CC3100 SimpleLink[™] Wi-Fi[®] and IoT Solution Getting Started Guide

User's Guide



Literature Number: SWRU375 June 2014



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User's Guide SWRU375–June 2014

CC3100 SimpleLink™ Wi-Fi[®] and IoT Solution Getting Started Guide

ABSTRACT

This guide is intended to assist users in the initial setup and demonstration of the *Getting Started with WLAN Station* application. The guide explains how to install an Integrated Development Environment (IDE), and then compile, download and debug *Getting Started with WLAN Station*.

1 Introduction

1.1 Prerequisites

The user should have the following items:

- One CC3100BOOST
- One CC31XXEMUBOOST or MSP430F5529 Launchpad
- An 802.11b/g/n Wireless Access Point (AP)
- A computer running Microsoft® Windows® 7 or XP operating systems.

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2 Getting Started

2.1 Download and Install Software

Download and install the following software:

- CC3100 SDK package http://www.ti.com/tool/cc3100sdk
 - This guide assumes the use of the default installation folder C:\TI\CC3100SDK\.



Getting Started with SimpleLink Studio

www.ti.com

3 Getting Started with SimpleLink Studio

3.1 Configure Boards

1. The jumpers on the CC3100BOOST should be connected as shown in Figure 1.

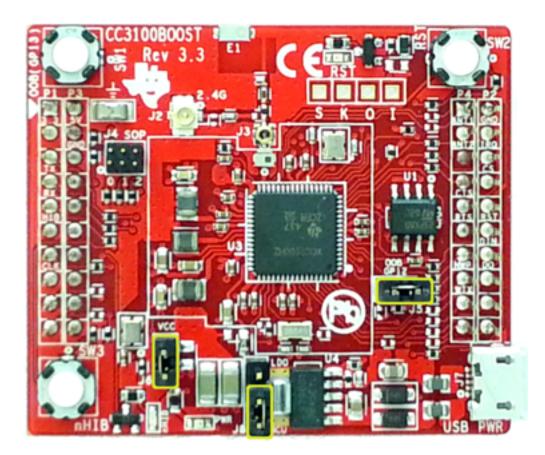


Figure 1. CC3100BOOST



2. The jumpers on the CC31XXEMUBOOST should be connected as shown in Figure 2.

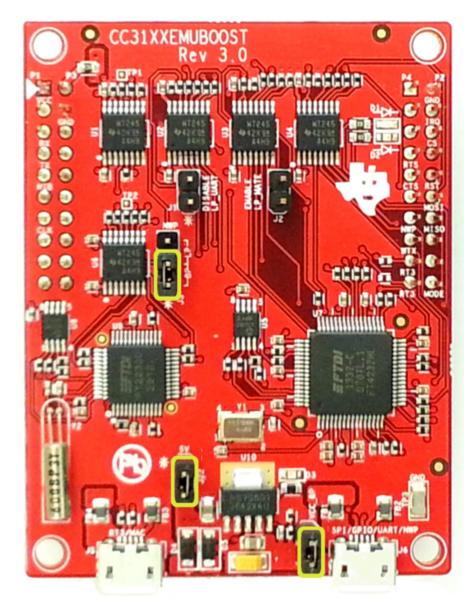


Figure 2. CC31XXEMUBOOST



3. Connect the CC3100BOOST to the CC31XXEMUBOOST as shown in Figure 3.

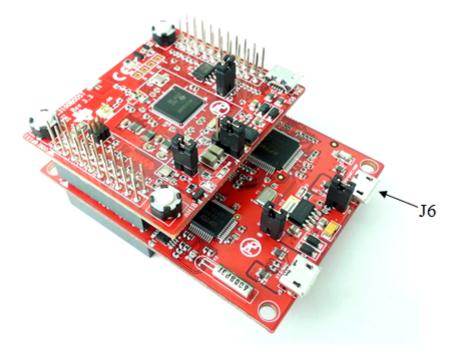


Figure 3. Connect the CC3100BOOST to the CC31XXEMUBOOST

3.2 Install USB Driver

- 1. Connect the J6 port CC31XXEMUBOOST to the PC using the provided micro-USB cable.
- 2. Open Windows Device Manager by selecting *Start Menu>Control Panel>Device Manager*. The CC3100BOOST will appear as four instances of "CC3100-BOOST" under the category *Other Devices* as shown in Figure 4. For all of these instances, the driver software will need to be updated.

