

BDE-RFM216 Low Power Long Range Sub-1 GHz Module User Guide

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Low Power, Long Range Sub-1 GHz Module BDE-RFM216-IN USER GUIDE

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Introduction

This user guide is for BDE-RFM216-IN, a Wireless Module based on TI CC1312R. It is a quick start guide for how to connect the module with the evaluation board BDE-EVB07 or with the TI Launchpad, and how to build the first application. It also shows a demo for how BDERFM216-IN receives a data packet that is sent from another BDE-RFM216-IN.

Get Ready

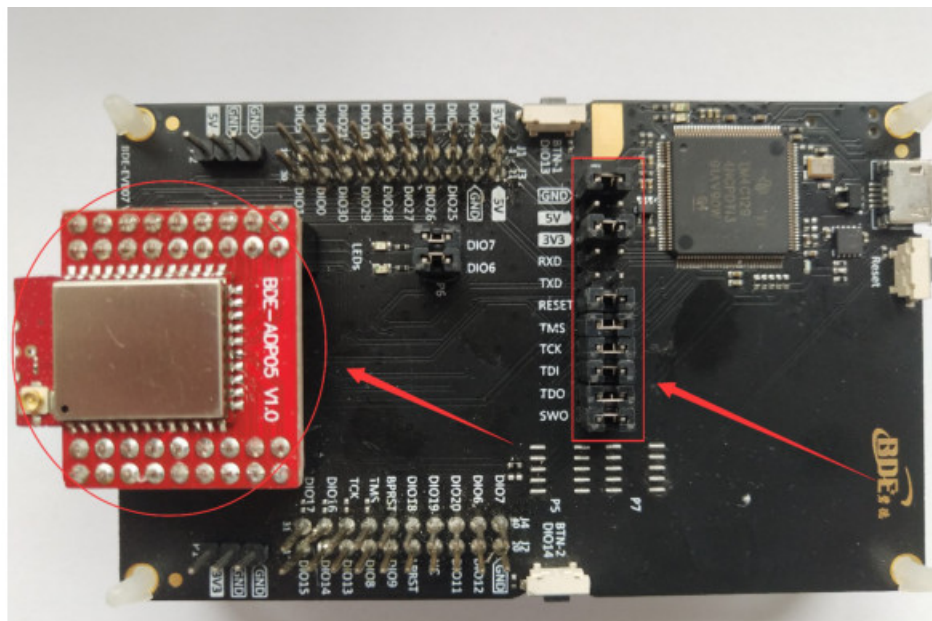
The following tools are recommended to develop with BDE-RFM216-IN.
Hardware tools:

- ## Software tools:

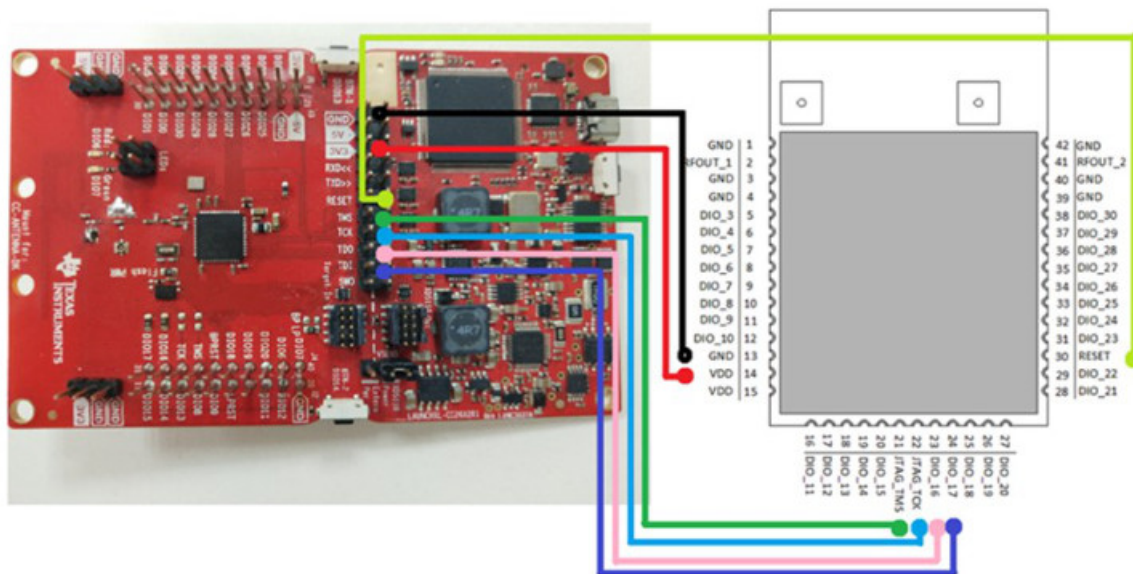
- ## Build Your First Application

A. Connect the Hardware

Use a USB cable to connect EVB07 and PC or laptop. Plug BDE-RFM216-IN with the adaptor board into the dev board and connect all the pins with Jumpers as the following picture shows.



The connection is as follows.



Connection Designator	BDE-RFM216-IN	LaunchPad Pin
3V3 Power	VDD	3V3
Ground	GND	GND
RST	RST	RESET
TMS	TMS	TMS
TCK	TCK	TCK
TDO	DIO16	TDO
TDI	DIO17	TDI

Optional: TDO TDI RXD TXD

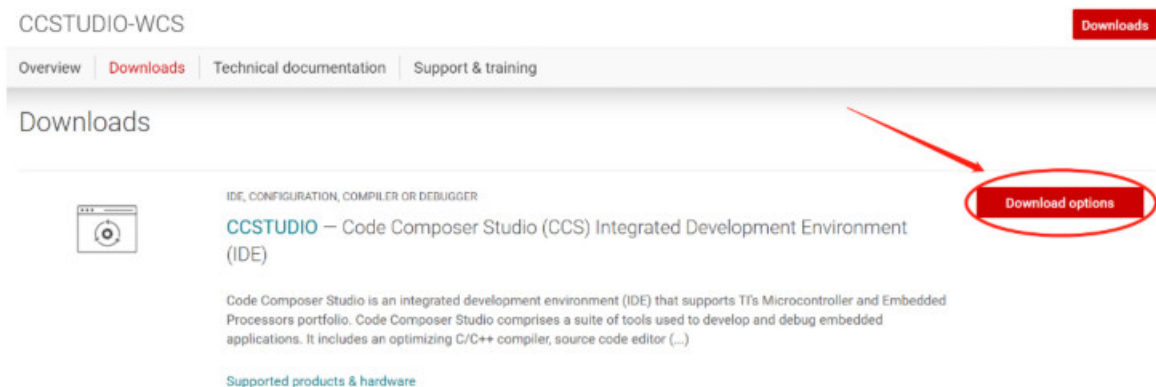
B. Build the Application

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

1. Click on this option



2. Select an option to download CCS

Download options



Code Composer Studio (CCS) Integrated Development Environment (IDE)

Version: 10.3.0.00007

Release date: 05 Apr 2021

SINGLE FILE INSTALLERS

↓ [Windows single file installer for CCS IDE \(1181753652 KB\)](#)

↓ [Linux single file installer for CCS IDE \(1102001729 KB\)](#)

↓ [macOS single file installer for CCS IDE \(1083552986 KB\)](#)

ON-DEMAND INSTALLERS

↓ [Windows on-demand installer for CCS IDE \(40136960 KB\)](#)

↓ [Linux on-demand installer for CCS IDE \(25338386 KB\)](#)

↓ [macOS on-demand installer for CCS IDE \(24595266 KB\)](#)

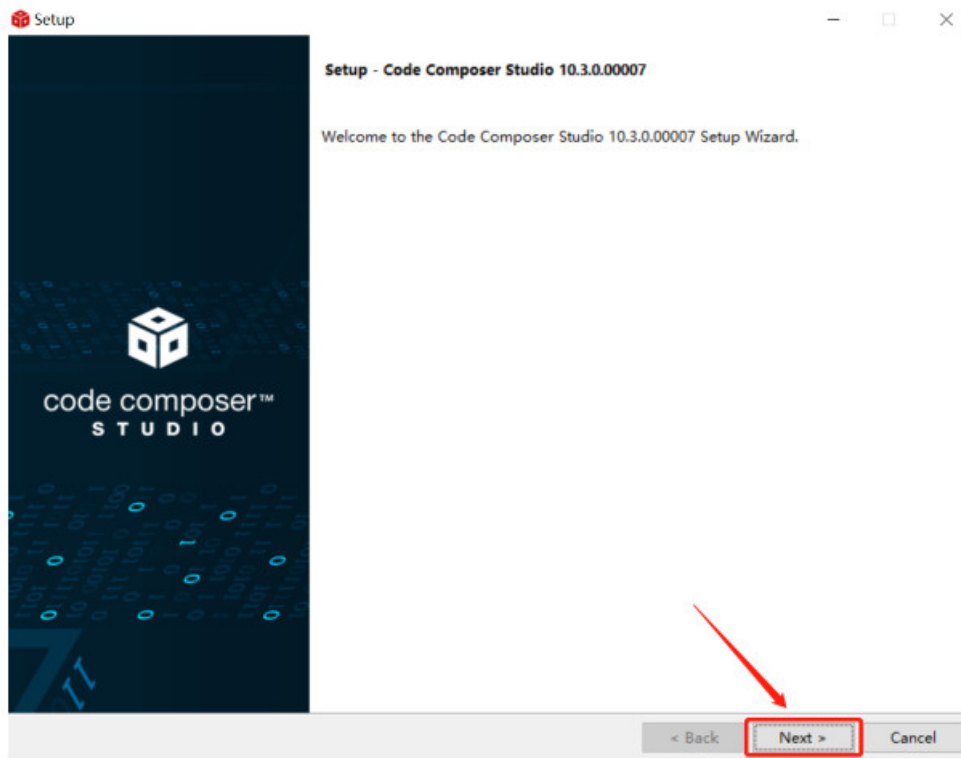
3. Unzip the package to a local disc

CCS10.3.0.00007_win64.zip	2021/4/19 11:11	WinRAR ZIP
CCS10.3.0.00007_win64	2021/4/20 11:36	文件夹

