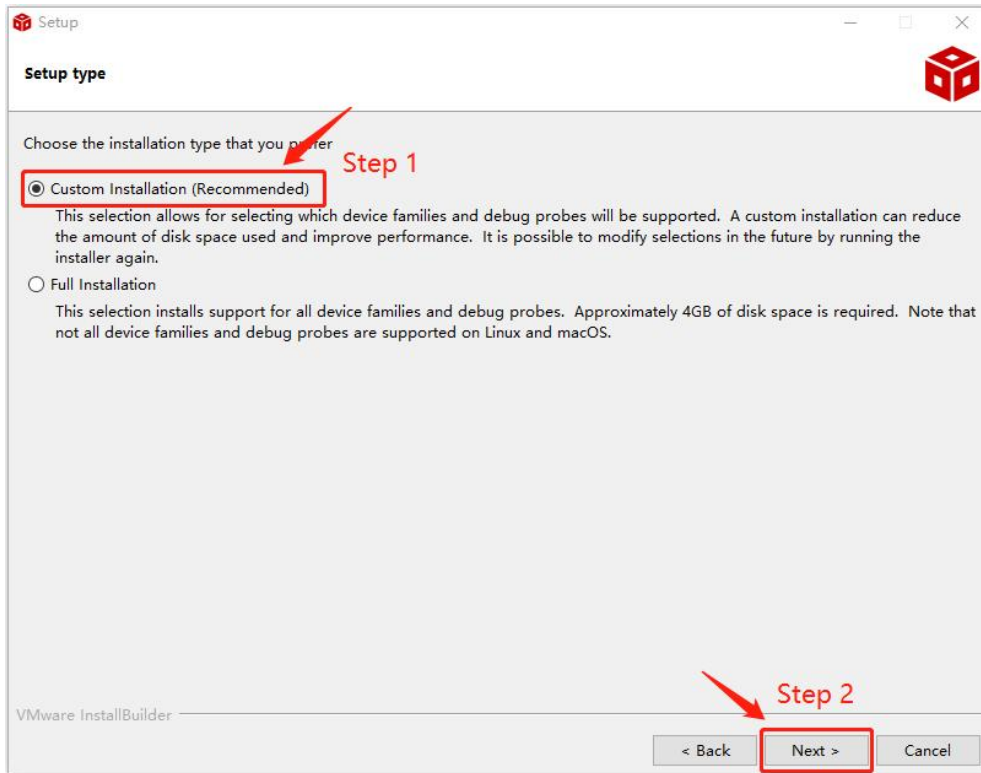


Figure10. Choose the installation type for CCS

Step 10: Select the component

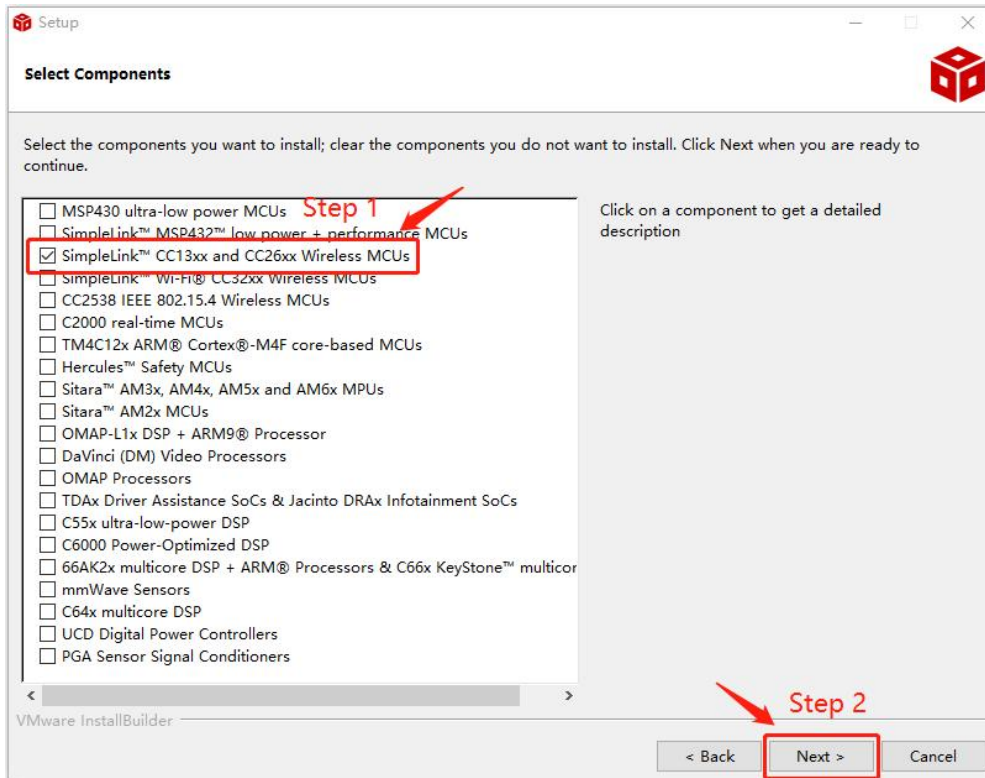


Figure11. Select the components for CCS

Step 11: Select the default option

