

BDE-RFM204 USER GUIDE

Introduction

This user guide is for BDE-RFM204, a Wireless Module based on TI CC1310. 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 BDE-RFM204 receives a data packet that is sent from another BDE-RFM204.

Get Ready

The following tools are recommended to develop with BDE-RFM204.

Hardware tools:

- Two modules of BDE-RFM204([BDE-RFM204-915-BDE Technology Inc. \(bdecomm.com\)](#)
[BDE-RFM204-868-BDE Technology Inc. \(bdecomm.com\)](#))
- Two BDE-ADP203D V1.0 (adaptor board)
- PC or Laptop
- Two BDE-EVB07 ([BDE-EVB07-BDE Technology Inc. \(bdecomm.com\)](#))
or
- Two TI Launchpad ([LAUNCHXL-CC1310 Evaluation board | TI.com](#))
- USB cable for power supply and debugging

Software tools:

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

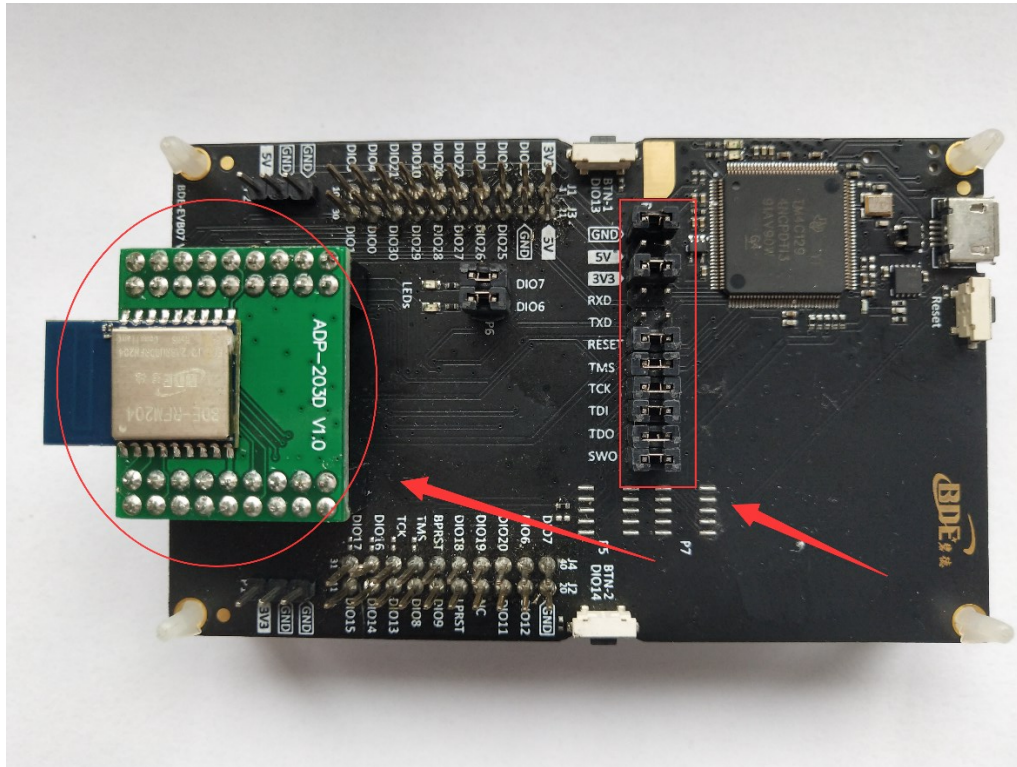
Build Your First Application

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

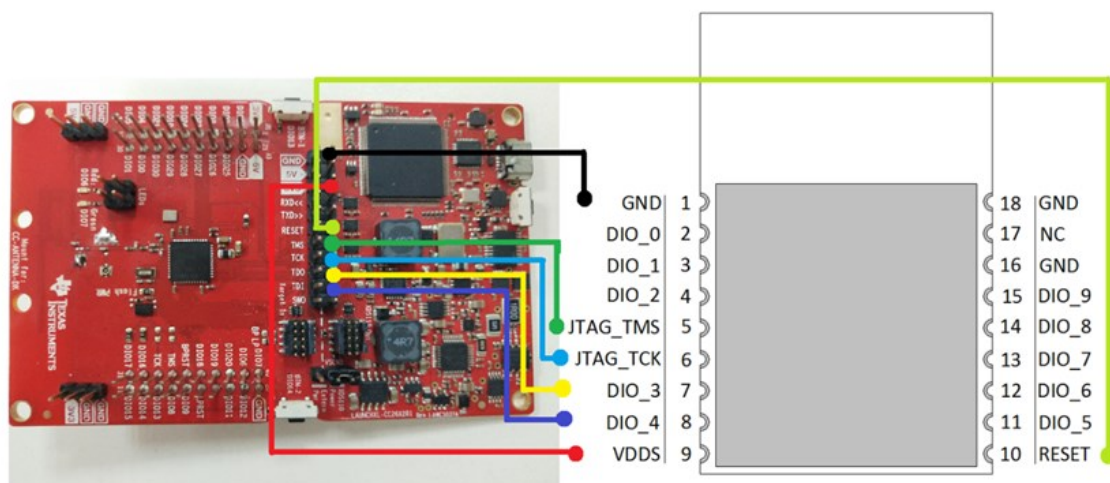
A. Connect the Hardware

If chose EVB07:

Use USB cable to connect EVB07 and PC or laptop. Plug BDE-RFM204 with the adaptor board into the dev board and connect all the pins with Jumpers as the following picture shows.



If chose TI Launchpad:
The connection is as following.



Connection Designator	BDE-RFM204	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

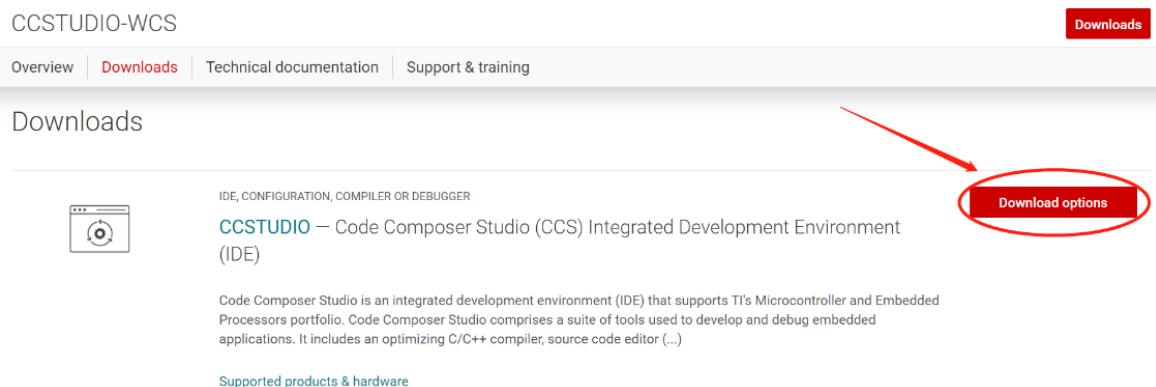
B. Build the Application

■ 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



The screenshot shows the 'CCSTUDIO-WCS' page on the TI website. The 'Downloads' tab is selected. Under the 'Downloads' section, there is a card for 'CCSTUDIO – Code Composer Studio (CCS) Integrated Development Environment (IDE)'. A red arrow points to the 'Download options' button on the right side of the card.

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 \(24595266 KB\)](#)