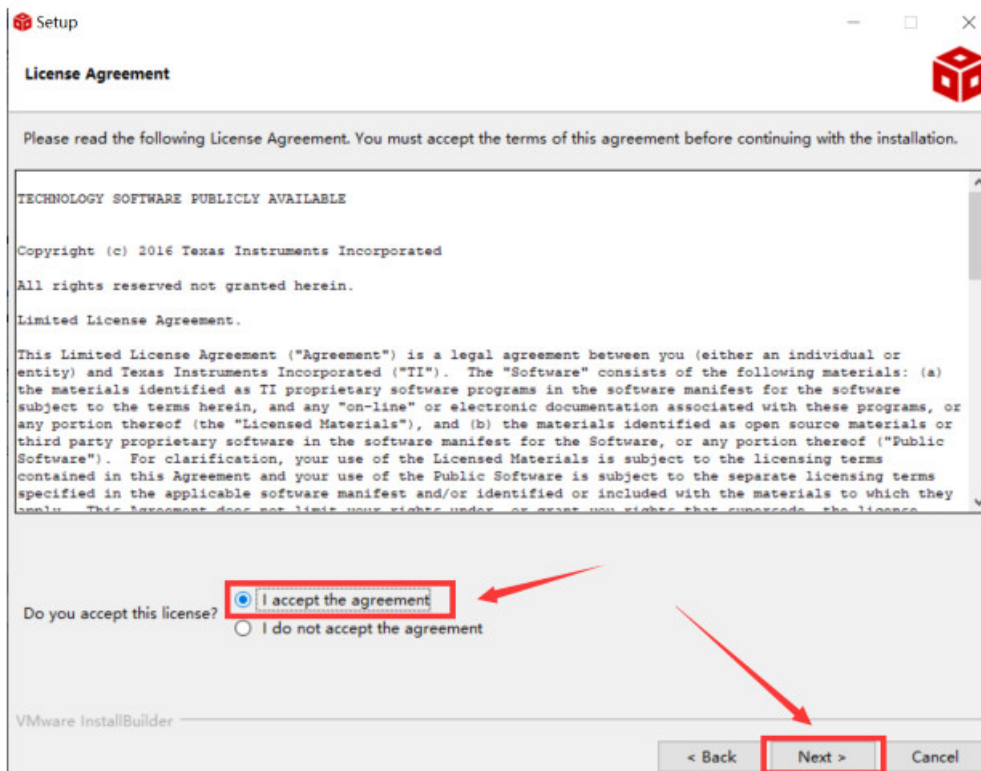
4. Click the setup of CCS

binary	2021/3/29 21:38
CCS10.3.0.00007_win64	2021/4/19 11:23
components	2021/3/29 21:38
features	2021/3/29 21:38
artifacts.jar	2021/3/29 21:38
ccs_setup_10.3.0.00007.exe	2021/3/29 21:37
content.jar	2021/3/29 21:38
README_FIRST_win64.txt	2021/3/29 21:38
timestamp.txt	2021/3/29 21:38

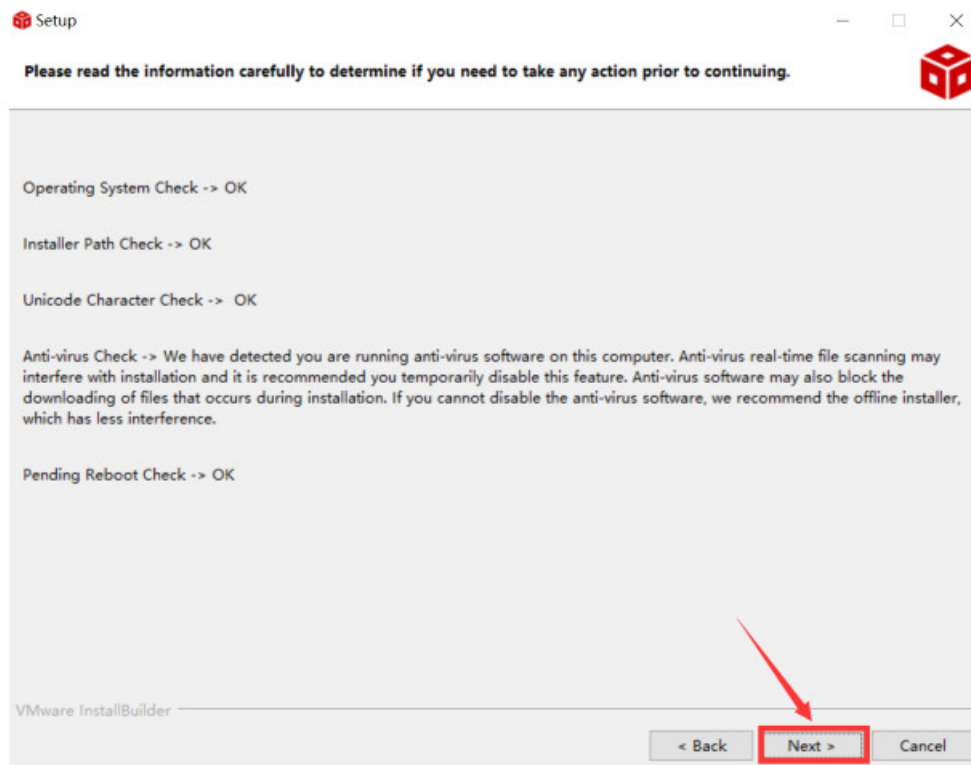
5. Click "Next"