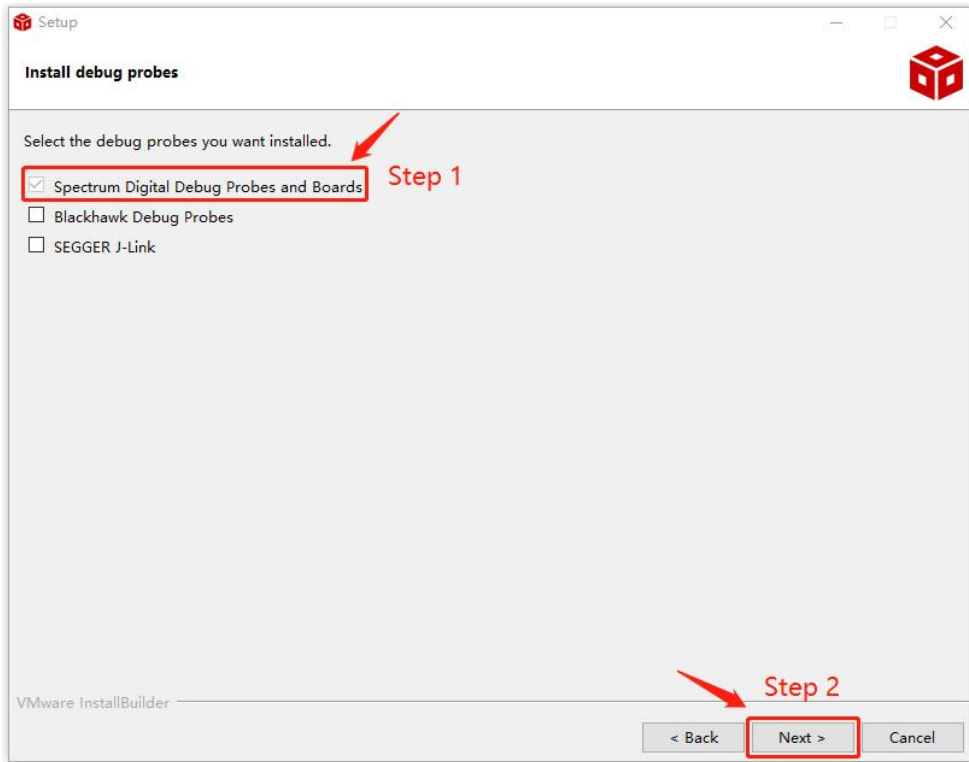


Figure12. Select the debug probes for CCS

Step 12: Click "Next"

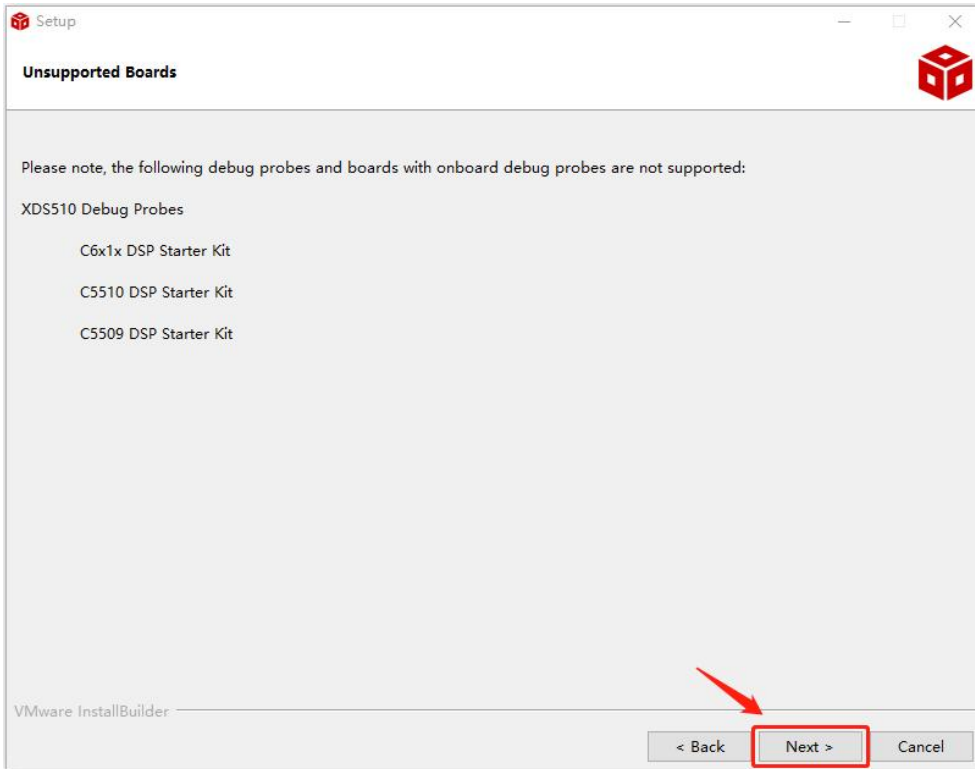


Figure13. Unsupported boards for CCS

Step 13: Click "Next"