TEXAS INSTRUMENTS

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🚽 Device Manager			X				
File Action View Help							
DVD/CD-ROM drives			*				
👂 🖓 Human Interface Device	es						
Imaging devices							
Keyboards							
Mice and other pointing	g devices						
Monitors							
A Providence And Andrews							
	Adapter for 64-bit Windows						
DW1530 Wireless-N							
	gabit Network Connection						
Juniper Network Co	nnect Virtual Adapter						
▲			=				
CC3100-BOOST	Update Driver Software						
CC3100-BOOST	Disable						
CC3100-BOOST							
Ports (COM & LPT)	Uninstall						
ECP Printer Port	Scan for hardware changes						
Smart card readers	Properties						
Sound, video and game	controllers						
Storage controllers							
System devices							
Universal Serial Bus controllers							
🔤 🖣 Generic USB Hub	🖶 Generic USB Hub						
Generic USB Hub			T				
Launches the Update Driver Softwa	re Wizard for the selected device.						
			,				

Figure 4. Device Manager

- 3. Right click on the first instance of "CC3100-BOOST" and select "Update Driver Software..."
- 4. Select "Browse my computer for driver software".



Getting Started with SimpleLink Studio

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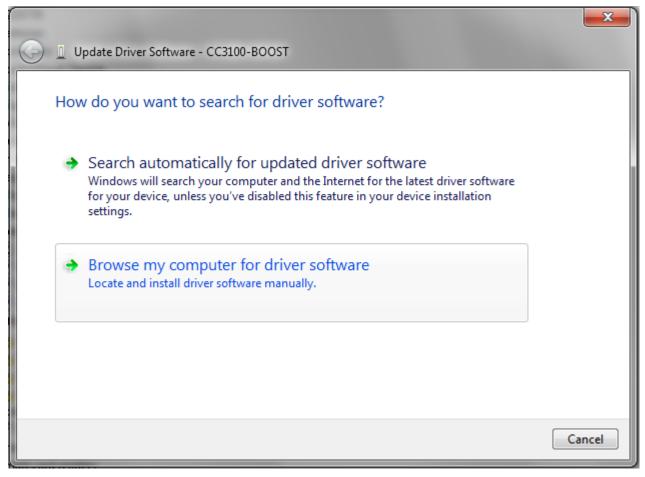


Figure 5. Update Driver Software

5. Fill the search path as C:\T/\CC3100SDK\cc3100-sdk\tools\cc31xx_board_drivers, and press Next. There is no need to restart the PC.



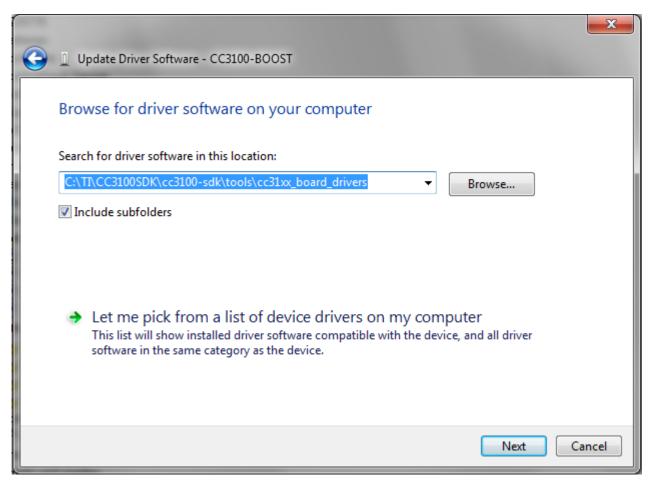


Figure 6. Update Driver Software

- 6. Repeat the three steps above for each of the three other instances of "CC3100-BOOST."
- 7. Repeat the same steps for the four instances of "USB Serial Port" that should have appeared as shown in Figure 7.