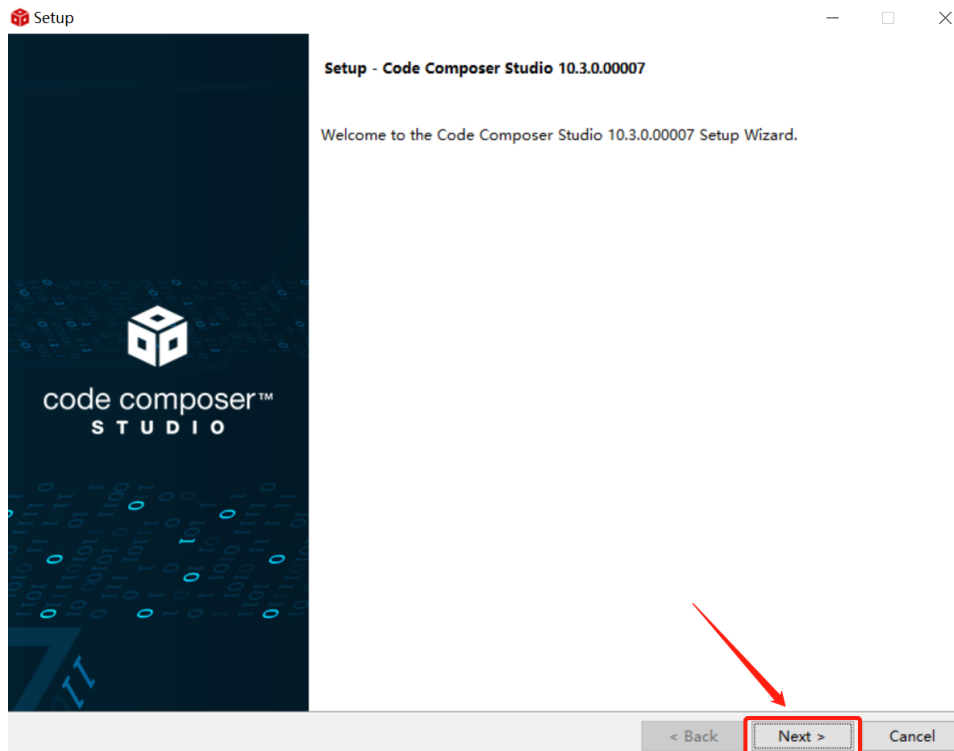
3. Unzip the package to a local disc

	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

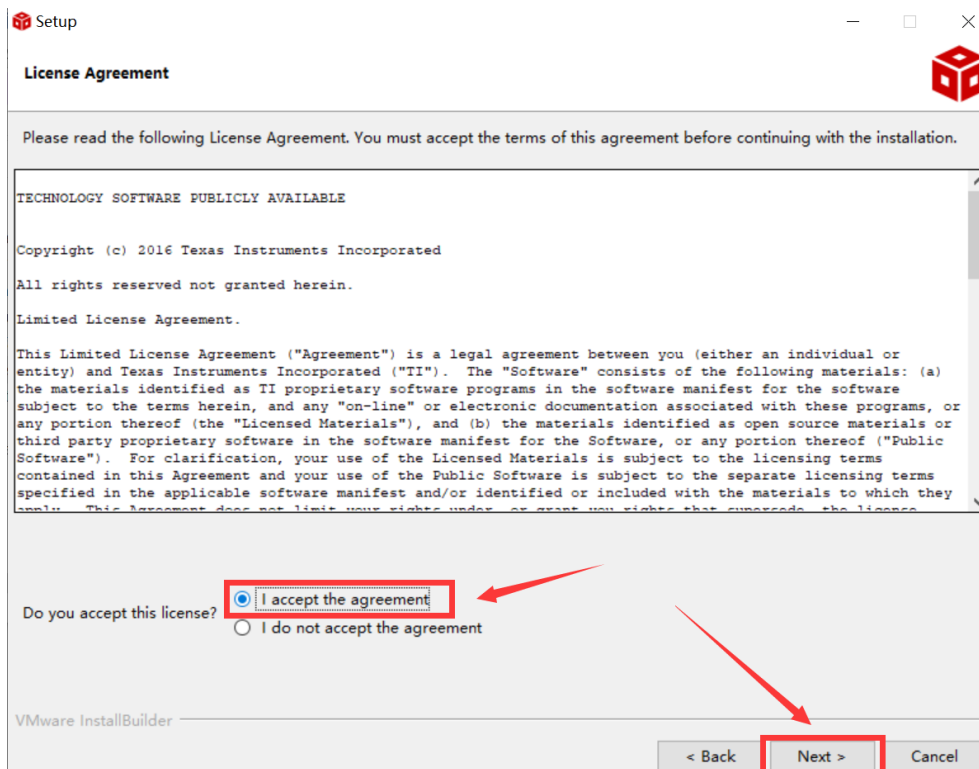
4. Click the setup of CCS

	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

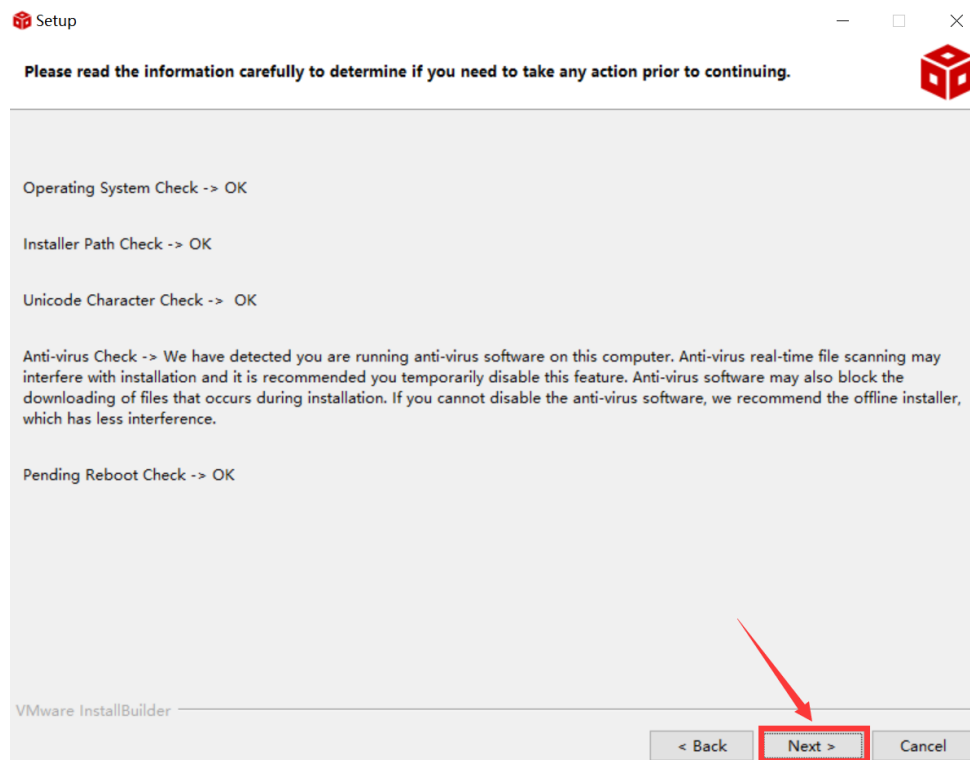
5. Click "Next"



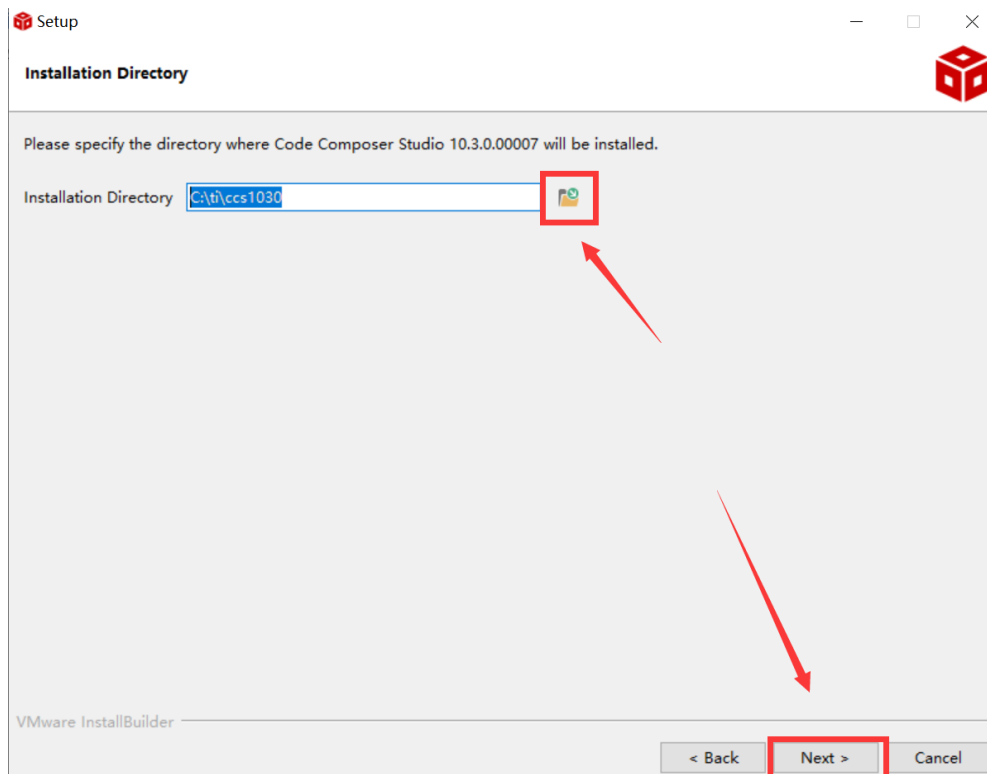
6. Select the default option



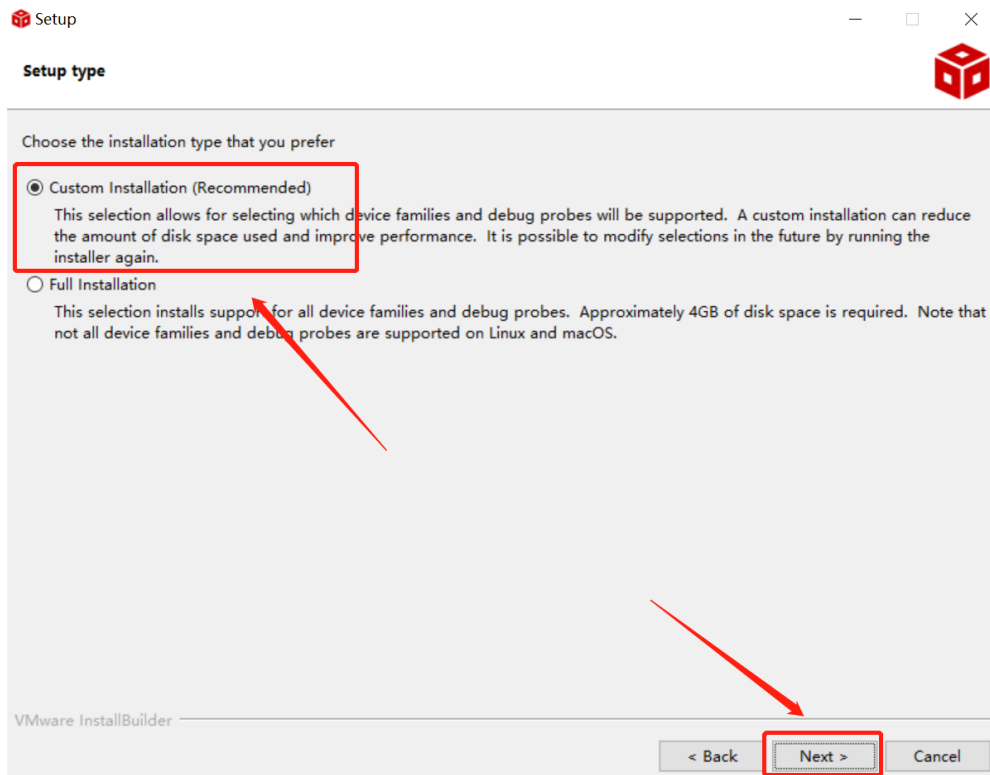
7. Click "Next"