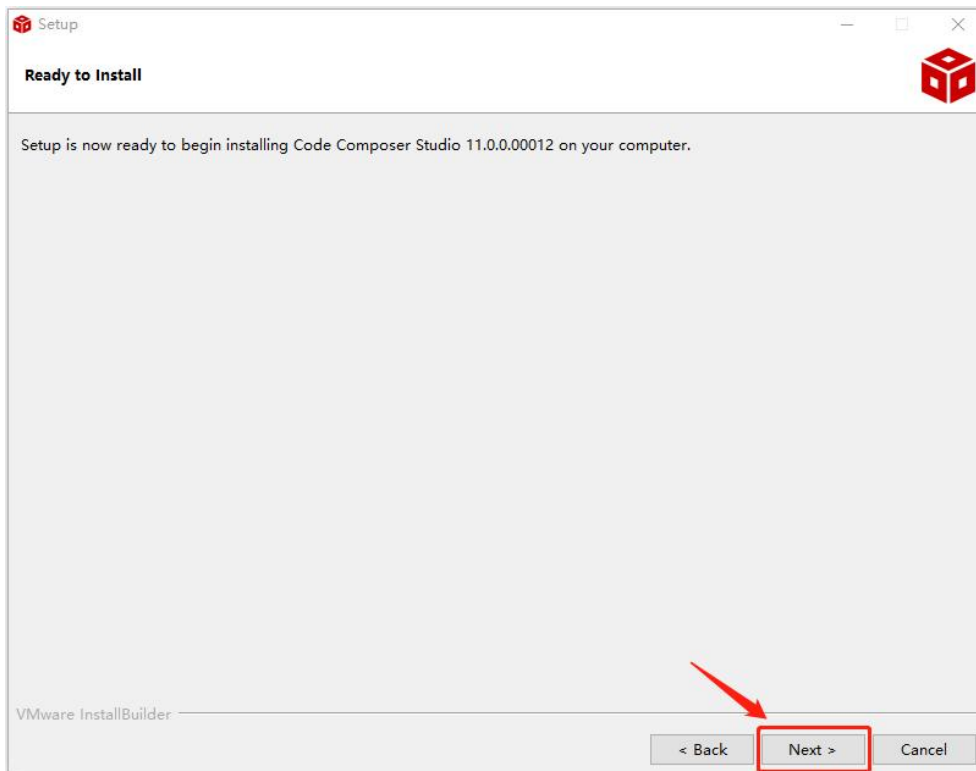


Figure14. Ready to install CCS

Step 14: Waiting for installation to complete

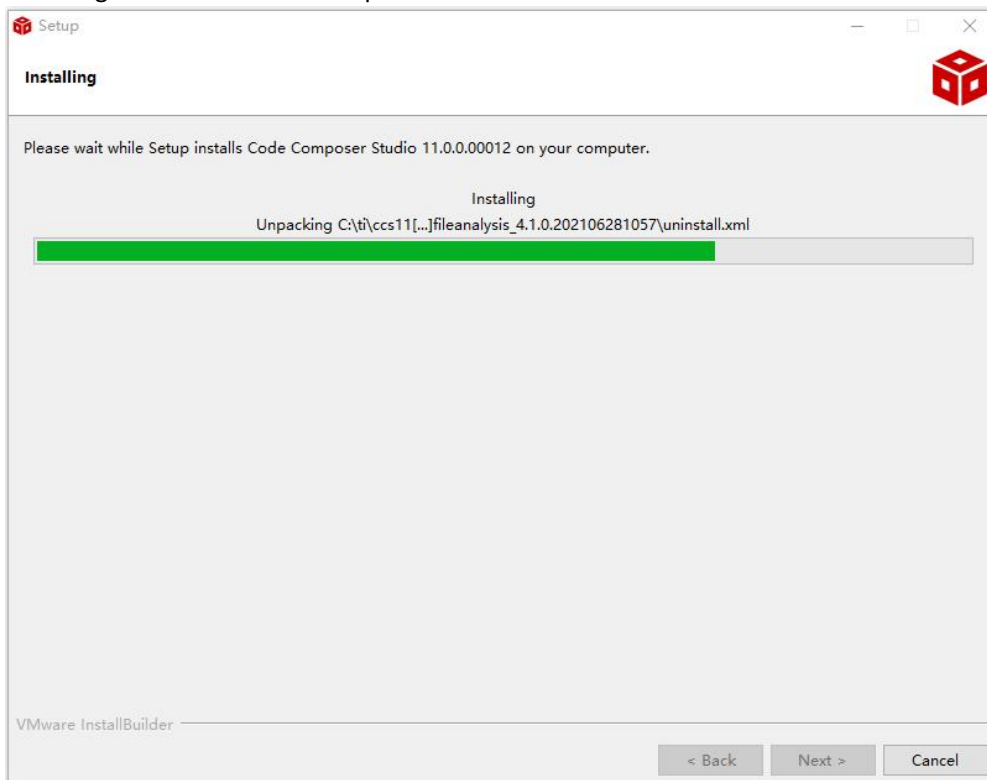


Figure15. Waiting for installation to complete for CCS



Step 15: Finish

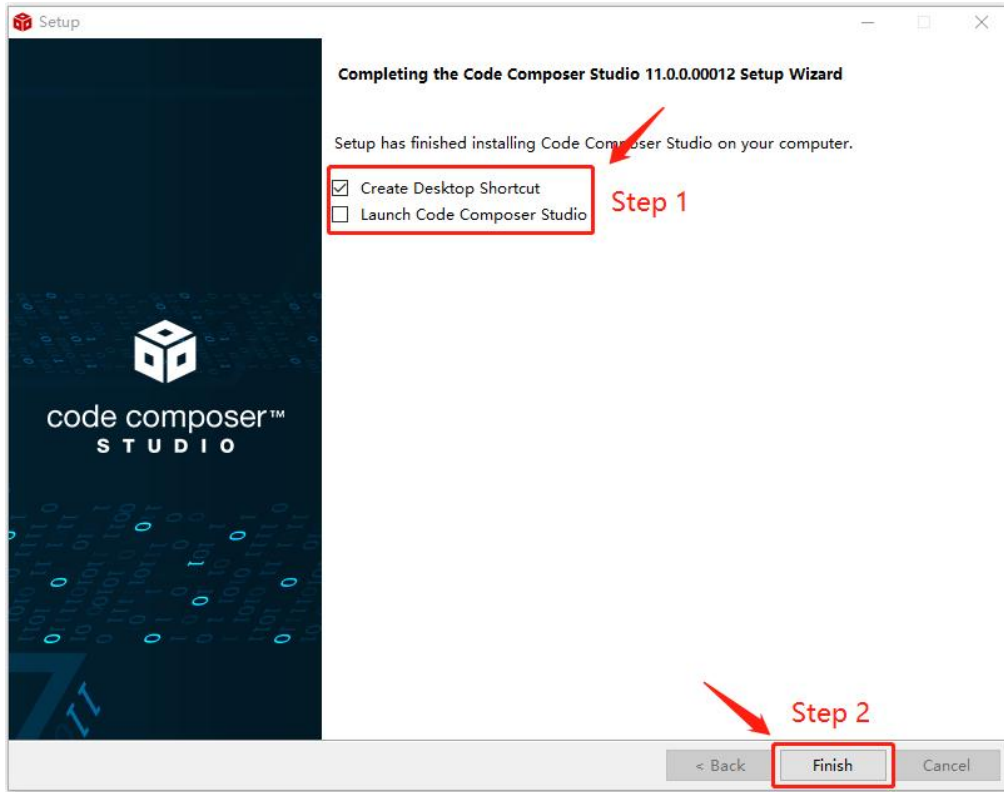


Figure16. Completing the CCS Setup Wizard

■ Software Development Kit (SDK) installation

Step 1: Click on this option

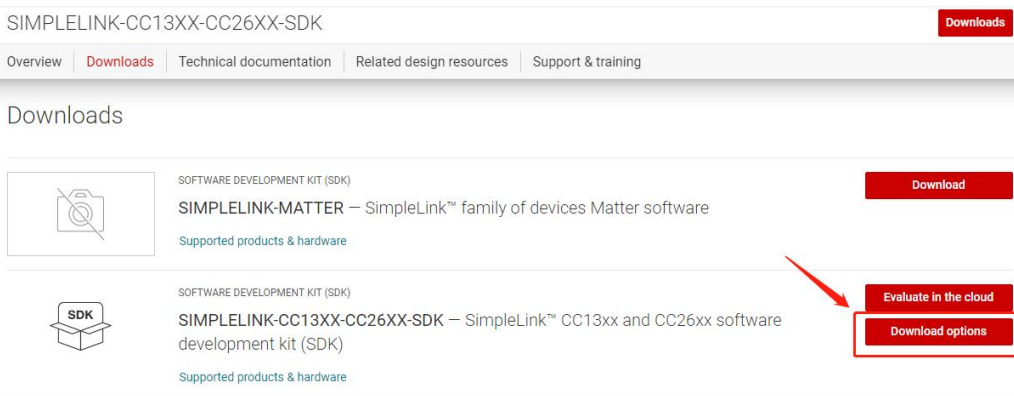


Figure 17. Download SDK

Step 2: Select an option you need to download SDK

Version: 6.10.00.29 Release date: 08 Apr 2022

Release notes View software details

Downloads Supported products & hardware

Windows Installer for SimpleLink CC13XX CC26XX SDK — 915801 K	MD5 checksum 7a04cc7521babf52edd981b4142566c
Linux Installer for SimpleLink CC13XX CC26XX SDK — 904718 K	MD5 checksum 4e4d9de7814dde87113581f7ae81ddef
Mac OS Installer for SimpleLink CC13XX CC26XX SDK — 989889 K	MD5 checksum 5e93f026fd425f2ea57ef536da987a90

= Requires export approval (1 minute)

Figure 18. Download the appropriate version for SDK

Step 3: Login to your TI account. If you are a new user, please register a TI account first

Figure 19. Login TI count

Step 4: Select “civil” if your application is for civil use

### U.S. Government export approval:

All fields are Required. Incomplete information will be DENIED.