Figure 7. USB Serial Port

8. The CC3100BOOST will now be visible in the Device Manager as shown in Figure 8. The user may see two COM ports instead of four.

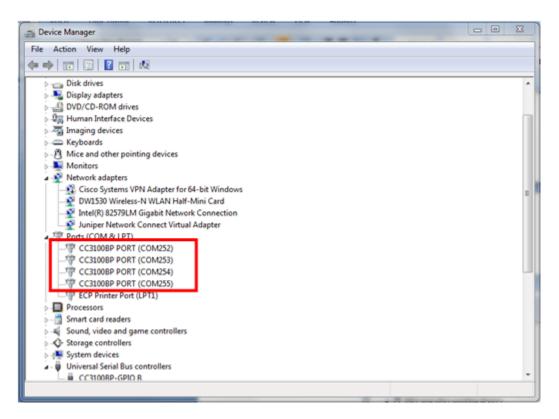


Figure 8. Device Manager

3.3 Run the Software

The *Getting Started with WLAN Station* example uses SimpleLink Studio. This example performs the following functions:

- 1. Prompts the user for the SSID of an AP to connect to.
- 2. Prompts the user for the security type.
- 3. Prompts the user for the password to the AP.
- 4. Attempts to acquire an IP address through DHCP.
- 5. Attempts to reach the internet.

Option 1. Microsoft Visual Studio:

- 1. Download and install Microsoft Visual Studio Express (2010 or later) from http://www.microsoft.com/en-us/download/details.aspx?id=40787.
- 2. Open Microsoft Visual Studio Express, and select File>Open>Project/Solution.
- Navigate to C:\T/\CC3100SDK\cc3100sdk\platform\simplelinkstudio\example_project_vs\getting_started_with_station, and open getting_started.sln. Update the project file if using a Visual Studio version later than 2010.
- 4. Select *Build>Build Solution* from the menu.
- 5. When building is complete, select *Debug>Start Debugging* from the menu.

Option 2. Eclipse:

- 1. Download and install the latest version of Java: https://www.java.com/en/download/.
- Download and Extract Eclipse from <u>http://www.eclipse.org/downloads/</u>. Choose the Eclipse IDE for C/C++ Developers package.



3. Download and install MinGW from

http://sourceforge.net/projects/mingw/files/latest/download?source=files. During installation, make sure you have the following configurations selected:

- (a) Set the installation location as C: WinGW.
- (b) In the MinGW Installation Screen, select packages for **mingw32-base** and **mingw32-gcc-g++** as shown in Figure 9.

🏇 MinGW Installation Manager							
Installation Package Settings Help							
Basic Setup	Package	Class	Installed Version	Repository Version	Description		
All Packages	mingw-developer-to	olkit bin		2013072300	An MSYS Installation for MinGW Developers (meta)		
	🐑 mingw32-base	bin		2013072200	A Basic MinGW Installation		
	mingw32-gcc-ada	bin		4.8.1-4	The GNU Ada Compiler		
	mingw32-gcc-fortra	n bin		4.8.1-4	The GNU FORTRAN Compiler		
	minaw32-acc-a++	bin		4.8.1-4	The GNU C++ Compiler		
	Unmark			4.8.1-4	The GNU Objective-C Compiler		
	Mark for Installation	on		2013072300	A Basic MSYS Installation (meta)		
	Mark for Reinstalla	ation					
	Mark for Upgrade				•		
	Mark for Removal						
	General	Dependencied	Installed Files Versi	ons			
	The GNU C++ Compil	ler					
	This package provides	U C++ language compi	iler.				
		mponent of the	MinGW Compiler St	uite; you require it on	ly if you wish to compile programs written in the C++		
	language.						
4					1		