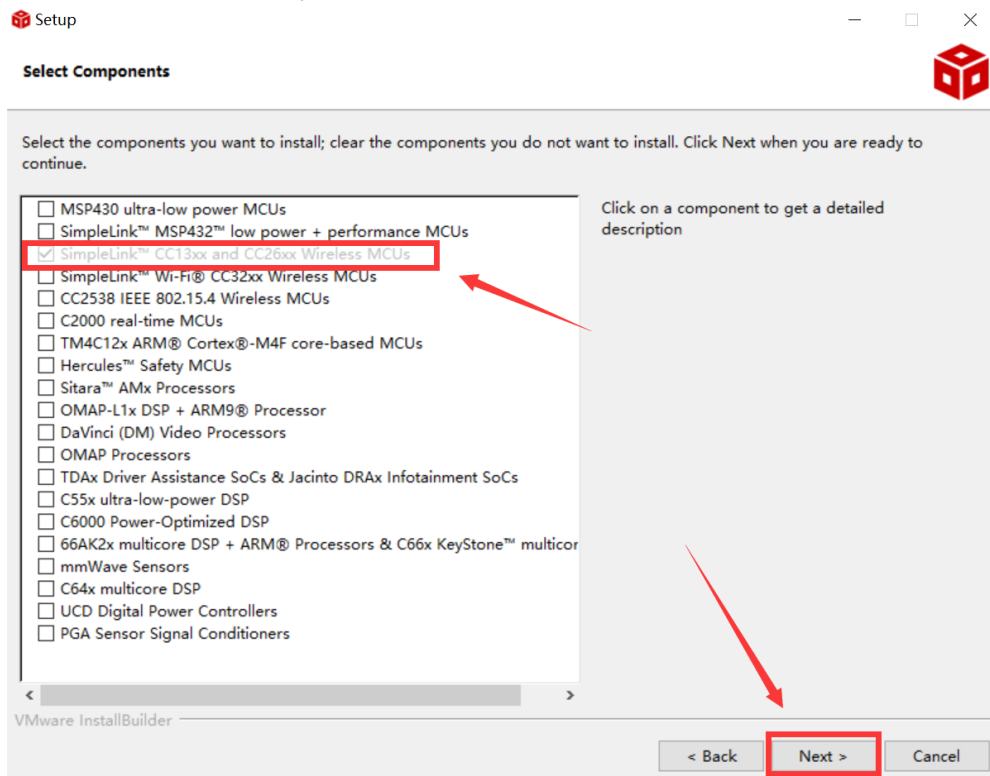
8. Select the Installation Directory



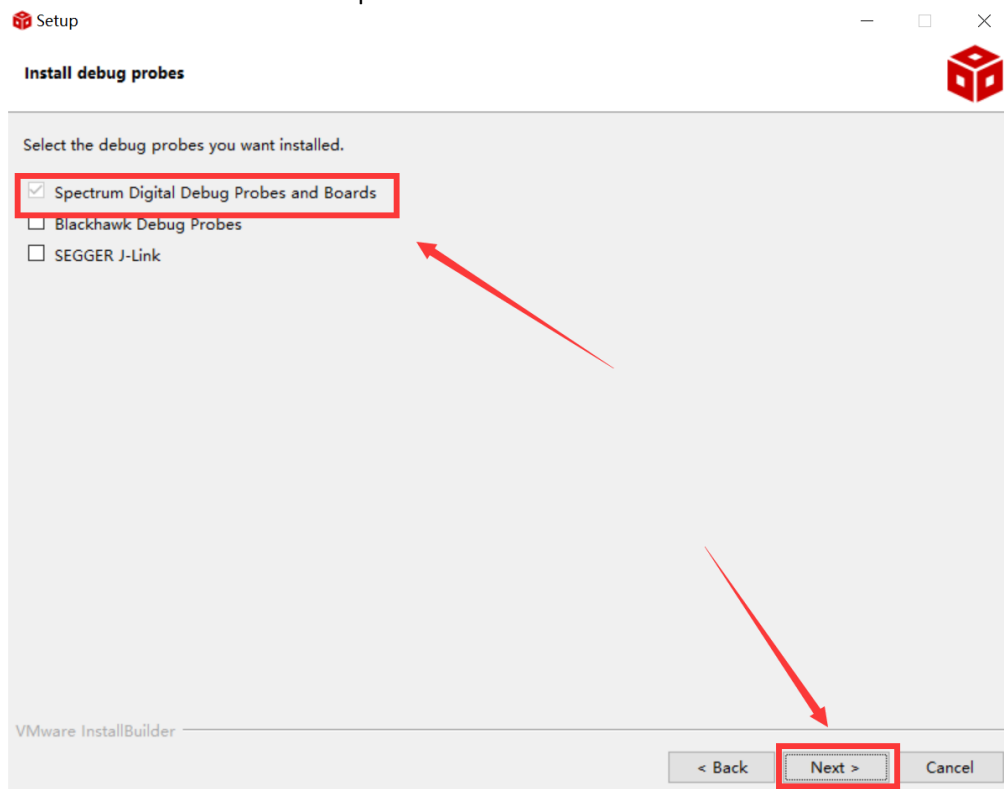
9. Select the default option



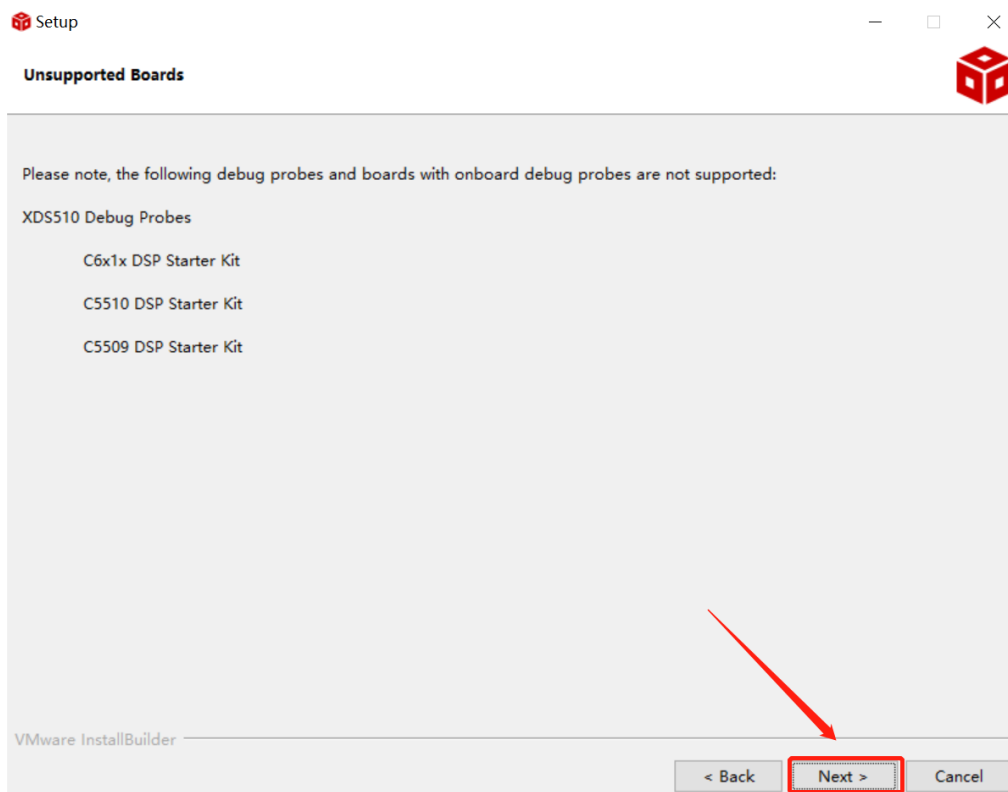
10. Select the component



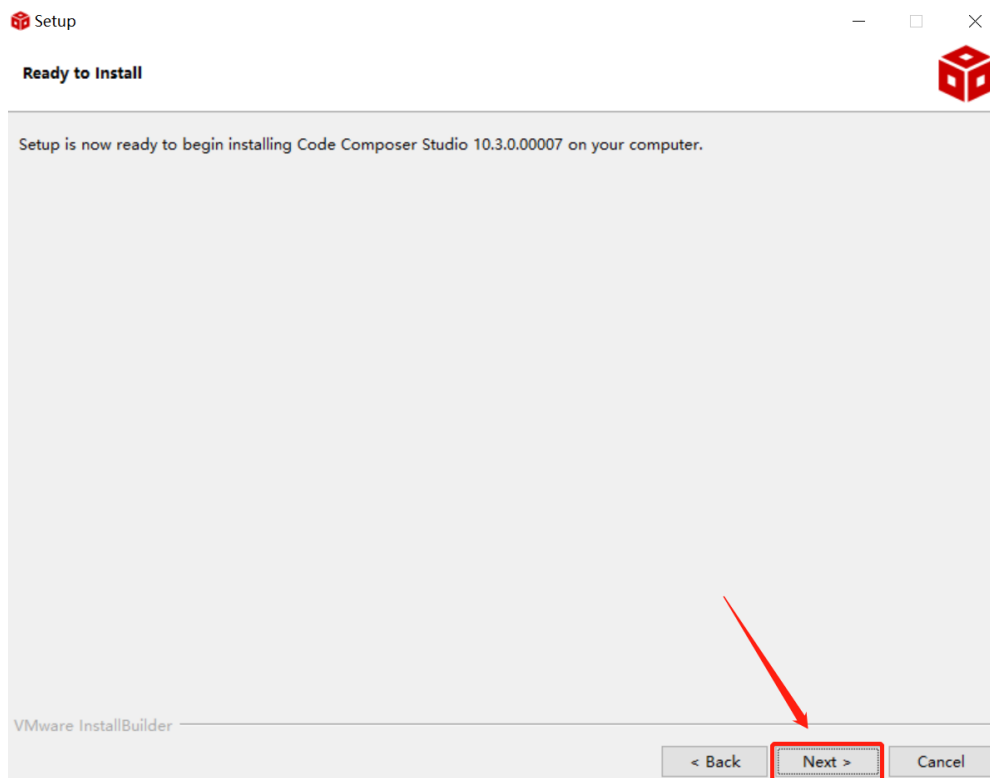
11. Select the default option



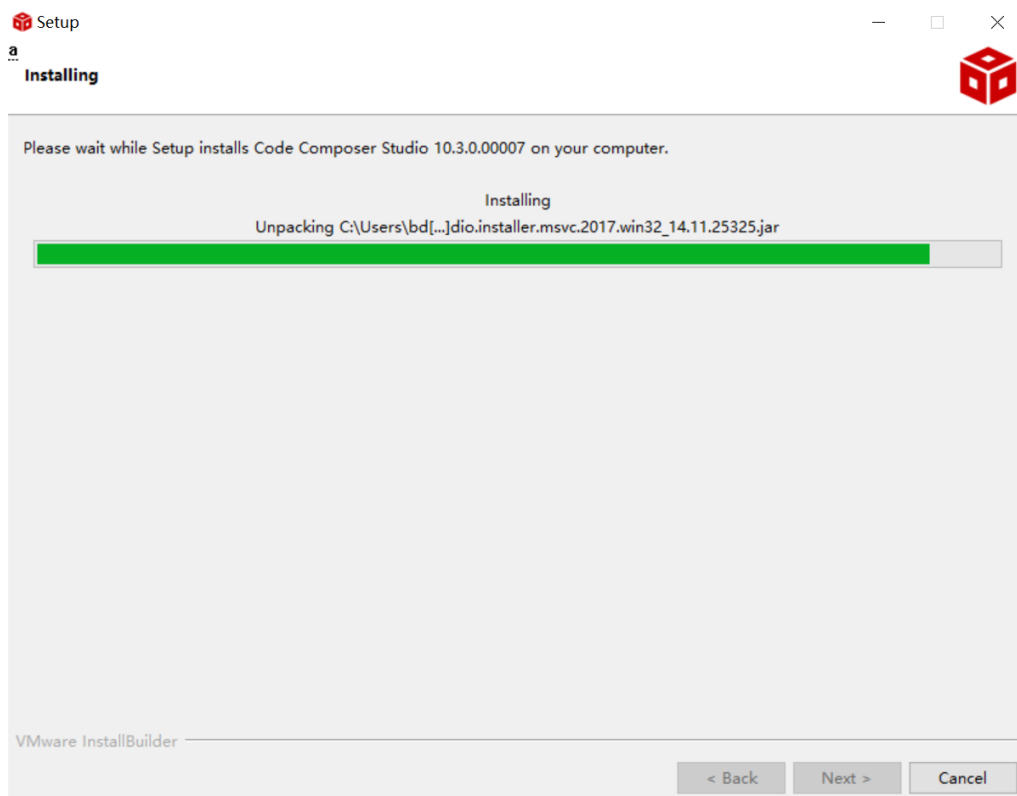
12. Click "Next"



13. Click "Next"



14. Waiting for installation to complete



■ Software Development Kit (SDK) installation

1. Click on this option

SIMPLELINK-CC13X0-SDK Downloads

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

Downloads

Primary software Supporting software Supported products & hardware

	SOFTWARE DEVELOPMENT KIT (SDK) SIMPLELINK-CC13X0-SDK – SimpleLink™ CC13x0 Software Development Kit Supported products & hardware	Download options Subscribe to alerts
	SOFTWARE DEVELOPMENT KIT (SDK) SIMPLELINK-CC13X0-SDK-CLOUD – SimpleLink™ CC13x0 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-CC13X0-SDK