First name:

Last name:

Your email address:

Your full company/university name:

Country this file will be used in:

What end-equipment/application will you use this file for:

Military

Civil

Figure 20. Choose application

Step 5: Select "Yes" and submit

I / We hereby certify that we will adhere to the conditions above.

I / We do not know of any additional facts different from the above.

I / We take responsibility to comply with these terms.

I / We understand we are responsible to abide by the most current. versions of the Export Administration Regulations and other U.S. export and sanctions laws.

I CERTIFY ALL THE ABOVE IS TRUE:

Yes  No

**Submit**

Thank you,  
Texas Instruments

Figure 21. Submit the above

Step 6: Download SDK

TI Home

## TI Request

You have been approved to receive this file.  
Click "Download" to proceed.

In a few moments, you will also receive an email with the link to this file.



Thank you,  
Texas Instruments

Figure 22. Download the installer

### Step 7: Installation

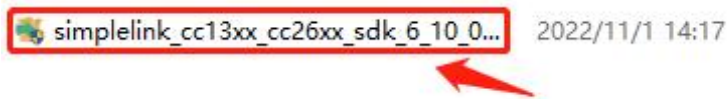


Figure 23. Setup SDK

### Step 8: Click "Next"

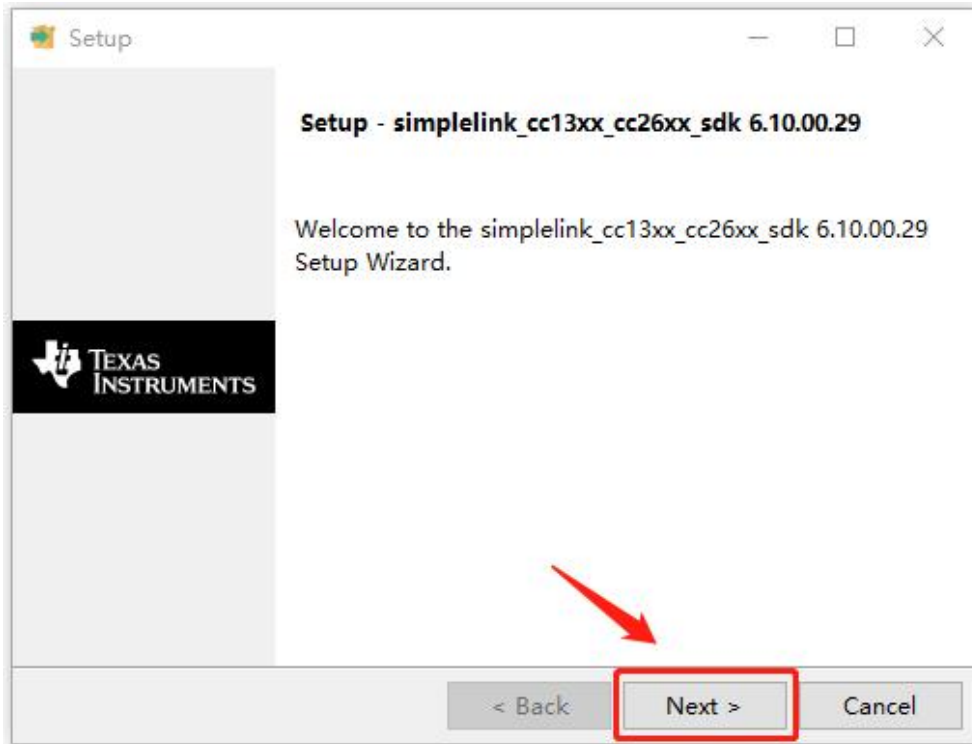


Figure 24. Welcome screen for setup SDK

Step 9: Select the default option



Figure 25. Accept the agreement for SDK

Step 10: Select the Installation directory (Usually by default)

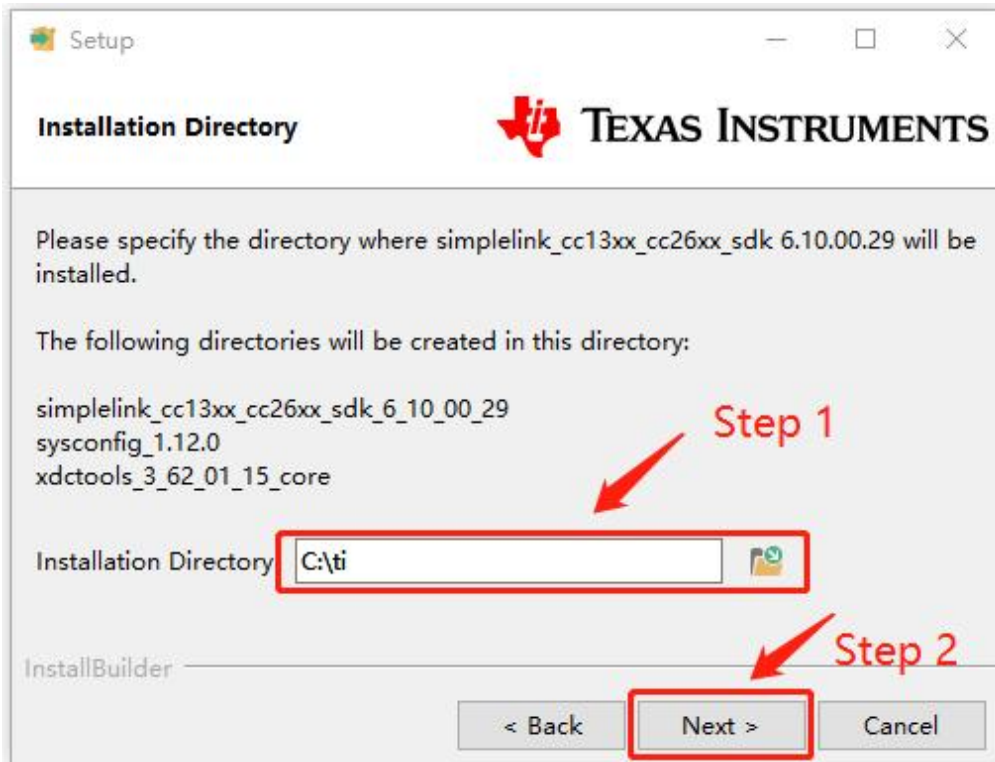


Figure 26. Specify the directory for SDK

Step 11: Click "Next"