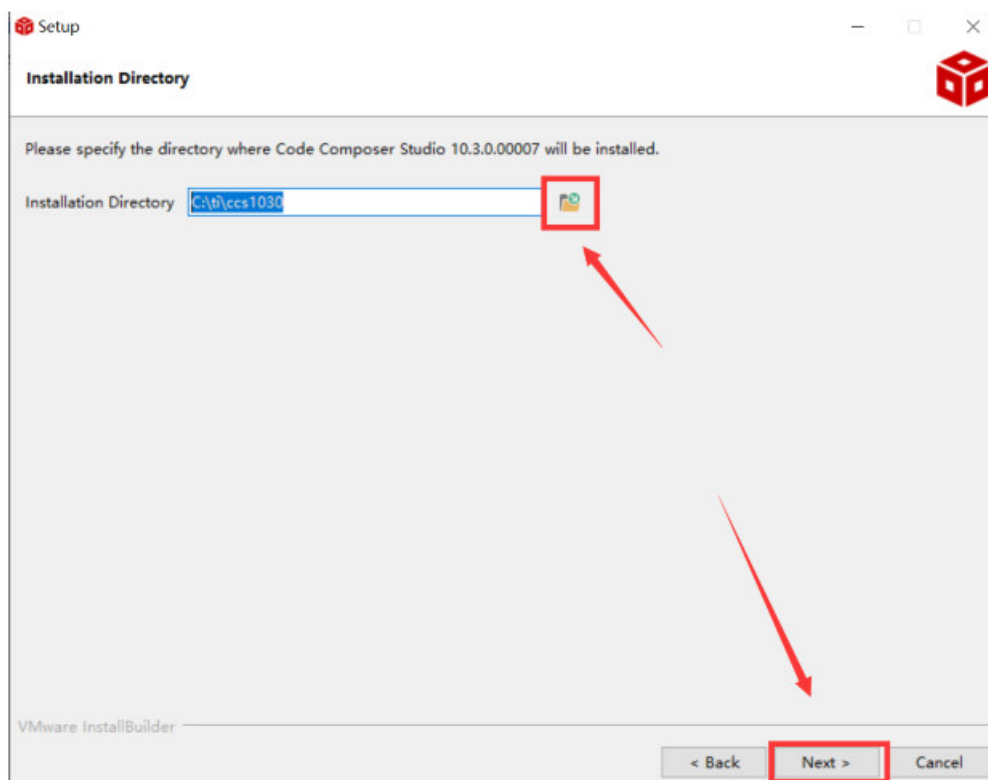
6. Select the default option



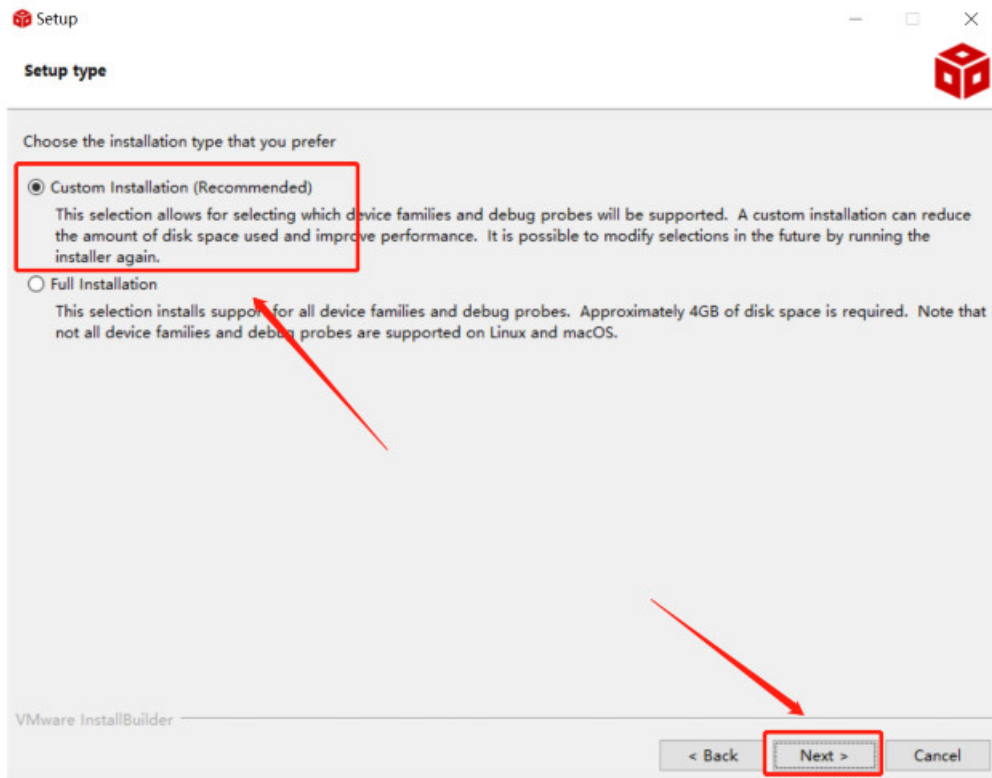
7. Click "Next"