SimpleLink™ CC13x0 Software Development Kit

Version: 4.20.00.05
Release date: 15 Apr 2021

SIMPLELINK SDK INSTALLERS

 Windows Installer for Simplelink CC13x0 SDK (156468376 KB)
 Mac OS Installer for SimpleLink CC13x0 SDK (163761448 KB)
 Linux Installer for SimpleLink CC13x0 SDK (163839747 KB)

EXPLORE IN THE CLOUD

 [TI Resource Explorer](#)

 = Requires export approval (1 minute)

[Release notes](#) | [Previous versions](#) | [Documentation](#) | [Supported products & hardware](#)

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

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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

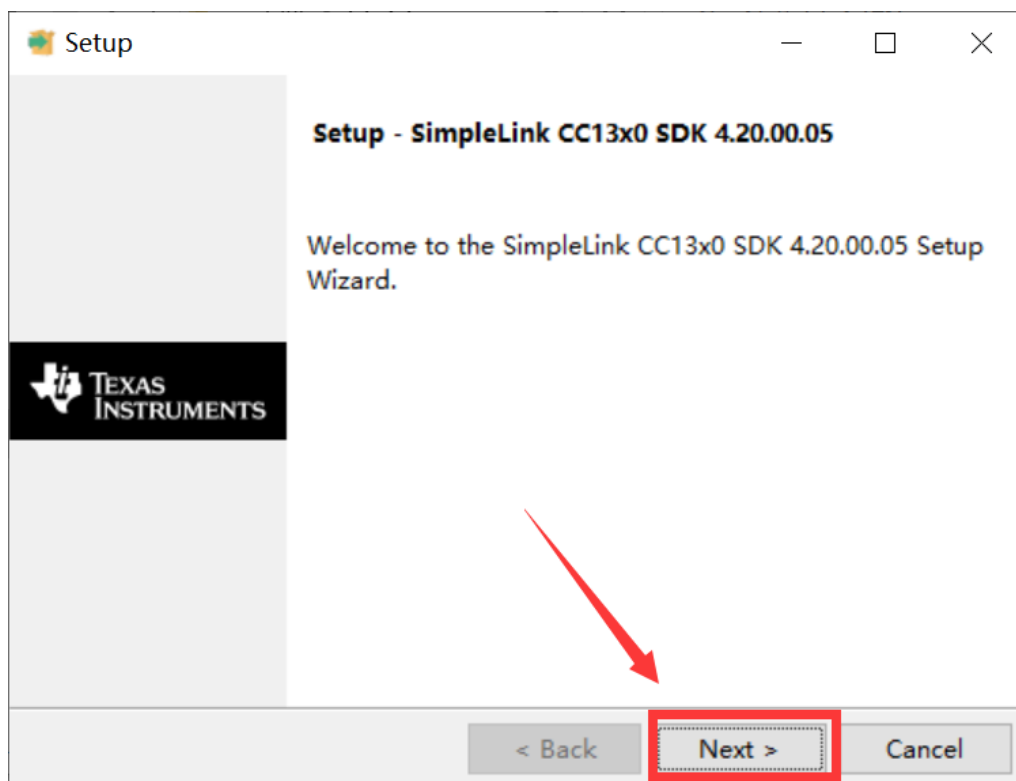
Thank you,
Texas Instruments

7. Installation

 simplelink_cc13x0_sdk_4_20_00_05.exe

2021/4/22 14:59

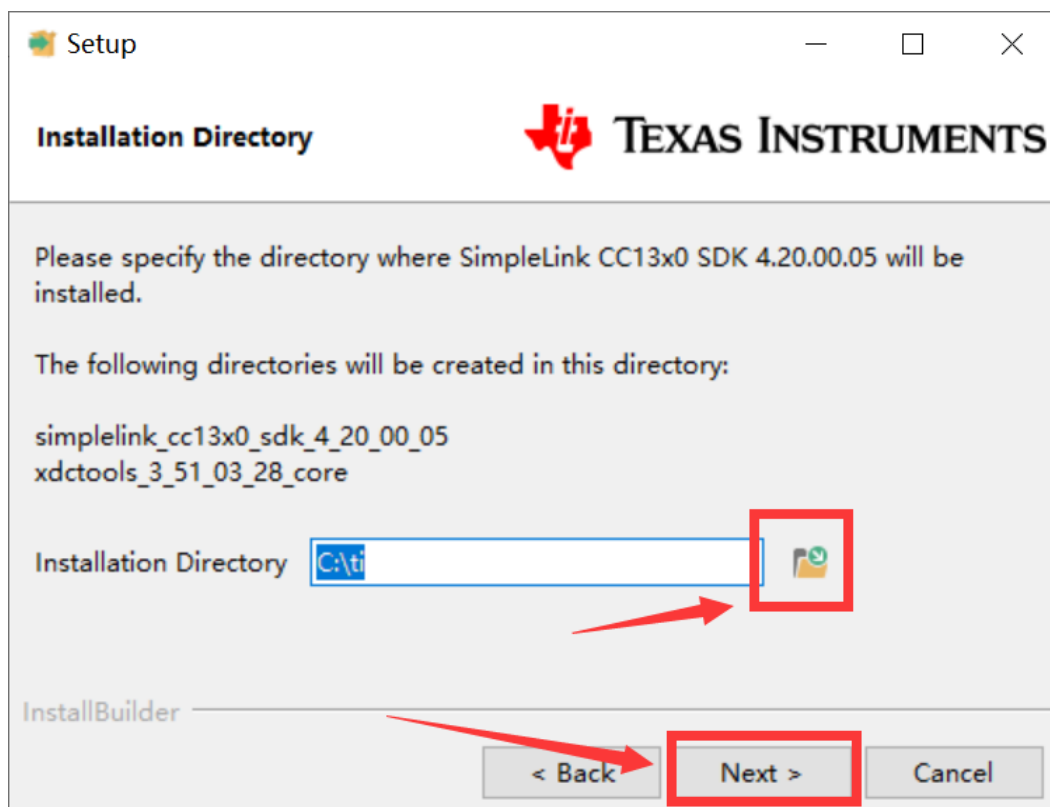
8. Click "Next"