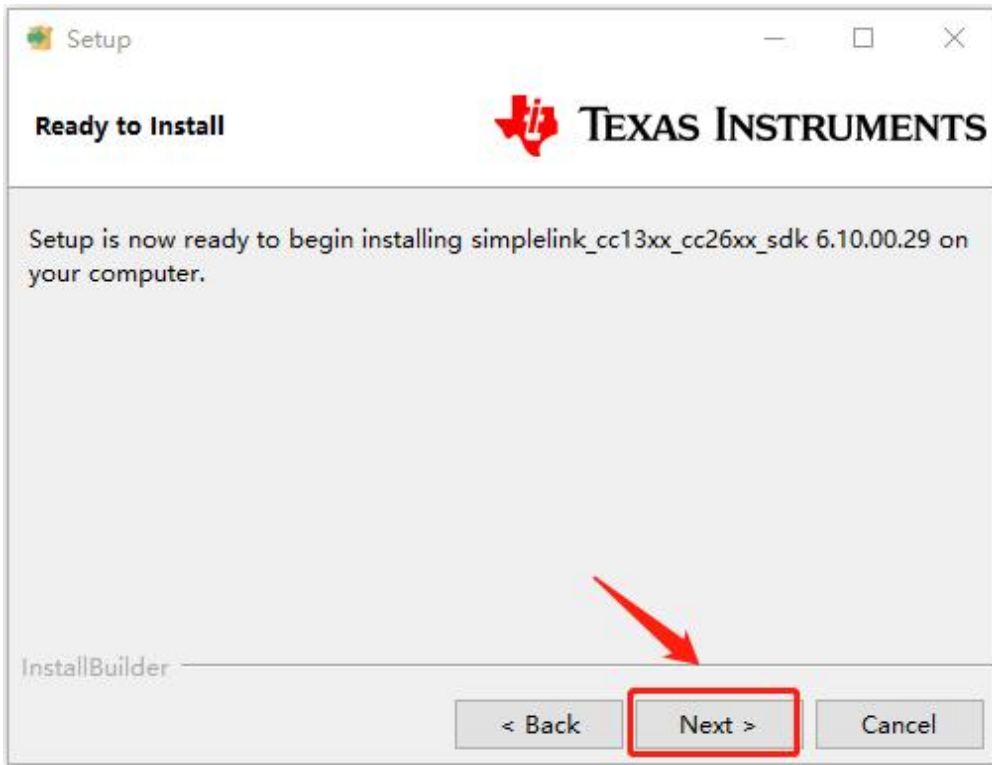


Figure27. Ready to install SDK

Step 12: Waiting for installation to complete

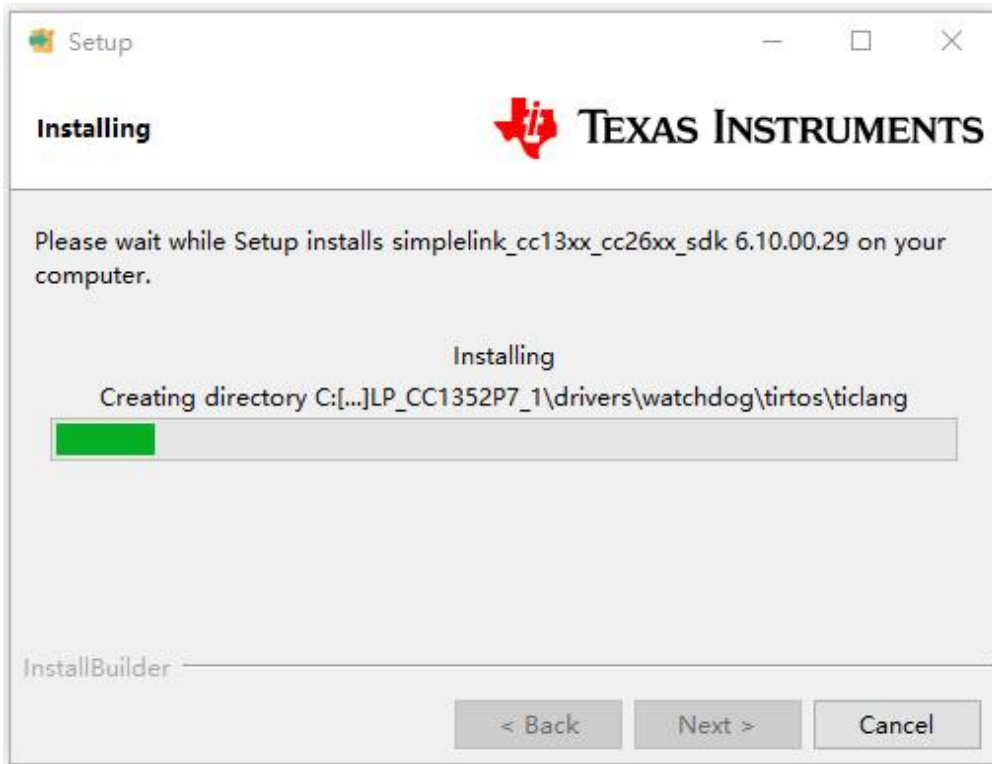


Figure28. Waiting for the SDK installation to complete



### 3.3. Run an example/demo code

Step 1: For the first module, select a directory as workspace

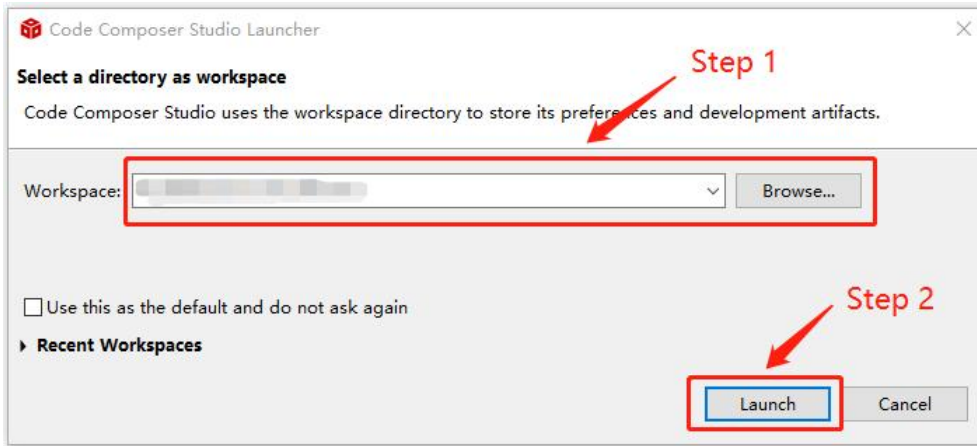


Figure29. Select a directory as workspace

Step 2: Find the option named “Import CCS project...”