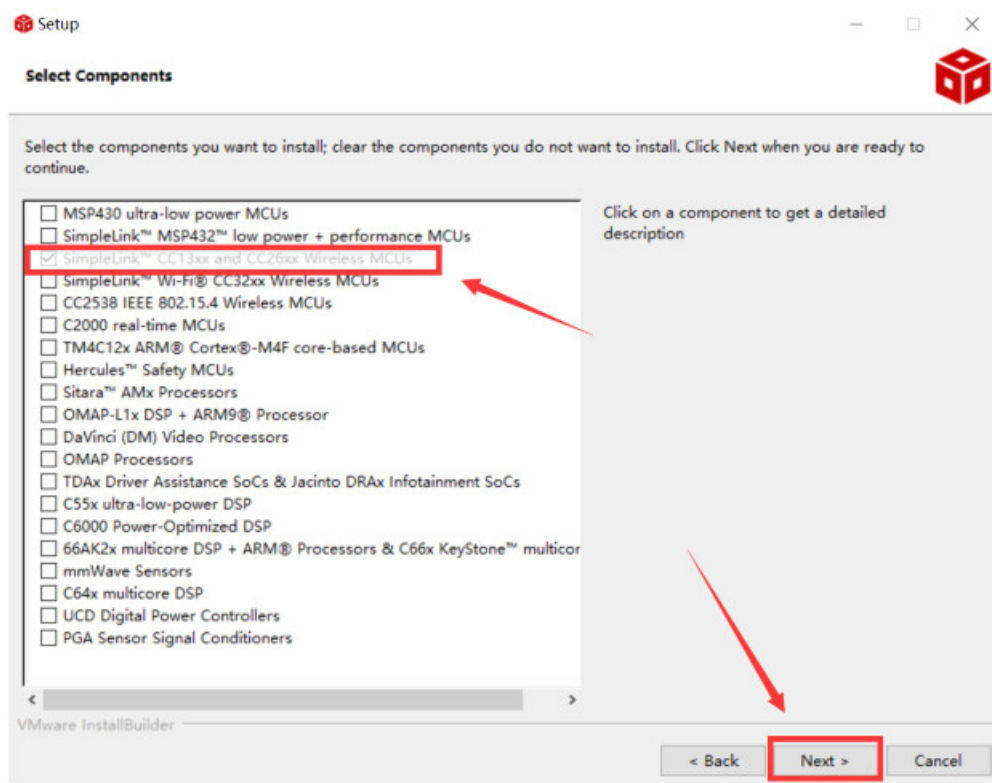
8. Select the Installation Directory



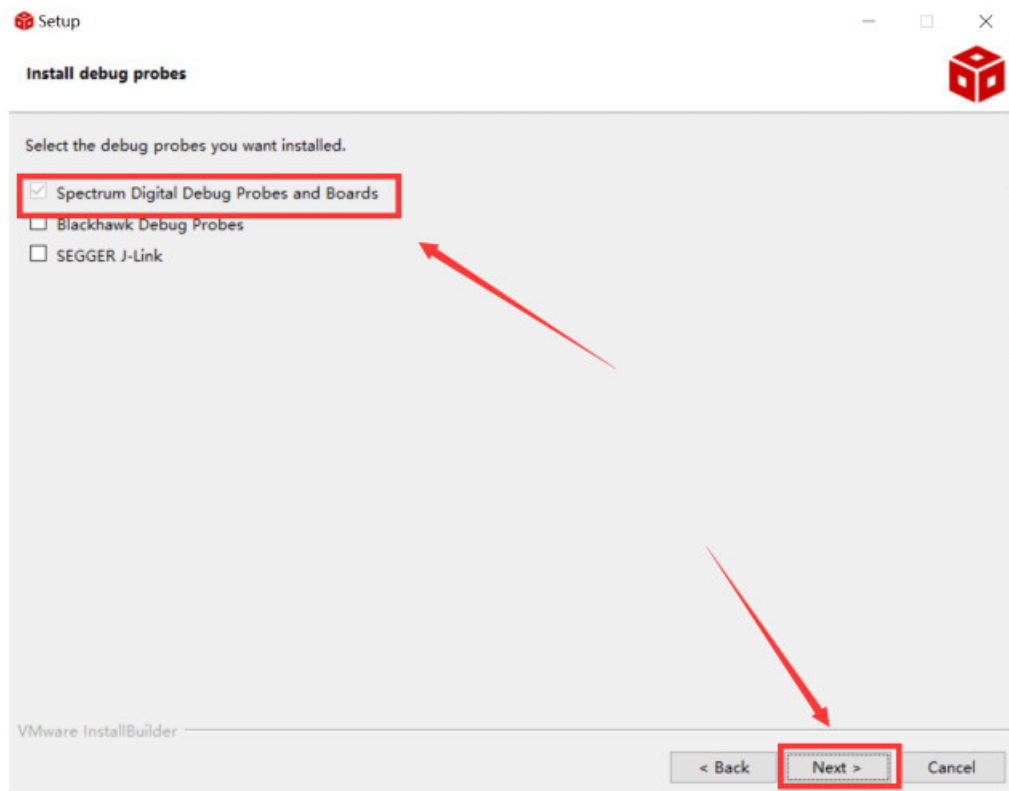
9. Select the default option



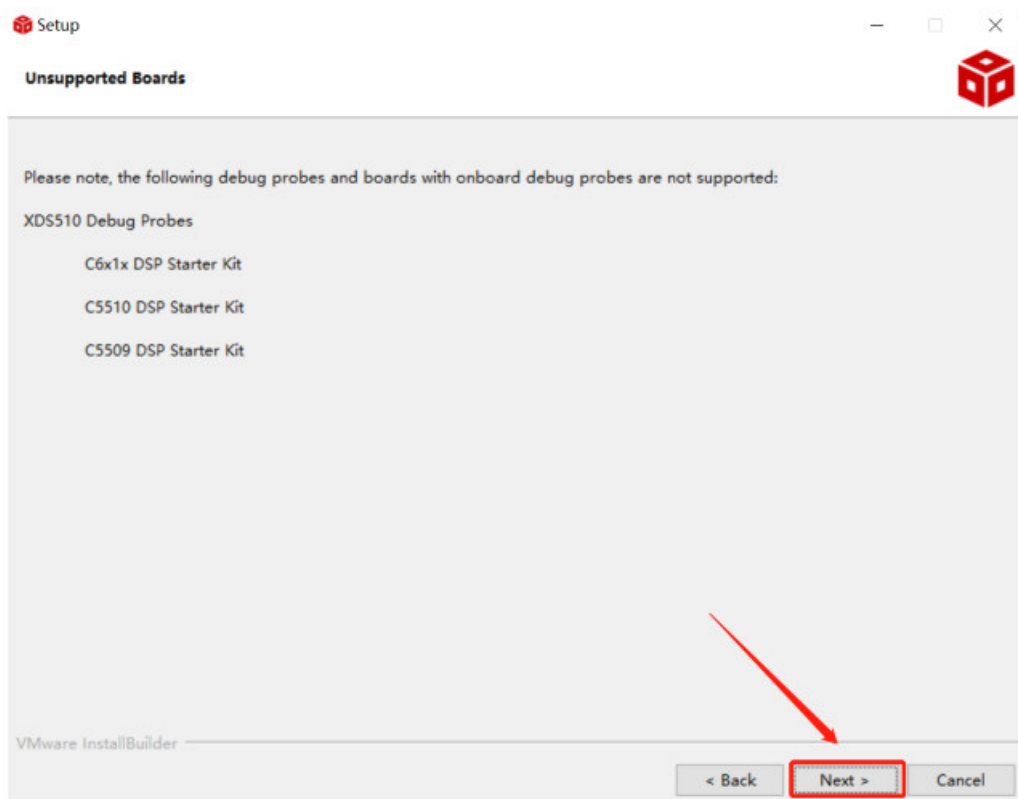
10. Select the component



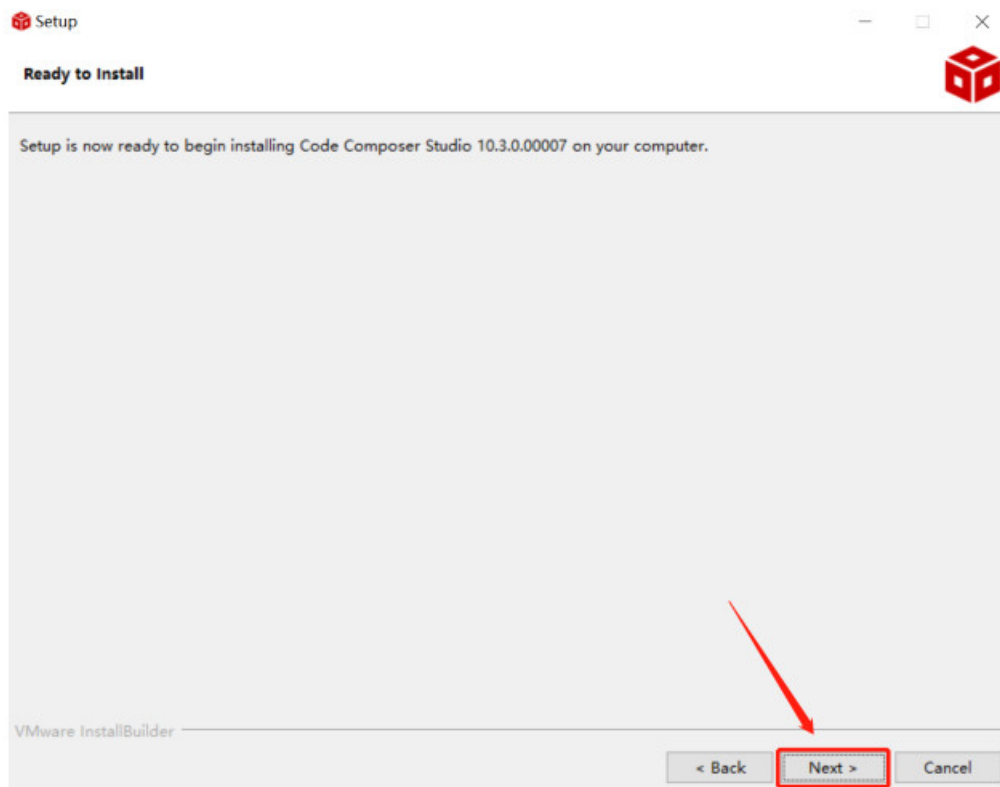
11. Select the default option



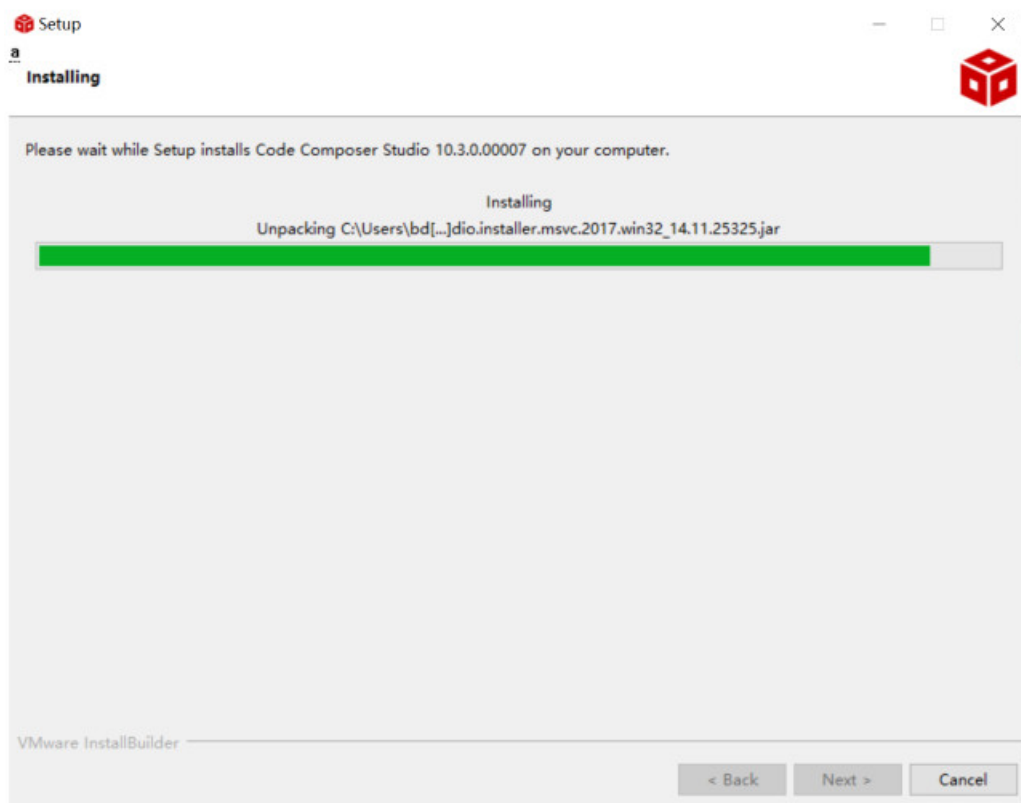
12. Click "Next"



13. Click "Next"



14. Waiting for installation to complete




■ Software Development Kit (SDK) installation

1. Click on this option

SIMPLELINK-CC13X2-26X2-SDK Download


Overview **Downloads** Technical documentation Related design resources Support & training

Primary software Supported products & hardware



SOFTWARE DEVELOPMENT KIT (SDK)
SIMPLELINK-CC13X2-26X2-SDK – SimpleLink™ CC13x2 and CC26x2 software development kit
[Supported products & hardware](#)

Download options
[Subscribe to alerts](#)



SOFTWARE DEVELOPMENT KIT (SDK)
SIMPLELINK-CC13X2-26X2-SDK-CLOUD – SimpleLink™ CC13x2 and CC26x2 software development kit cloud development on TI Resource Explorer
Start evaluation

2. Select an option you need to download SDK


Download options ×


SOFTWARE DEVELOPMENT KIT (SDK)


SIMPLELINK-CC13X2-26X2-SDK
SimpleLink™ CC13x2 and CC26x2 software development kit

Version: 5.10.00.48
Release date: 14 Apr 2021

SIMPLELINK SDK INSTALLERS

 **Windows Installer for Simplelink CC13X2 26X2 SDK (839629528 KB)**

 Mac OS Installer for SimpleLink CC13X2 26X2 SDK (896984089 KB)

 Linux Installer for SimpleLink CC13X2 26X2 SDK (824512748 KB)

EXPLORE IN THE CLOUD

3. Log in to your TI account, if you are a new user, register a TI account first

myTI account

[myTI FAQ](#)

Existing myTI user?

Your email address

Your myTI password

☒ Remember me

Login

[Forgot your password?](#)

By logging in, you agree to
[TI's Terms of use & Privacy policy.](#)

4. Select "civil" if your application is for civil use

ort

ll

e will
d 1-

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

I certify that the following is true:

5. Select "Yes" and submit

compliance with any such import, use, or export restrictions.