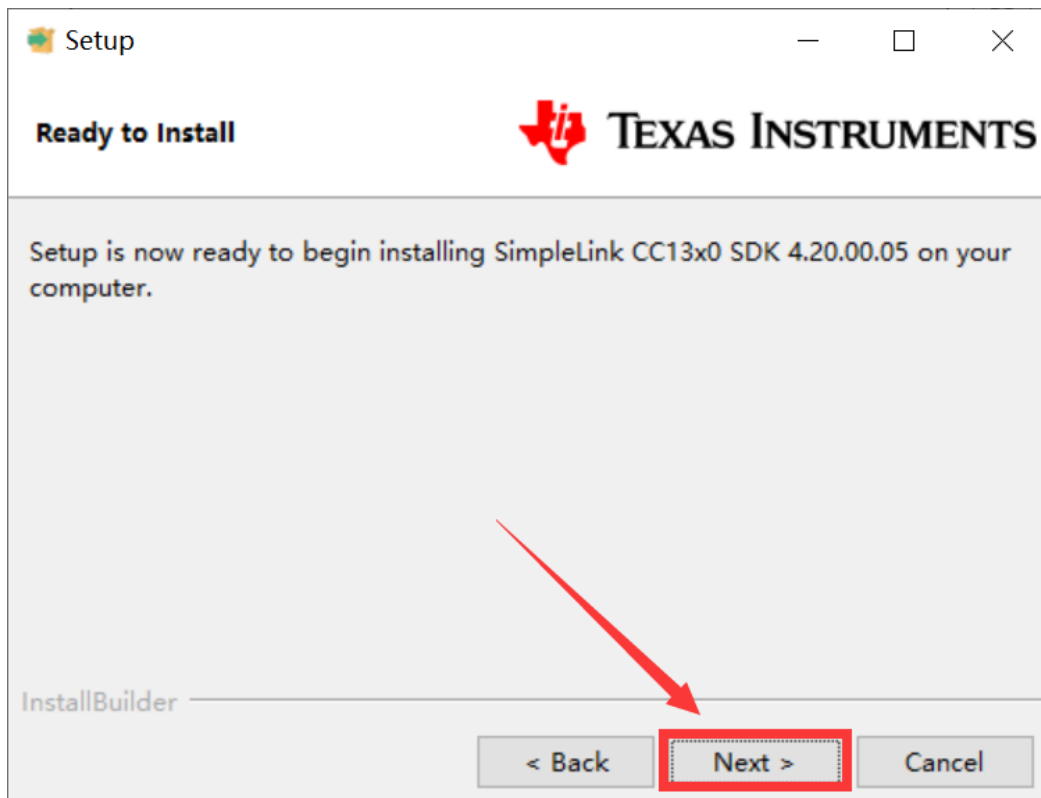
9. Select the default option



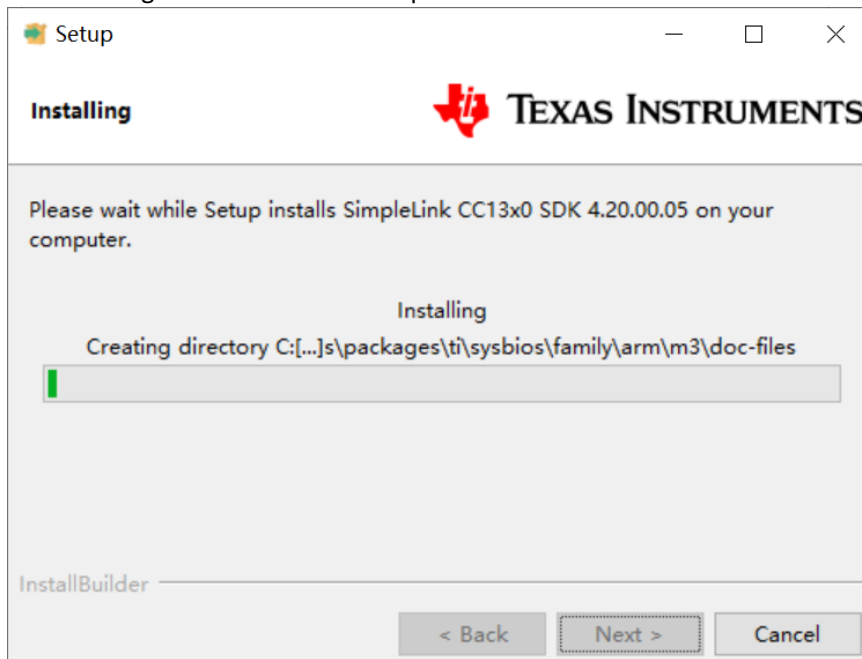
10. Select the Installation directory



11. Click "Next"

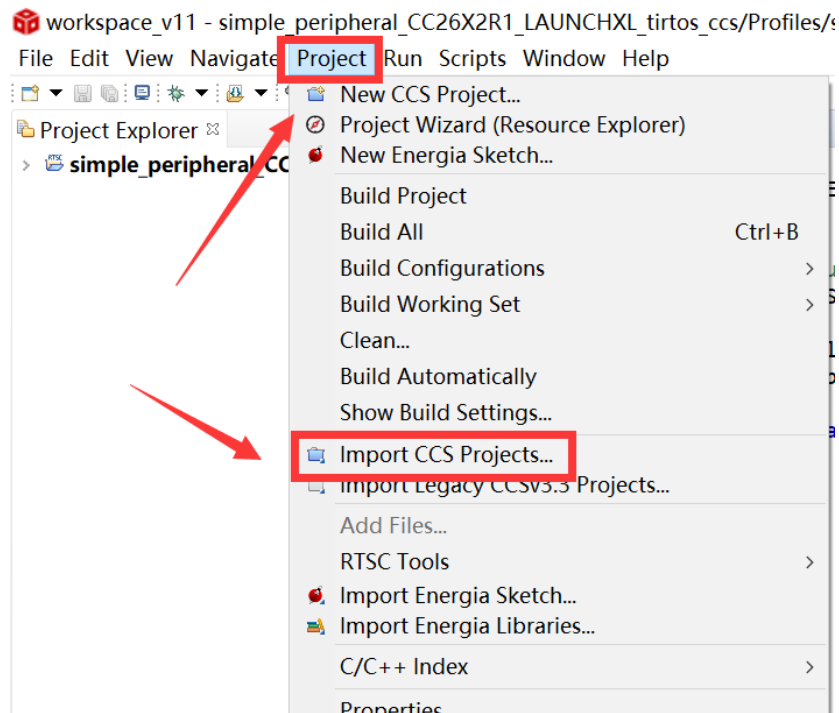


12. Waiting for installation to complete

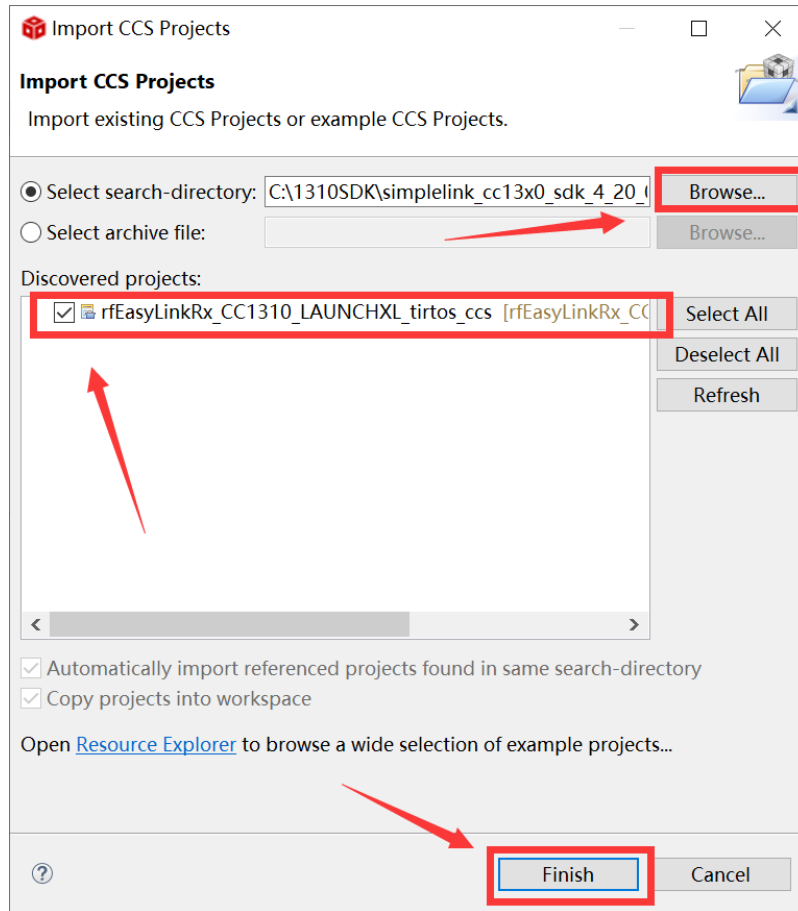


- Run an example/demo code

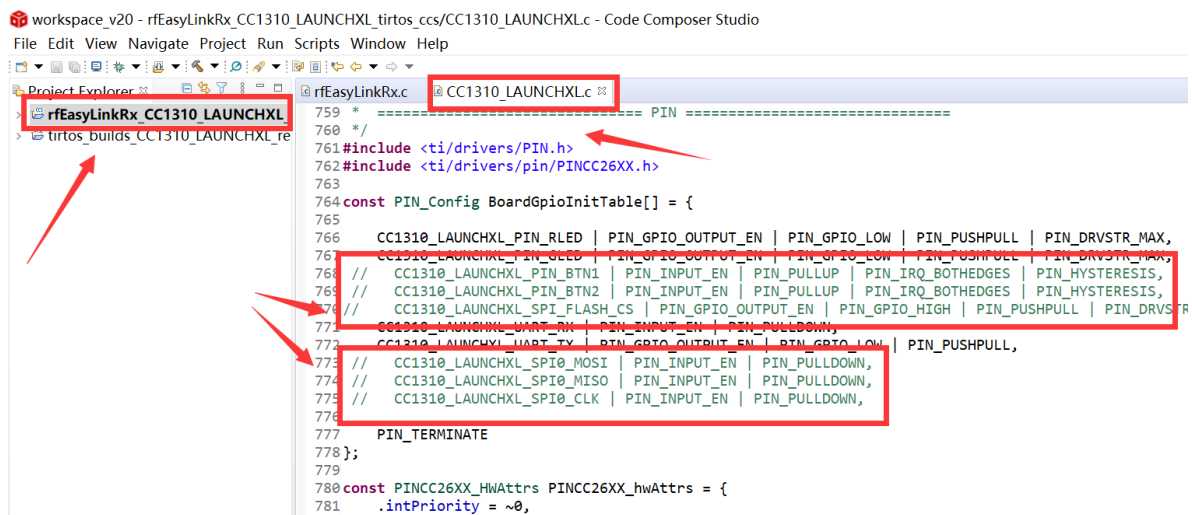
1. For the first module, find the option named "Import CCS project..."