Figure 9. MinGW Installation Screen

- (c) After selecting the packages, choose *Installation>Apply Changes* from the menu, then press Apply.
- (d) Select Installation>Quit from the menu to quit the installer.
- 4. After a successful MinGW installation, add its path (c:WinGW\bin\) to the Windows environment variable path by going into Control Panel>System>Advanced System Settings>Environment Variables. Under System Variables, select PATH and press Edit. Append ";C:\MinGW\bin\" to the end of the line and press Ok.
- 5. Open Eclipse by running *eclipse.exe* from the extracted Eclipse folder.
- In the "Select a workspace," choose your desired workspace directory (for example: C:\Users\myself\Desktop\eclipse_workspace). This directory should be different from the user's other versions of Eclipse.
- 7. From the menu select *File>New>Makefile Project with Existing Code*.
- 8. Enter 'Getting_started' as the project name.
- For Existing Code Location, enter C:\TI\CC3100SDK\cc3100sdk\platform\simplelinkstudio\example_project_eclipse\getting_started_with_station.
- 10. For Toolchain for Indexer Settings, choose "MinGW GCC" as shown in Figure 10.



👄 New Project
Import Existing Code
Create a new Makefile project from existing code in that same directory
Project Name
Getting_started
Existing Code Location
prm\simplelinkstudio\example_project_eclipse\getting_started_with_station Browse
Languages
Toolchain for Indexer Settings
<none> Cross GCC</none>
Cygwin GCC
GNU Autotools Toolchain Microsoft Visual C++
MinGW GCC
Show only available toolchains that support this platform
? Finish Cancel

Figure 10. Import Existing Code

- 11. Press Finish.
- 12. Select Window>Show View>Project Explorer from the menu.
- 13. Select the Getting_started project in the Project Explorer, and select *File>Properties* from the menu.
- 14. In the Project Explorer window, right click on < Project_Folder_Name>, then select Property.
- 15. Click the **C/C++ Build** menu and do the following:
 - (a) Uncheck Use the default build command.
 - (b) Type *mingw32-make -f Makefile* in **Build command**.
 - (c) Uncheck Generate Makefiles automatically.
 - (d) Set the Build Directory as: \${workspace_loc:/Getting_started}
- 16. Expand the **C/C++ Build** menu, and select **Tool Chain Editor**. Under **Current Builder**, Select "Gnu Make Builder", then click Apply.
- 17. Select **Environment** in the **C/C++ Build** menu. Make sure the value of MSYS_HOME is empty, then click Apply.

 Click the C/C++ General menu, and select Paths and Symbols. Under the Includes tab, in the Languages column, select GNU C. Press the Add button to add the directory: C:\TI\CC3100SDK\cc3100-sdk\simplelink\include.

Properties for Getting_started			
type filter text	Paths and Symbols		⇔ - ⇔
 Resource Builders C/C++ Build Build Variables Environment 		t [Active]	anage Configurations
Logging Settings	🕒 Includes 🛛 # Sym	bols 📑 Libraries 👼 Library Paths 😕 Source Location	😕 Output Locati
Tool Chain Editor	Languages	Include directories	Add
 C/C++ General Code Analysis Documentation File Types Formatter Indexer Language Mappings Paths and Symbols 	Assembly GNU C GNU C++	E:\TI\CC3100SDK\cc3100-sdk\simplelink\include	Edit Delete Export Move Up
Preprocessor Include Pa Profiling Categories	A The selected folde	er does not exist or not accessible.	Move Down
Project References Run/Debug Settings ▷ Task Repository	Show built-in value		
WikiText		Restore De	efaults Apply
?		ОК	Cancel

Figure 11. Paths and Symbols

- 19. Press OK.
- 20. To fix a known bug in Eclipse console output, add the following line of code to the beginning of the main function:

setvbuf(stdout, NULL, _IONBF, 0);

- 21. Save the file, and select *Project>Clean* from the menu.
- 22. Select the Getting_started project and press OK.
- 23. Select the Getting_started project from Project Explorer, and from the menu select *Project>Build Project*.
- 24. Press Ctrl+F11 to start the program.