- 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

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.

Download

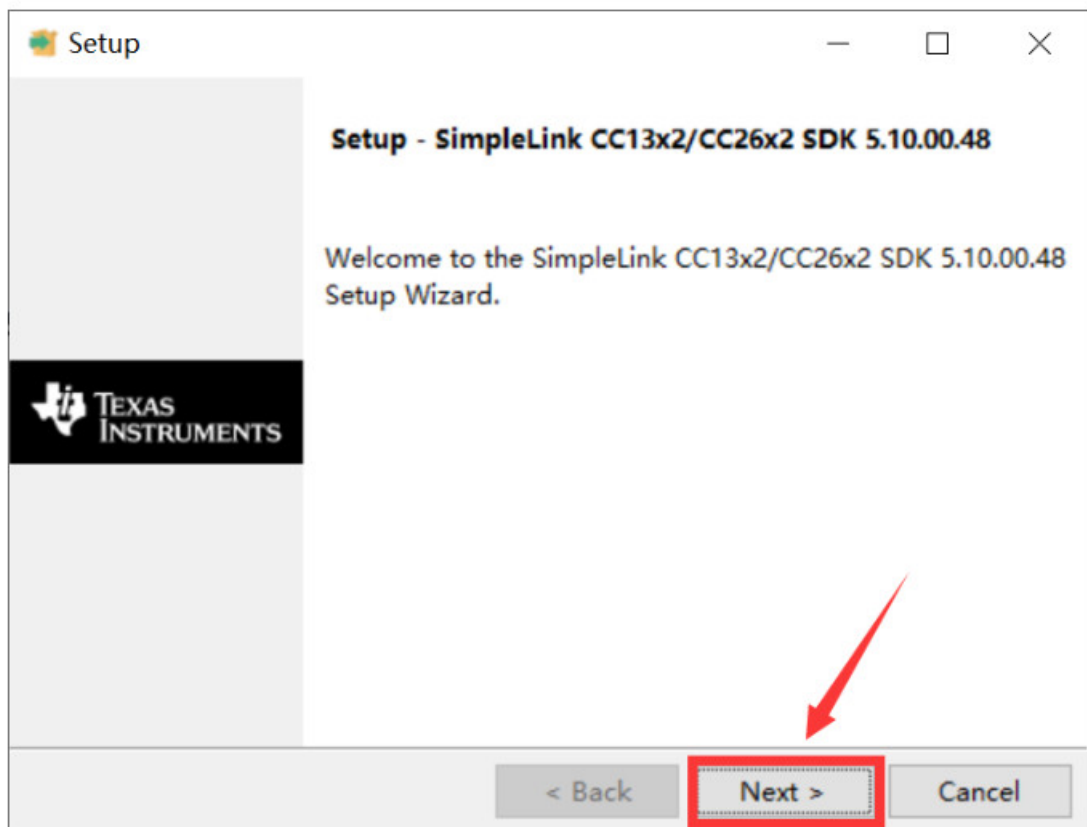
Having trouble downloading? Try www.ti.com/software-help

Thank you,
Texas Instruments

7. Installation

 simplelink_cc13x2_26x2_sdk_5_10_00_48.exe 2021/4/19 15:11

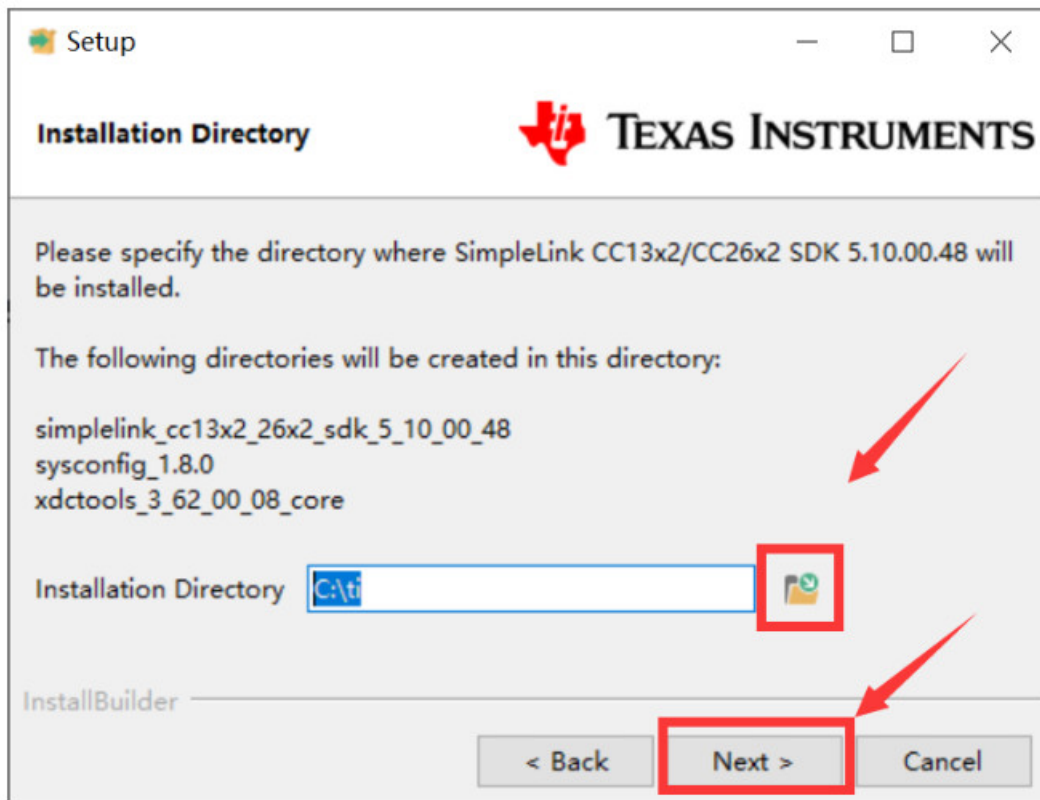
8. Click "Next"