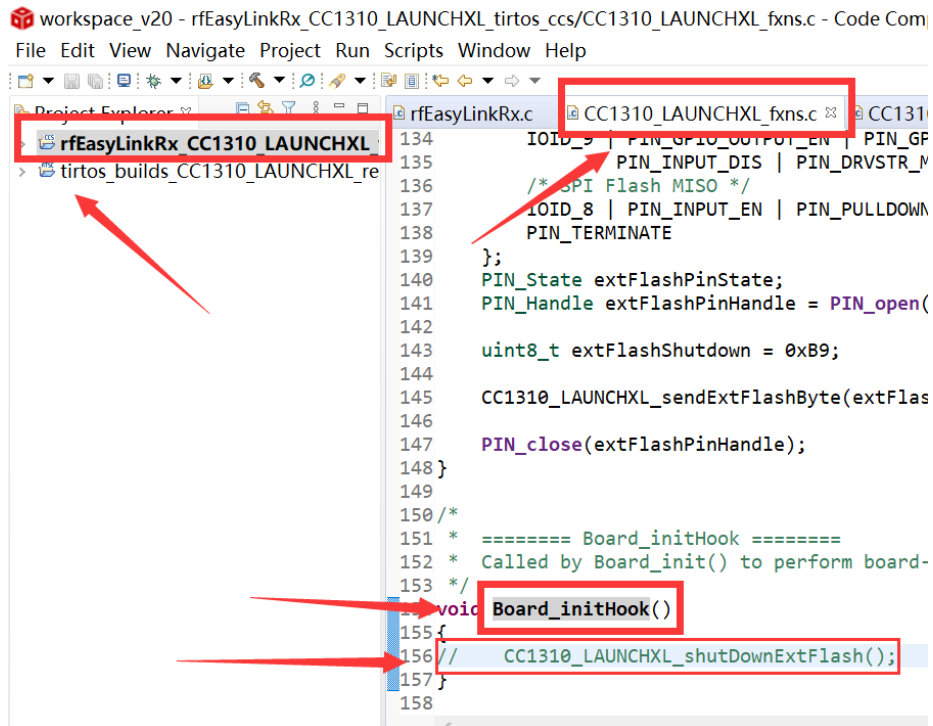
2. According to the following path to find the sending end project:
ti\simplelink_cc13x0_sdk_4_20_00_05\examples\rtos\CC1310_LAUNCHXL\easylink\rfEasyLinkRx\tirtos\ccs



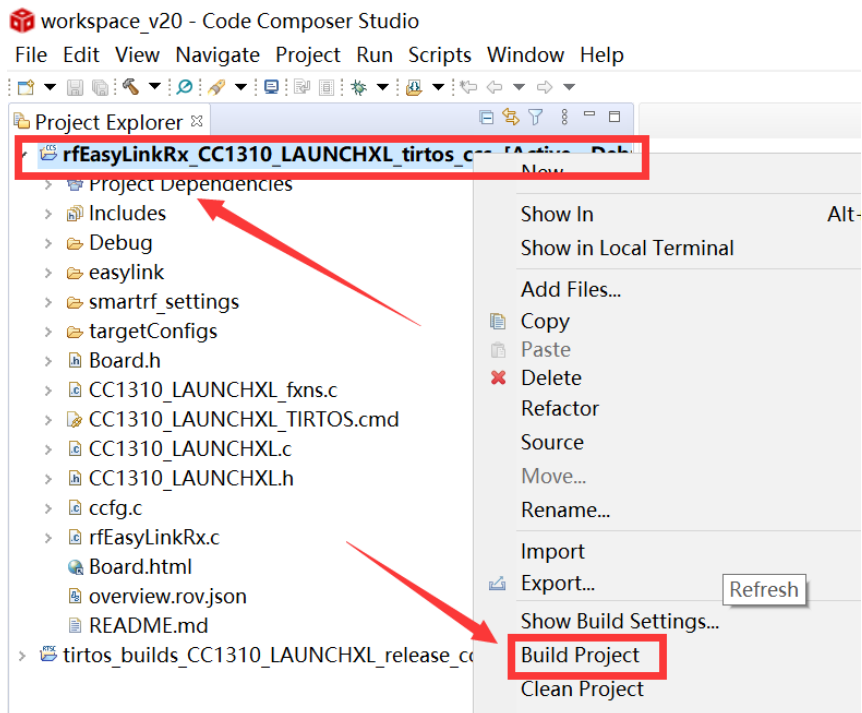
3. Open the "CC1310_LAUNCHXL.c", comment these lines as the arrows show.



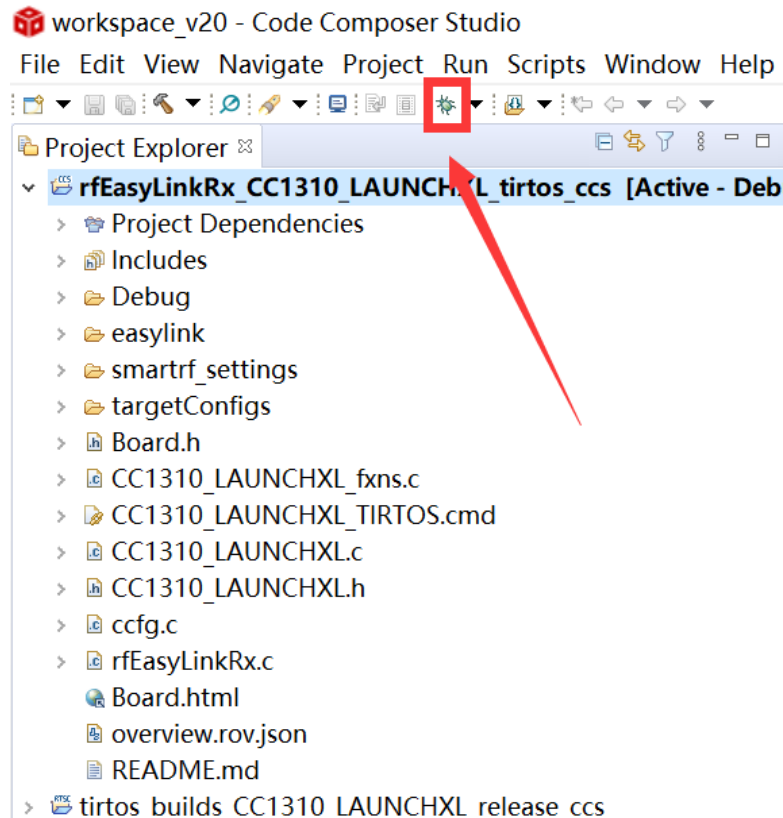
4. Open the "CC1310_LAUNCHXL_fxns.c", comment the line as the arrows shows.



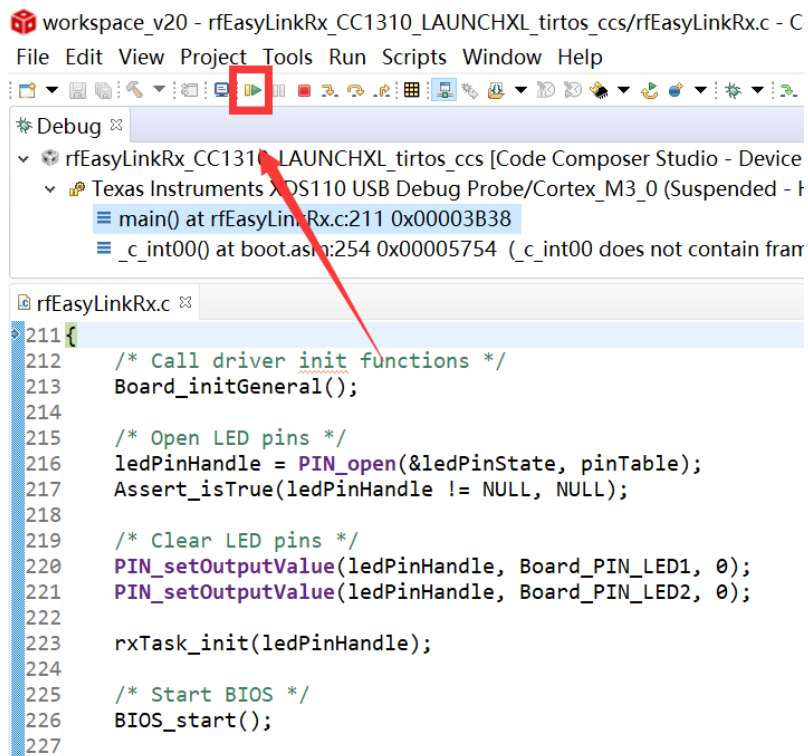
5. Right Click the project to build the receiving end project



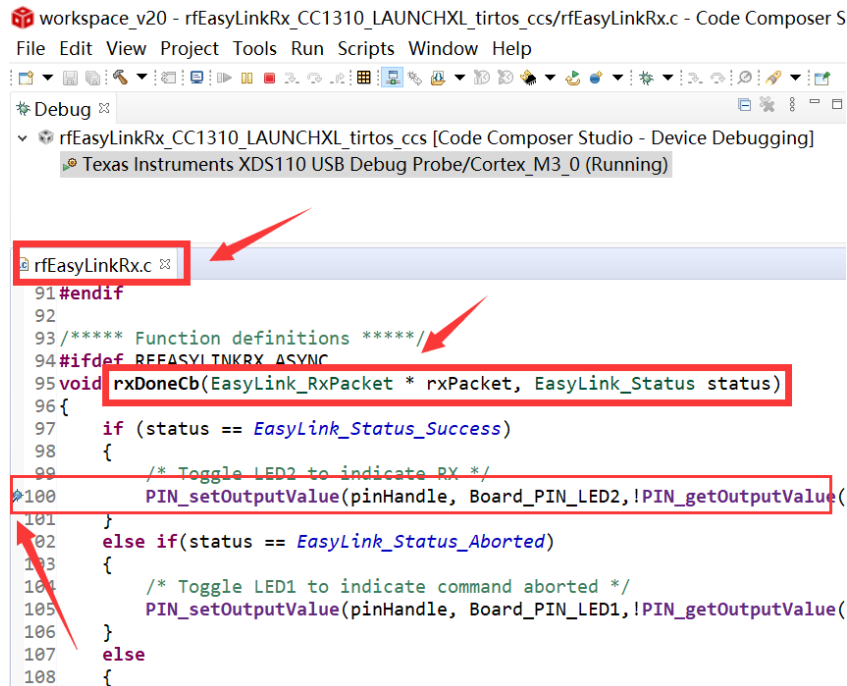
6. Click this bug icon (means download and debugging)