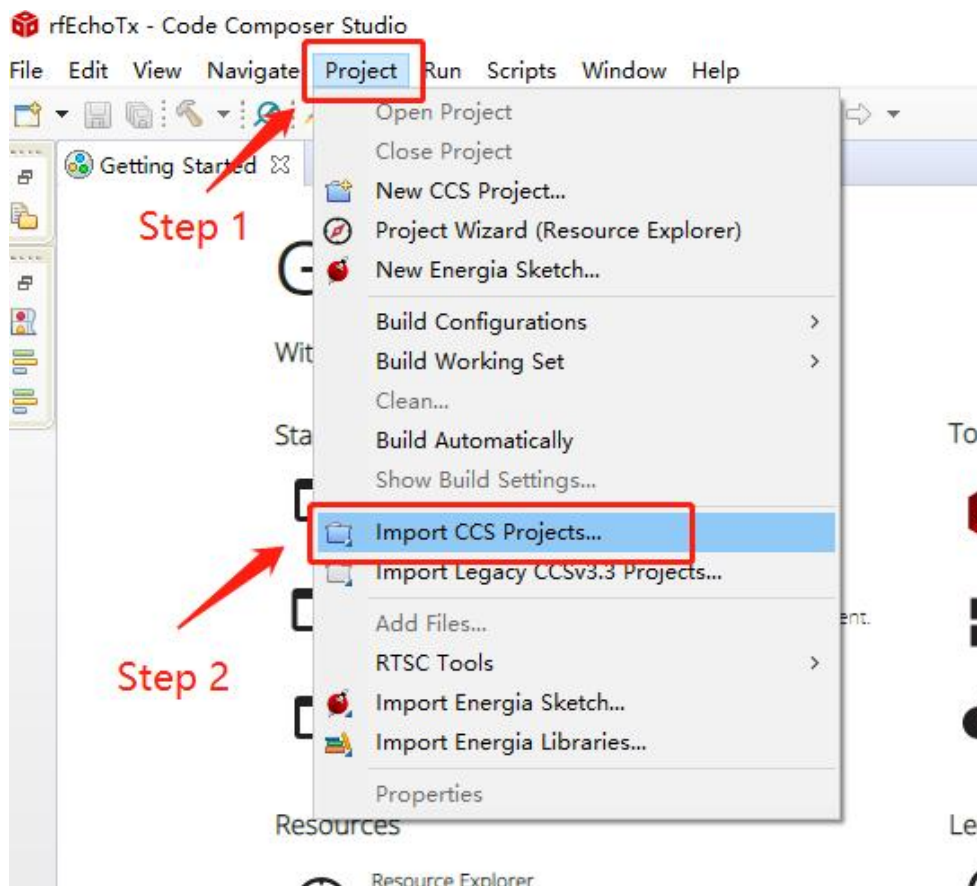


Figure30. Import CCS Projects

Step 3: Click "Browse" and find the following path to import the project:

C:\ti\simplelink\_cc13xx\_cc26xx\_sdk\_6\_10\_00\_29\examples\rtos\LP\_CC1311P3\prop\_rf\rfEchoTx\tirtos7\ccs