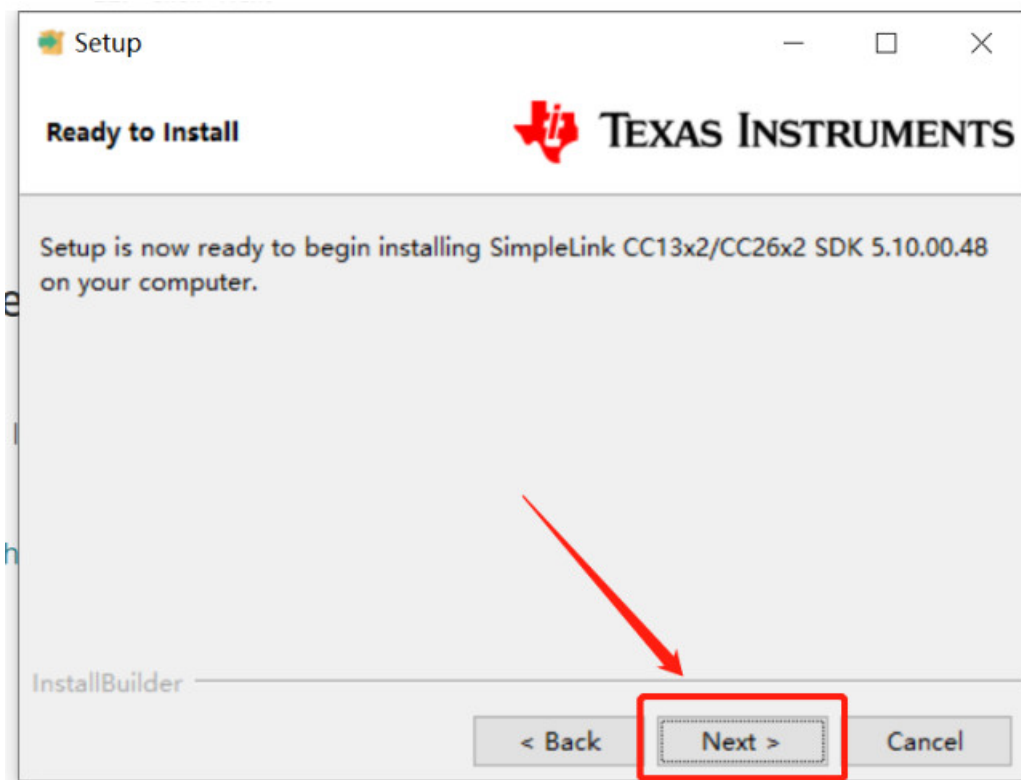
9. Select the default option



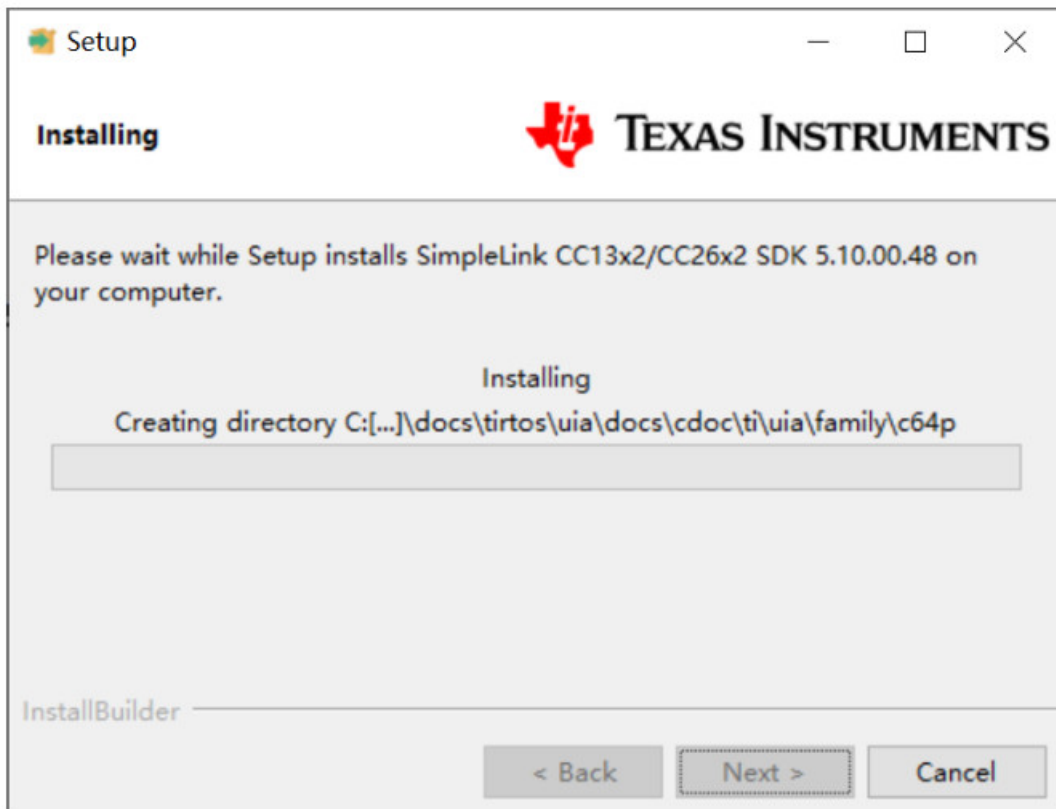
10. Select the Installation directory



11. Click "Next"

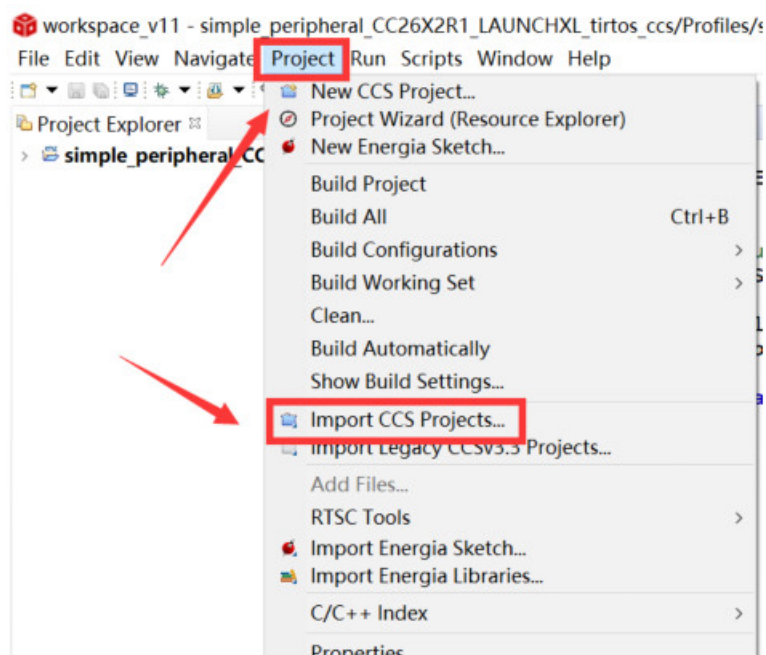


12. Waiting for installation to complete



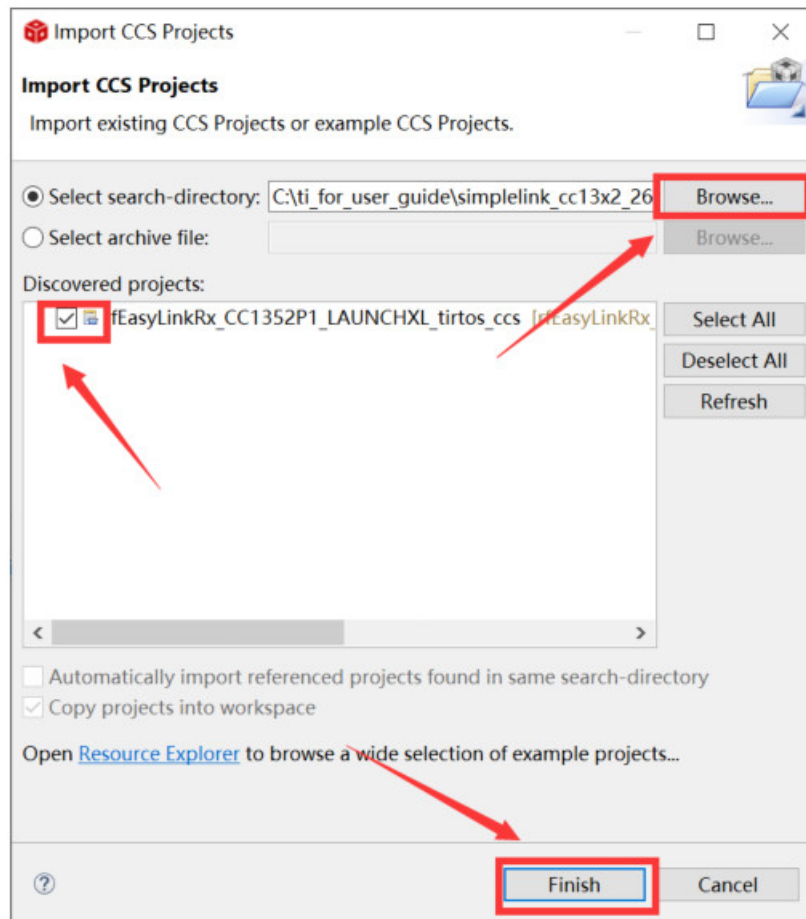
■Run an example/demo code

1. For the first module, find the option named “Import CCS project...”

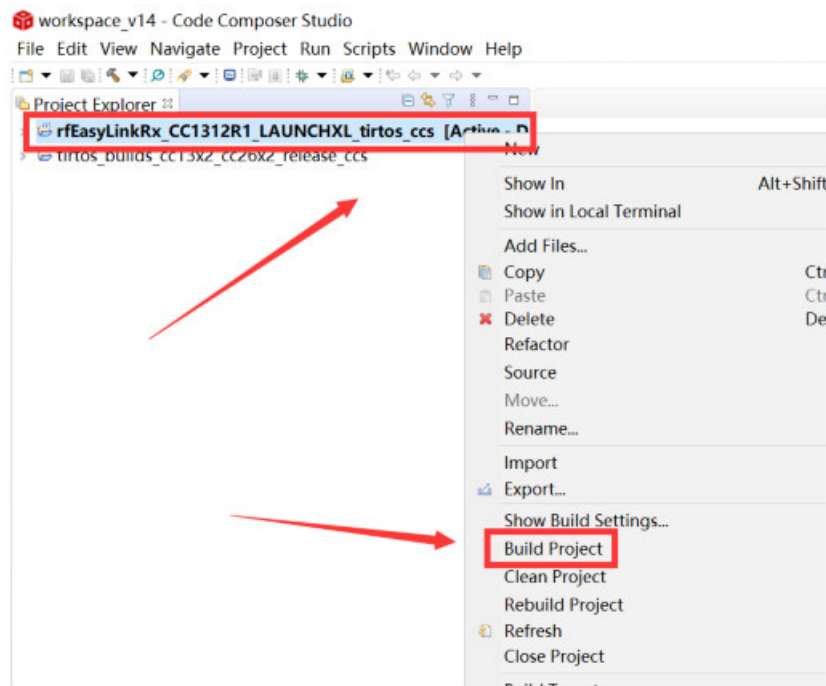


2. According to the following path to find the sending end project:

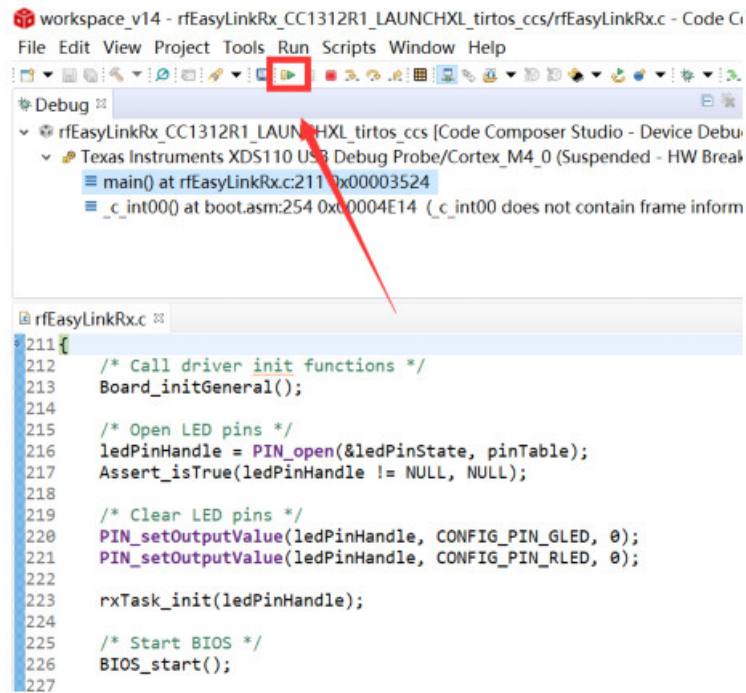
ti\simplelink_cc13x2_26x2_sdk_5_10_00_48\examples\rtos\CC1312R1_LAUNCHXL\easylink\rfEasyLinkRx\tirtos\ccs.



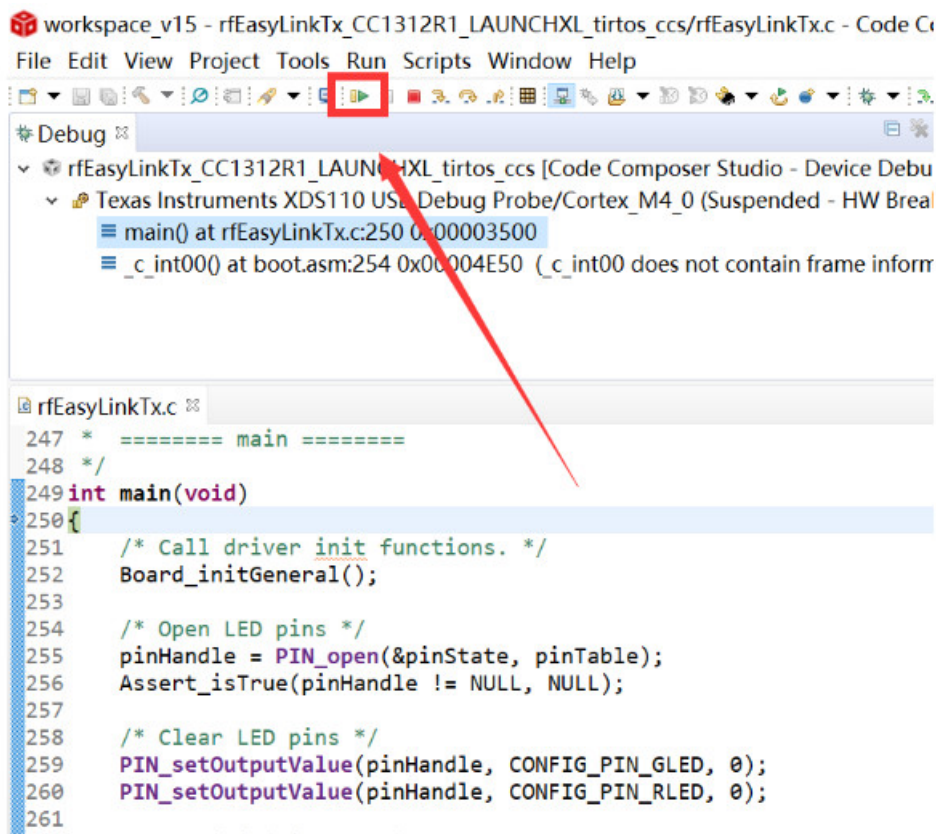
3. Right-Click the project to build the receiving end project



4. Click this bug icon (means download and debugging)



5. Click on this option to start debugging



6. Find the file which is named "rfEasyLinkRx.c" and the function which is named "rxDoneCb", and set a breakpoint at the line as the arrows show

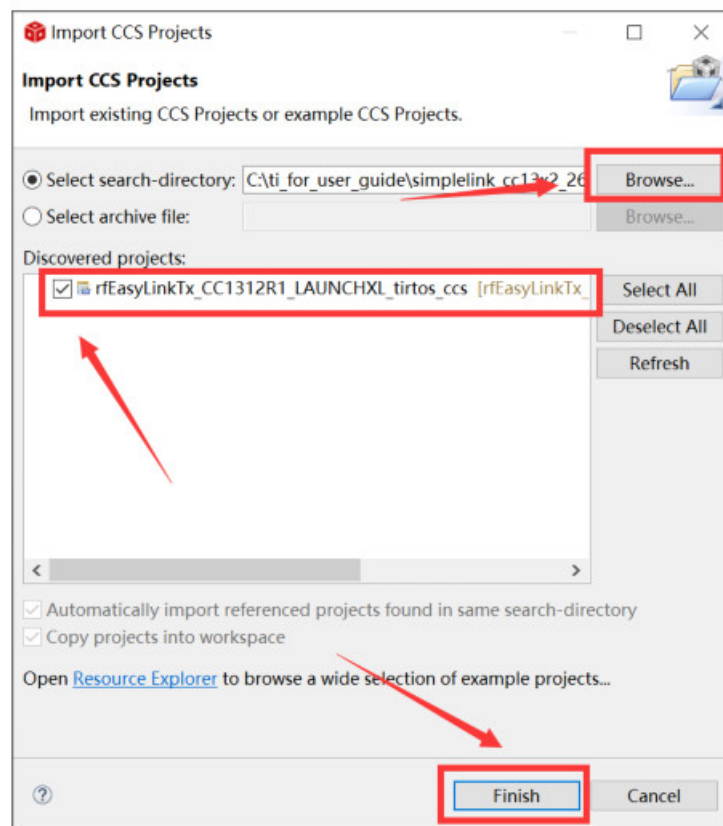
```

workspace_v14 - rfEasyLinkRx_CC1312R1_LAUNCHXL_tirtos_ccs/rfEasyLinkRx.c - Code Composer Studio