7. Click on this option to start debugging



8. 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 shows



workspace_v20 - rfEasyLinkRx_CC1310_LAUNCHXL_tirtos_ccs/rfEasyLinkRx.c - Code Composer S

File Edit View Project Tools Run Scripts Window Help

Debug

rfEasyLinkRx_CC1310_LAUNCHXL_tirtos_ccs [Code Composer Studio - Device Debugging]

Texas Instruments XDS110 USB Debug Probe/Cortex_M3_0 (Running)

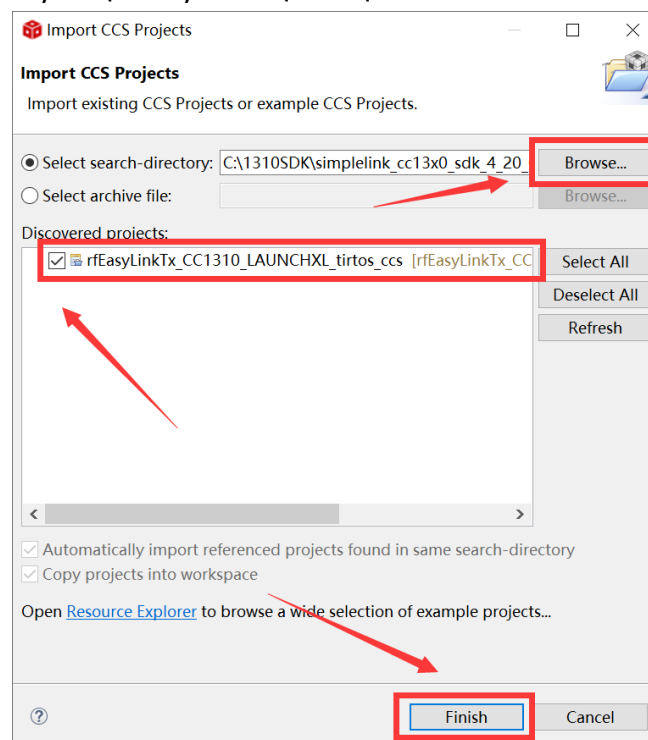
rfEasyLinkRx.c

```

91 #endif
92
93 /**** Function definitions ****/
94 #ifdef RF_EASYLINK_RX_ASYNC
95 void rxDoneCb(EasyLink_RxPacket * rxPacket, EasyLink_Status status)
96 {
97     if (status == EasyLink_Status_Success)
98     {
99         /* Toggle LED2 to indicate RX */
100         PIN_setOutputValue(pinHandle, Board_PIN_LED2, !PIN_getOutputValue(
101     }
102     else if(status == EasyLink_Status_Aborted)
103     {
104         /* Toggle LED1 to indicate command aborted */
105         PIN_setOutputValue(pinHandle, Board_PIN_LED1, !PIN_getOutputValue(
106     }
107     else
108     {

```

9. For another module, according to the following path to find the sending end project:
- ti\simplelink_cc13x0_sdk_4_20_00_05\examples\rtos\CC1310_LAUNCHXL\easylink\rfEasyLinkTx\tirtos\ccs



10. Open the “CC1310_LAUNCHXL.c”, comment these lines as the arrows show.

workspace_v21 - rfEasyLinkTx_CC1310_LAUNCHXL_tirtos_ccs/CC1310_LAUNCHXL.c - Code Composer Studio

File Edit View Navigate Project Run Scripts Window Help

Project Explorer: rfEasyLinkTx_CC1310_LAUNCHXL.c

```

758 /*
759 * ===== PIN =====
760 */
761 #include <ti/drivers/PIN.h>
762 #include <ti/drivers/pin/PINCC26XX.h>
763
764 const PIN_Config BoardGpioInitTable[] = {
765     CC1310_LAUNCHXL_PIN_RLED | PIN_GPIO_OUTPUT_EN | PIN_GPIO_LOW | PIN_PUSHPULL | PIN_CFG_PULLUP,
766     CC1310_LAUNCHXL_PIN_GLED | PIN_GPIO_OUTPUT_EN | PIN_GPIO_LOW | PIN_PUSHPULL | PIN_CFG_PULLUP,
767     CC1310_LAUNCHXL_PIN_BTN1 | PIN_INPUT_EN | PIN_PULLUP | PIN_IRQ_BOTHEDGES | PIN_CFG_PULLUP,
768     CC1310_LAUNCHXL_PIN_BTN2 | PIN_INPUT_EN | PIN_PULLUP | PIN_IRQ_BOTHEDGES | PIN_CFG_PULLUP,
769     CC1310_LAUNCHXL_SPI_FLASH_CS | PIN_GPIO_OUTPUT_EN | PIN_GPIO_HIGH | PIN_PUSHPULL | PIN_CFG_PULLUP,
770     CC1310_LAUNCHXL_UART_RX | PIN_INPUT_EN | PIN_PULLDOWN,
771     CC1310_LAUNCHXL_UART_TX | PIN_GPIO_OUTPUT_EN | PIN_GPIO_LOW | PIN_PUSHPULL,
772     CC1310_LAUNCHXL_SPI0_MOSI | PIN_INPUT_EN | PIN_PULLDOWN,
773     CC1310_LAUNCHXL_SPI0_MISO | PIN_INPUT_EN | PIN_PULLDOWN,
774     CC1310_LAUNCHXL_SPI0_CLK | PIN_INPUT_EN | PIN_PULLDOWN,
775     PIN_TERMINATE
776 };
777
778 const PINCC26XX_HwAttrs PINCC26XX_hwAttrs = {
779     .intPriority = ~0,
780     .swiPriority = 0
781 };
  
```

11. Open the “CC1310_LAUNCHXL_fxns.c”, comment the line as the arrows shows.

workspace_v21 - rfEasyLinkTx_CC1310_LAUNCHXL_tirtos_ccs/CC1310_LAUNCHXL_fxns.c - Code Composer Studio

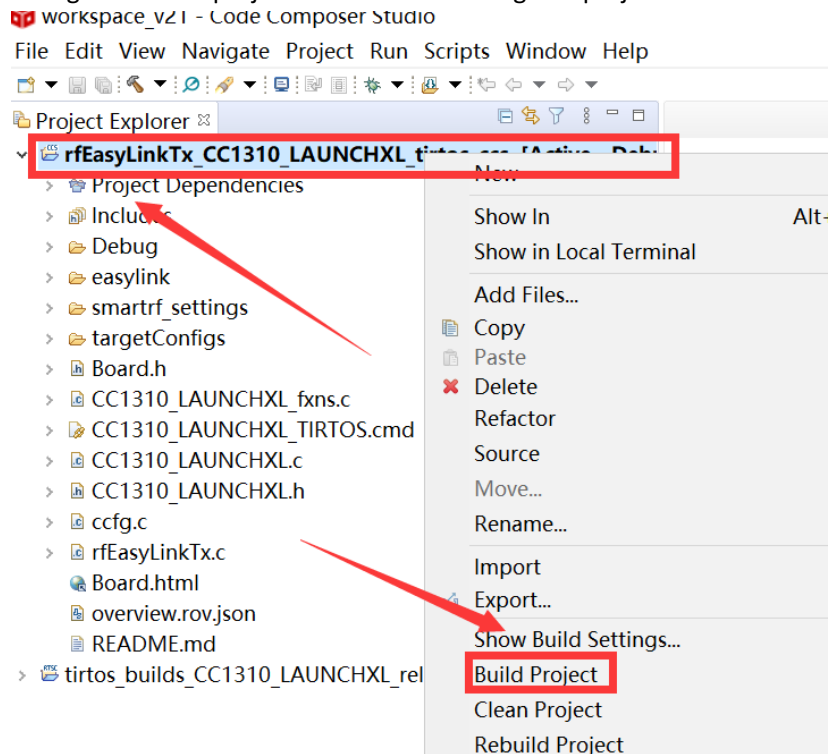
File Edit View Navigate Project Run Scripts Window Help

Project Explorer: rfEasyLinkTx_CC1310_LAUNCHXL_fxns.c

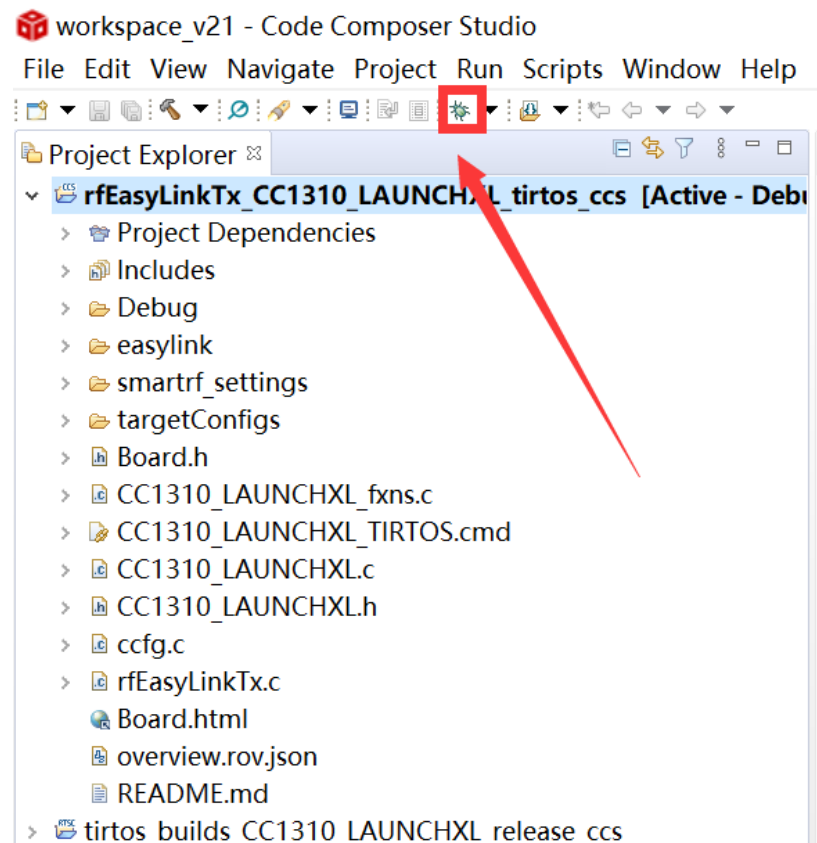
```

134     IOID_9 | PIN_GPIO_OUTPUT_EN | PIN_GPIO_LOW |
135     PIN_INPUT_DIS | PIN_DRVSTR_MED,
136     /* SPI Flash MISO */
137     IOID_8 | PIN_INPUT_EN | PIN_PULLDOWN,
138     PIN_TERMINATE
139 };
140 PIN_State extFlashPinState;
141 PIN_Handle extFlashPinHandle = PIN_open(&extFlashPinState, &extFlashPinConfig);
142
143 uint8_t extFlashShutdown = 0xB9;
144
145 CC1310_LAUNCHXL_sendExtFlashByte(extFlashPinHandle, extFlashShutdown);
146
147 PIN_close(extFlashPinHandle);
148 }
149
150 /*
151 * ===== Board_initHook =====
152 * Called by Board_init() to perform board-specific initialization
153 */
154 void Board_initHook()
155 {
156     // CC1310_LAUNCHXL_shutDownExtFlash();
157 }
158
  