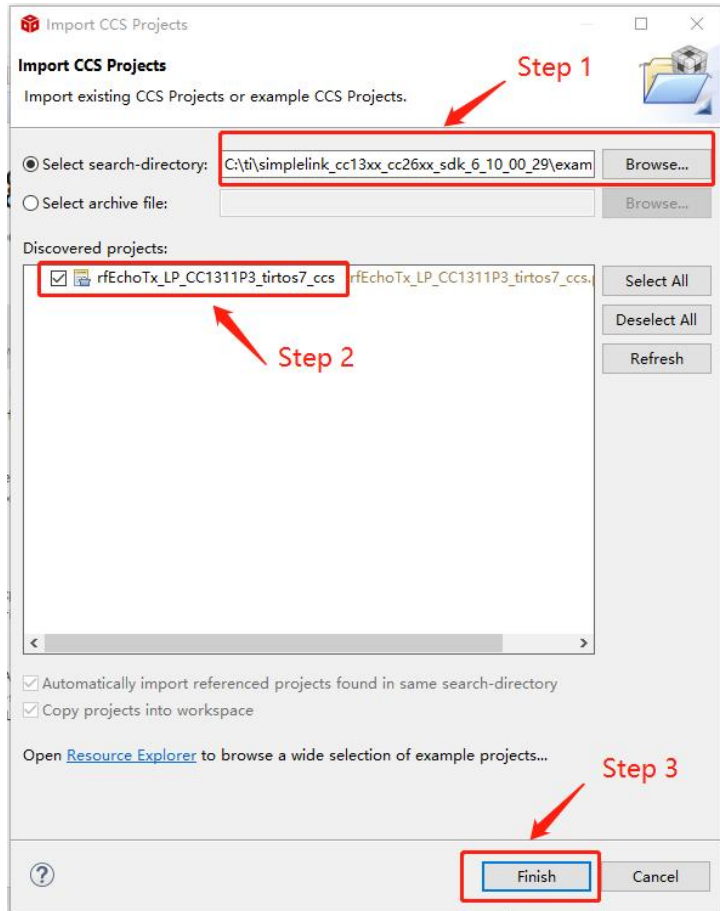


Figure31. Find the following path to import the project

Step 4: Click the "Build" icon to build the project

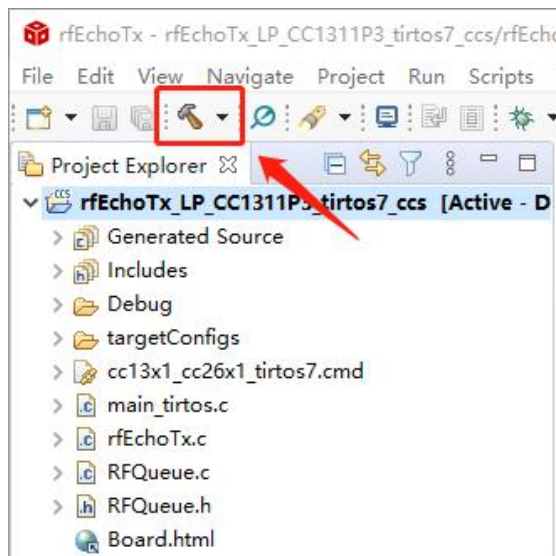


Figure32. Build project

Step 5: Click the “Debug” icon to download

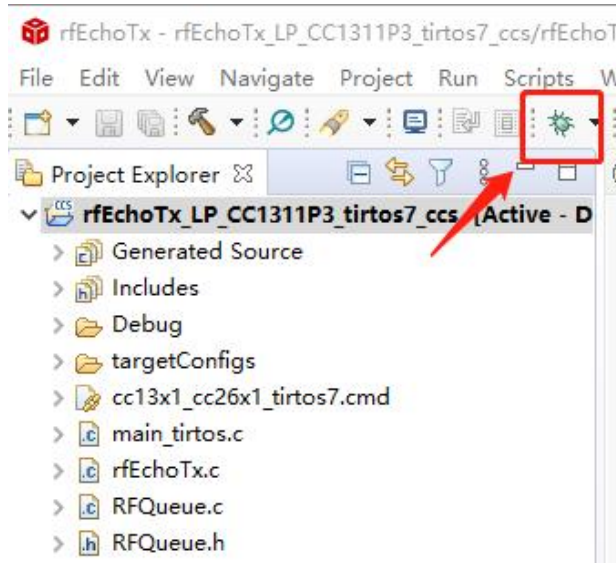


Figure33. Download

Step 6: Click on this option to start debugging

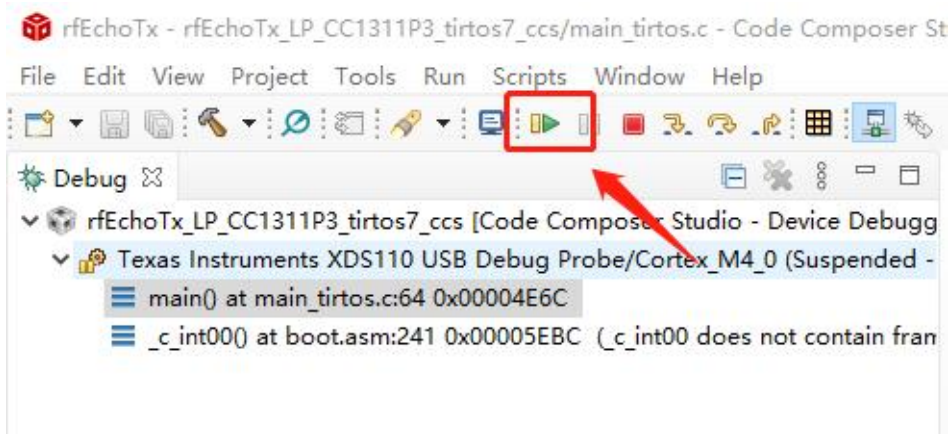


Figure34. start debugging

By far you should have built your first application successfully. Now you should build your second application and download in another module to communicate between the two modules.

For another module, refer to Step 1 to find the discovered items according to the following path:

C:\ti\simplelink\_cc13xx\_cc26xx\_sdk\_6\_10\_00\_29\examples\rtos\LP\_CC1311P3\prop\_rf\rfEchoRx\tirtos7\ccs

Follow steps 4 to 6 to complete the compilation and debug of the application.

You can see that the green LED and red LED in the first development board are flashing alternately, which indicates that the module is switching between TX and RX. The green LED means sending the data packet, and the red LED means not receiving the data packet from the other module.



Figure35. The module send the packet

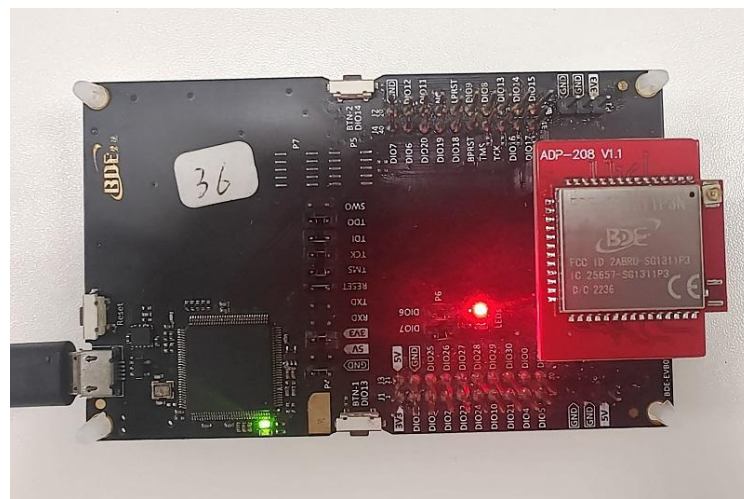


Figure36. The module did not receive the packet

The second module will not have any action on the two LEDs of the evaluation board when no packet is received. When a packet is received, the modules enables the red LED. Then the second module switches from RX state to TX state and sends the data it just received.

When the first module receives the data packet from the second module, it compares the data packet with the previously sent data packet, and if the received data packet is the same as the previously sent data packet, it enables the green light.

When the two modules are in communication state, the first module only enables the green LED and the second module only enables the red LED.