File Edit View Project Tools Run Scripts Window Help
Debug
  rfEasyLinkRx_CC1312R1_LAUNCHXL_tirtos_ccs [Code Composer Studio - Device Debugging]
    Texas Instruments XDS110 USB Debug Probe/Cortex_M4_0 (Running)
  Variables
    Name

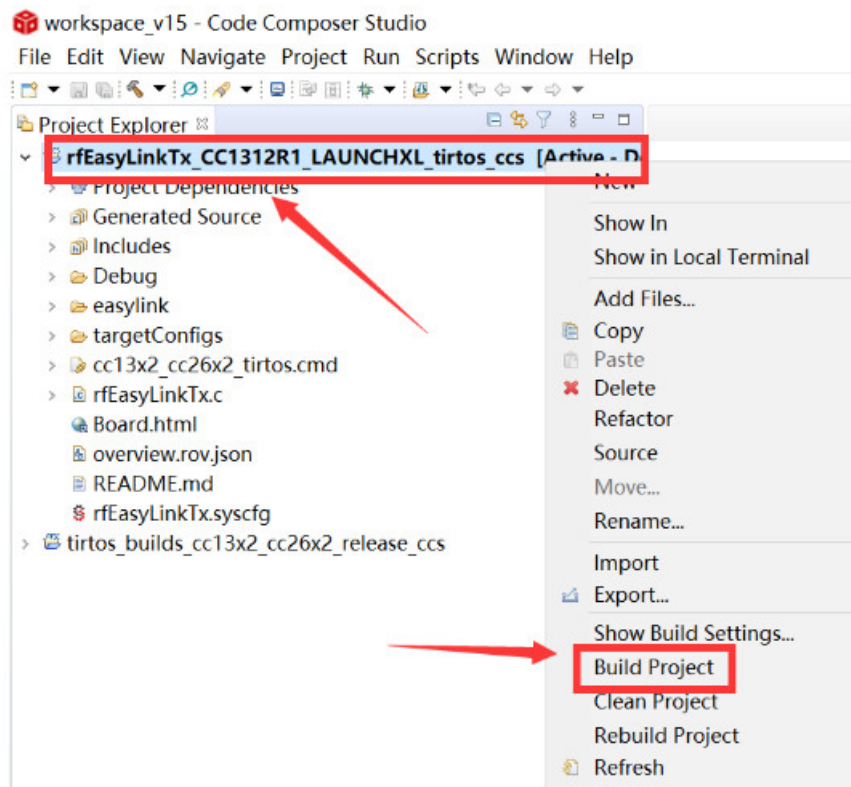
rfEasyLinkRx.c
95/**** Function definitions ****/
94#ifdef RFEASYLINKRX_ASYNC
95void rxDoneCb(EasyLink_RxPacket * rxPacket, EasyLink_Status status)
96{
97    if (status == EasyLink_Status_Success)
98    {
99        /* Toggle RLED to indicate RX */
100        PIN_setOutputValue(pinHandle, CONFIG_PIN_RLED, !PIN_getOutputValue(CONFIG_PIN_RLED))
101    }
102    else if(status == EasyLink_Status_Aborted)
103    {
104        /* Toggle GLED to indicate command aborted */
105        PIN_setOutputValue(pinHandle, CONFIG_PIN_GLED, !PIN_getOutputValue(CONFIG_PIN_GLED))
106    }
107    else
108    {
109        /* Toggle GLED and RLED to indicate error */
110        PIN_setOutputValue(pinHandle, CONFIG_PIN_GLED, !PIN_getOutputValue(CONFIG_PIN_GLED))
111        PIN_setOutputValue(pinHandle, CONFIG_PIN_RLED, !PIN_getOutputValue(CONFIG_PIN_RLED))
112    }
113    Semaphore_post(rxDoneSem);
114}