```

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



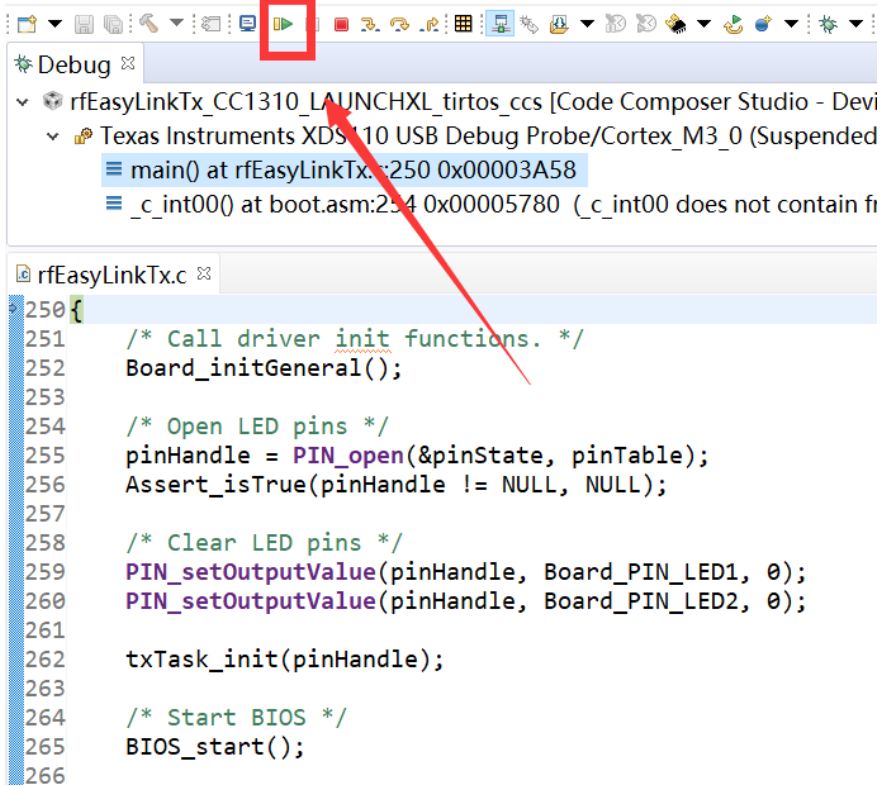
13. Click this bug icon (means download and debugging)



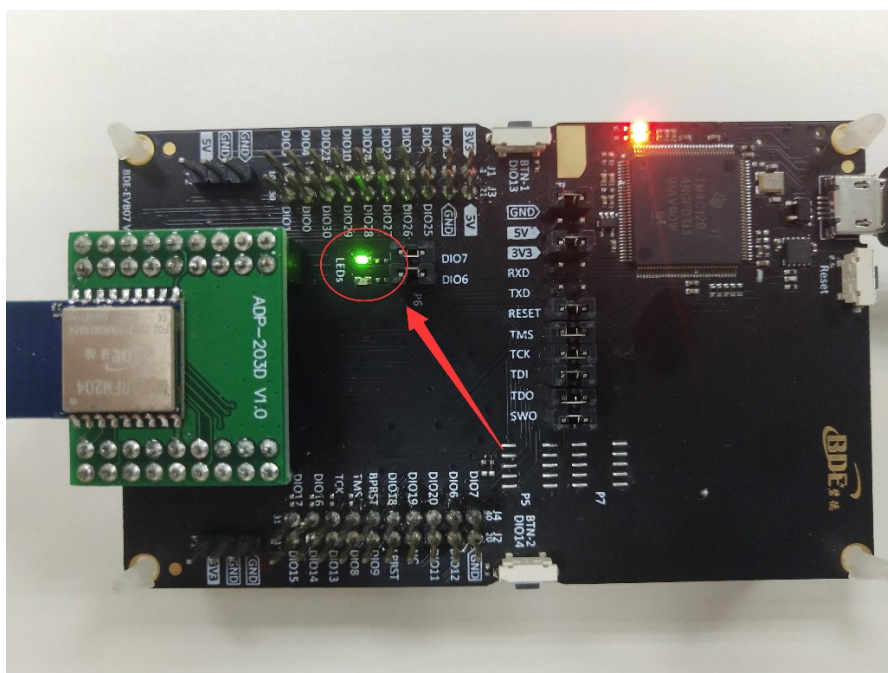
14. Click on this option to start debugging

 workspace_v21 - rfEasyLinkTx_CC1310_LAUNCHXL_tirtos_ccs/rfEasyLinkTx.c -

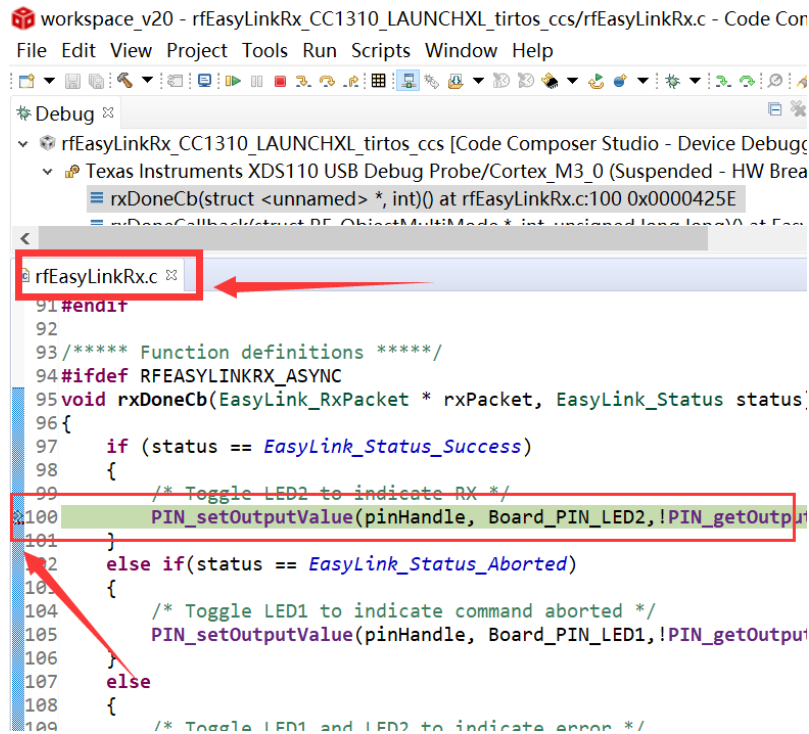
File Edit View Project Tools Run Scripts Window Help



15. You can see the lights flashing (means sending a data uninterruptedly)



16. The program stops at the breakpoint



```

workspace_v20 - rfEasyLinkRx_CC1310_LAUNCHXL_tirtos_ccs/rfEasyLinkRx.c - Code Com
File Edit View Project Tools Run Scripts Window Help
Debug
  rfEasyLinkRx_CC1310_LAUNCHXL_tirtos_ccs [Code Composer Studio - Device Debug
    Texas Instruments XDS110 USB Debug Probe/Cortex_M3_0 (Suspended - HW Brea
      rxDoneCb(struct <unnamed> *, int) at rfEasyLinkRx.c:100 0x0000425E
      rxDoneCallback(struct RF_ObjectMultiMode *, int, unsigned long, long) at Eas
    <
  rfEasyLinkRx.c
    91 #endif
    92
    93 /**** Function definitions *****/
    94 #ifdef RFEASYLINKRX_ASYNC
    95 void rxDoneCb(EasyLink_RxPacket * rxPacket, EasyLink_Status status)
    96 {
    97     if (status == EasyLink_Status_Success)
    98     {
    99         /* Toggle LED2 to indicate RX */
    100         PIN_setOutputValue(pinHandle, Board_PIN_LED2, !PIN_getOutputValue(pinHandle, Board_PIN_LED2));
    101     }
    102     else if(status == EasyLink_Status_Aborted)
    103     {
    104         /* Toggle LED1 to indicate command aborted */
    105         PIN_setOutputValue(pinHandle, Board_PIN_LED1, !PIN_getOutputValue(pinHandle, Board_PIN_LED1));
    106     }
    107     else
    108     {
    109         /* Toggle LED1 and LED2 to indicate error */

```

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

For further development, please check out the [CC1310 data sheet, 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](#)

[CC1310 SimpleLink™ Ultra-Low-Power Sub-1 GHz Wireless MCU](#)

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

Revision History

Revision	Date	Description
V1.0	8-Jun-2019	Initial Release
V1.4	3-Nov-2019	Editorial Correction
V2.0	14-Apr-2021	Replacement of 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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Website: <http://www.bdecomm.com/cn/> Email: shu@bdecomm.com

USA:

67 E Madison St, #1603A, Chicago, IL 60603

Tel: +1-312-379-9589

Website: <http://www.bdecomm.com/> Email: info@bdecomm.com