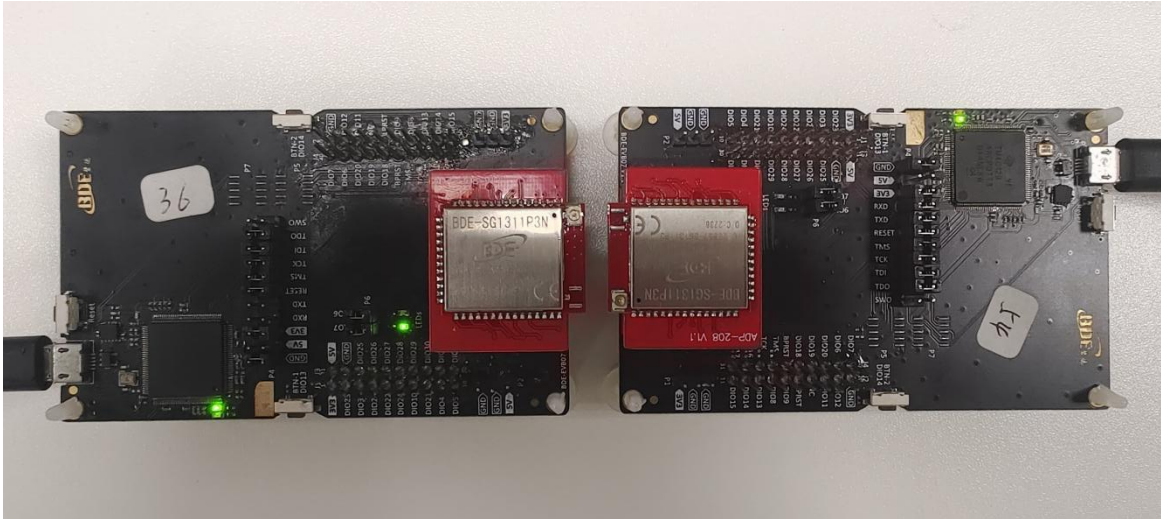


Figure37. The first module is in TX and the second module is in RX

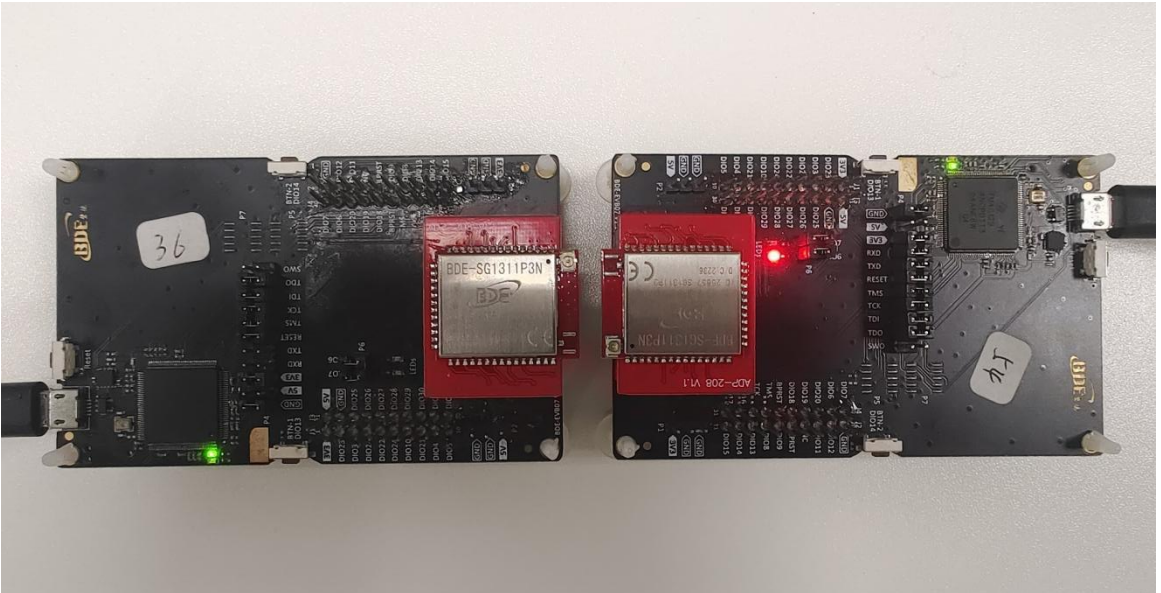


Figure38. The first module is in RX and the second module is in TX

#### 4. Modifications regarding the use of PA

The default HIGH PA and SUB 1 GHZ pin mappings in demo are different from those of the BDE-SG1311P3 module. If HIGH PA is used, the user need to modify the setting of the antenna switch.

In the following tables, Table 2 is the truth table about antenna switch settings in demo and Table 3 is the truth table about antenna switch settings in BDE-SG1311P3 module. The settings of HIGH PA and SUB 1 GHZ in the two truth tables are diametrically opposed.

Table 2. Truth table of demo

Path	DIO30	DIO29
OFF	0	0
HIGH PA	1	0
SUB 1 GHZ	0	1

Table 3. Truth table of BDE-SG1311P3 module

Path	DIO30	DIO29
OFF	0	0
HIGH PA	0	1
SUB 1 GHZ	1	0

If the default antenna switch setting is used, the actual transmitted power will be very low when PA function is turned on. To avoid this kind of situation, user can refer to the following code in the main program rewriting `rfDriverCallbackAntennaSwitching()` function. The prototype of the function is in `ti_drivers_config.c`.

```

void rfDriverCallbackAntennaSwitching(RF_Handle client, RF_GlobalEvent events, void *arg)
{
    if (events & RF_GlobalEventRadioSetup) {
        GPIO_setMux(CONFIG_RF_HIGH_PA, IOC_PORT_GPIO);
        GPIO_setMux(CONFIG_RF_SUB1GHZ, IOC_PORT_GPIO);
        /* Switch off all paths. */
        GPIO_write(CONFIG_RF_HIGH_PA, 0);
        GPIO_write(CONFIG_RF_SUB1GHZ, 0);
        /* Decode the current PA configuration. */
        RF_TxPowerTable_PAtype paType = (RF_TxPowerTable_PAtype)RF_getTxPower(client).paType;
        if (paType == RF_TxPowerTable_HighPA) {
            /* - High PA --> HIGH PA
             * - LNA enable --> Sub-1 GHz */
            GPIO_setMux(CONFIG_RF_HIGH_PA, IOC_PORT_RFC_GPO0);
            GPIO_setMux(CONFIG_RF_SUB1GHZ, IOC_PORT_RFC_GPO3);
        } else {
            /* RF Core active --> Sub-1 GHz */
            GPIO_setMux(CONFIG_RF_HIGH_PA, IOC_PORT_GPIO);
            GPIO_setMux(CONFIG_RF_SUB1GHZ, IOC_PORT_GPIO);
            GPIO_write(CONFIG_RF_HIGH_PA, 1);
        }
    }
    else if (events & RF_GlobalEventRadioPowerDown) {
        /* Switch off all paths. */
        GPIO_write(CONFIG_RF_HIGH_PA, 0);
        GPIO_write(CONFIG_RF_SUB1GHZ, 0);
        /* Reset the IO multiplexer to GPIO functionality */
        GPIO_setMux(CONFIG_RF_HIGH_PA, IOC_PORT_GPIO);
        GPIO_setMux(CONFIG_RF_SUB1GHZ, IOC_PORT_GPIO);
    }
}

```



By far you should have successfully implemented communication between the two modules.

For further development, please check out the [CC1311P3 data sheet, product information and support | TI.com](#) page and download the User guide (<https://www.ti.com/lit/ug/swcu191f>)

## Other Resources

[Mac OS Installer for SimpleLink CC13XX 26XX SDK](#)

[Linux Installer for SimpleLink CC13XX 26XX SDK](#)

[Mac OS Installer for Code Composer Studio IDE](#)

[Linux Installer for Code Composer Studio IDE](#)

[CC1311P3 SimpleLink™ High-Performance Sub-1 GHz Wireless MCU With Integrated Power Amplifier](#)

[Windows Installer for SmartRF Flash Programmer 2](#)

## Revision History

Revision	Date	Description
V1.0	21-Nov-2022	Initial Released

## More Questions:

Please search existing answers on [TI E2E support forums](#)

Contact your local TI sales representative.

Or

Contact BDE Technology, Inc.

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Website: <http://www.bdecomm.com/> Email: [info@bdecomm.com](mailto:info@bdecomm.com)