```

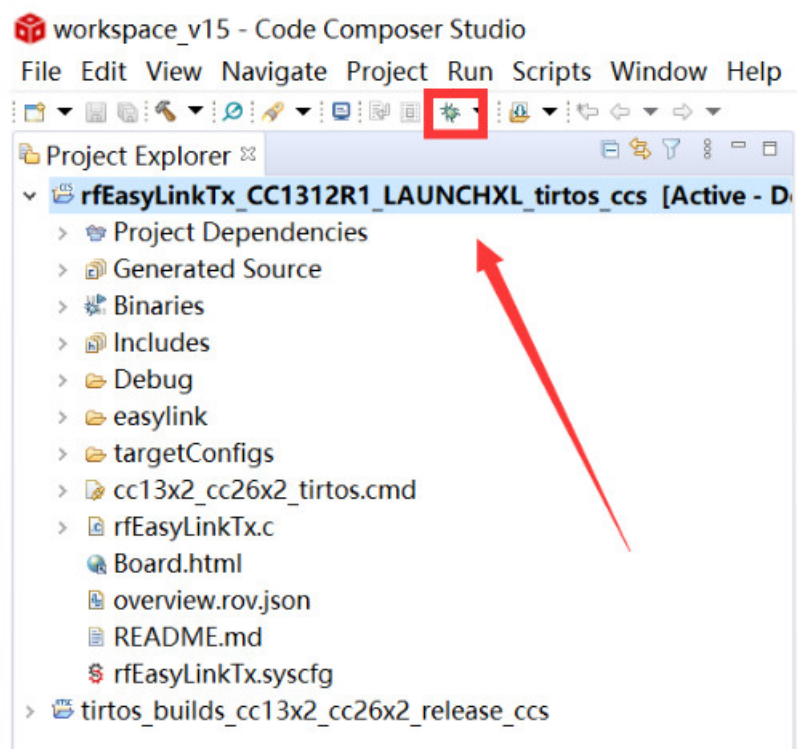
7. For another module, according to the following path to find the sending end project:
 ti\simplelink_cc13x2_26x2_sdk_5_10_00_48\examples\rtos\CC1312R1_LAUNCHXL\easylink\
 rfEasyLinkTx\tirtos\ccs



8. Right Click the project to build the sending end project



9. Click this bug icon (means download and debugging)



10. Click on this option to start debugging

workspace_v15 - rfEasyLinkTx_CC1312R1_LAUNCHXL_tirtos_ccs/rfEasyLinkTx.c - Code Composer Studio

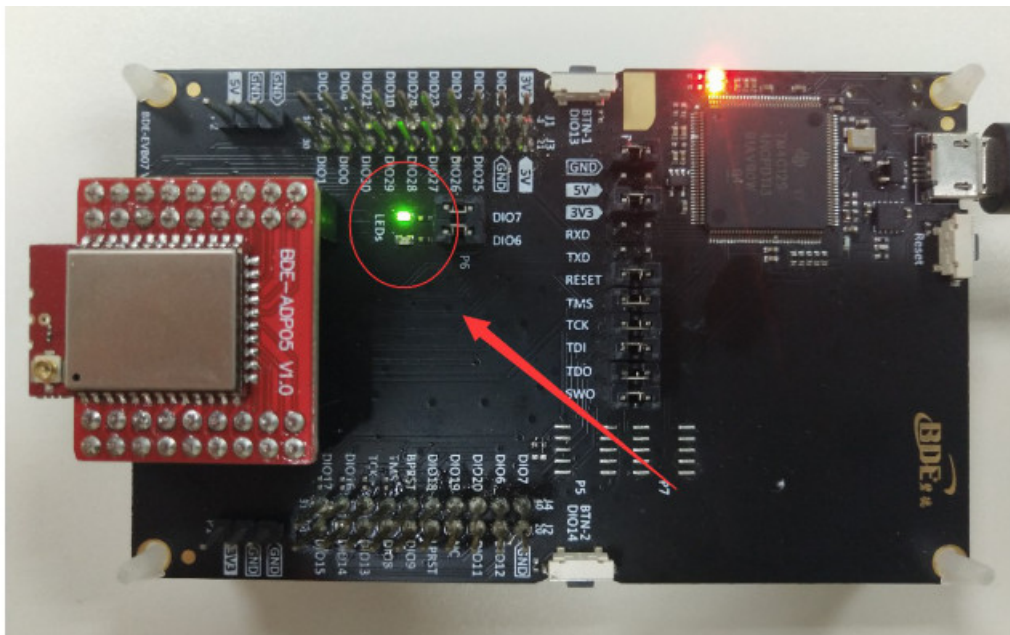
File Edit View Project Tools Run Scripts Window Help

Debug

- rfEasyLinkTx_CC1312R1_LAUNCHXL_tirtos_ccs [Code Composer Studio - Device Debug]
- Texas Instruments XDS110 USB Debug Probe/Cortex_M4_0 (Suspended - HW Breakpoint)
- main() at rfEasyLinkTx.c:250 0x00003500
- _c_int00() at boot.asm:254 0x00004E50 (_c_int00 does not contain frame information)

```
247 * ===== main =====
248 */
249 int main(void)
250 {
251     /* Call driver init functions. */
252     Board_initGeneral();
253
254     /* Open LED pins */
255     pinHandle = PIN_open(&pinState, pinTable);
256     Assert_isTrue(pinHandle != NULL, NULL);
257
258     /* Clear LED pins */
259     PIN_setOutputValue(pinHandle, CONFIG_PIN_GLED, 0);
260     PIN_setOutputValue(pinHandle, CONFIG_PIN_RLED, 0);
261     . . . . .
```

11. You can see the lights flashing (which means sending data uninterruptedly)



12. The program stops at the breakpoint


```
workspace_v14 - rfEasyLinkRx_CC1312R1_LAUNCHXL_tirtos_ccs/rfEasyLi
File Edit View Project Tools Run Scripts Window Help
Debug
  rxDoneCb(struct <unnamed> *, int)() at rfEasyLinkRx.c:100 0x000
  rxDoneCallback(struct RF_ObjectMultiMode *, int, unsigned long)
rfEasyLinkRx.c
92
93 /***** Function definitions *****/
94 #ifdef RFEASYLINKRX_ASYNC
95 void rxDoneCb(EasyLink_RxPacket * rxPacket, EasyLink_St
96 {
97     if (status == EasyLink_Status_Success)
98     {
99         /* Toggle RLED to indicate RX */
100         PIN_setOutputValue(pinHandle, CONFIG_PIN_RLED, 1
101     }
102     else if(status == EasyLink_Status_Aborted)
103     {
104         /* Toggle GLED to indicate command aborted */
105         PIN_setOutputValue(pinHandle, CONFIG_PIN_GLED, 1
106     }
107     else
108     {
109         /* Toggle GLED and RLED to indicate error */
110         PIN_setOutputValue(pinHandle, CONFIG_PIN_GLED, 1
```

By far you should've built your first application successfully.

For further development, please check out the CC1312R datasheet, product information and support | TI.com page and download the User Guide (<https://www.ti.com/lit/pdf/swcu185>)

Other Resources

Mac OS Installer for SimpleLink CC13X2 26X2 SDK

Linux Installer for SimpleLink CC13X2 26X2 SDK

Mac OS Installer for Code Composer Studio IDE

Linux Installer for Code Composer Studio IDE

CC1312R SimpleLink™ High-Performance Sub-1 GHz Wireless MCU

Windows Installer for SmartRF Flash Programmer 2

Revision History

Revision	Date	Description
V1.0	5-Apr-2019	Initial Release
V2.0	14-Apr-2021	Changed template

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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BDE Technology Inc.

Documents / Resources

	<p>BDE BDE-RFM216 Low Power Long Range Sub-1 GHz Module [pdf] User Guide BDE-RFM216, Low Power Long Range Sub-1 GHz Module</p>
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