Getting Started with the MSP430F5529

4 Getting Started with the MSP430F5529

4.1 Configure Boards

1. The jumpers on the CC3100BOOST should be connected as shown in Figure 12.

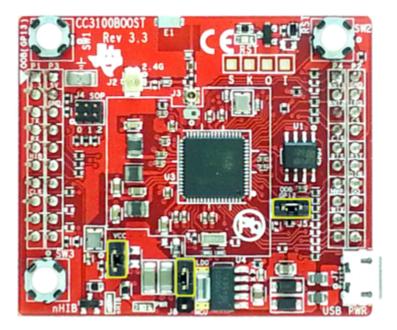


Figure 12. CC3100BOOST



2. The jumpers on the MSP430F5529 Launchpad should be connected as shown in Figure 13.

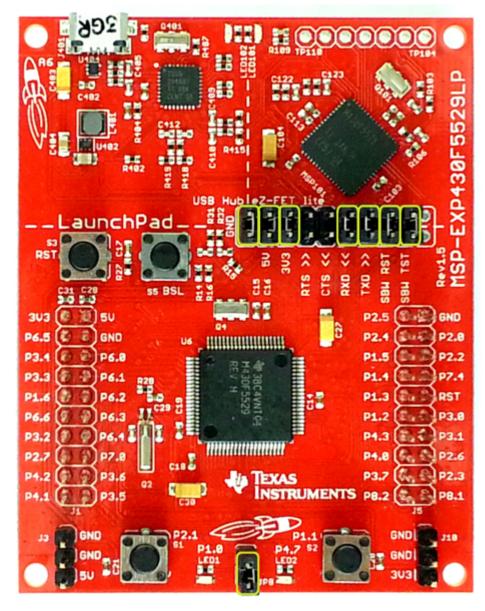


Figure 13. Jumpers on the MSP430F5529 Launchpad



3. Connect the CC3100BOOST to the MSP430F5529 Launchpad as shown in Figure 14.



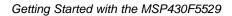
Figure 14. Connect the CC3100BOOST to the MSP430F5529 Launchpad

4. Connect a Micro-USB cable from J7 on the Boosterpack to the Windows PC, and connect a Micro-USB cable from J401 on the MSP430F5529 Launchpad to the Windows PC.

4.2 Run the Software

Option 1. Code Composer Studio (CCS):

- Download and run the Code Composer Studio 6.0 (CCS) installation wizard (ccs_setup_win32.exe) from the TI website or from the <u>CCS Wiki page</u>. Must be Version 6.0.0.00190 or later. When prompted to select processor support, select the 'MSP Ultra Low Power MCUs' processor support option. The remaining options for the installer should be left as the default. Installation may take up to an hour.
- 2. Open CCS, and choose File>Import from the menu. Under C/C++, choose CCS Projects.
- 3. Under Select Search Directory, enter the path: C:\T/\CC3100SDK\cc3100-sdk\platform\msp430f5529lp.
- 4. Check the project getting_started_with_wlan_station and press Finish.





Find the second	ts						
Select CCS Projects to Import							
Select a directory to search	Select a directory to search for existing CCS Eclipse projects.						
Select search-directory:	Browse						
-	C:\TI\CC3100SDKi\cc3100-sdk\platform\msp						
Select archive file:		Browse					
Discovered projects:							
🔲 📋 antenna_selectio	n [C:\TI\CC3100SDK_0_5\cc3100-sdk\platt	Select All					
	cies [C:\TI\CC3100SDK_0_5\cc3100-sdk\pli						
	n [C:\TI\CC3100SDK_0_5\cc3100-sdk\platf	Deselect All					
	ork_connection [C:\TI\CC3100SDK_0_5\cc3	Refresh					
	C:\TI\CC3100SDK_0_5\cc3100-sdk\platforr						
	CC3100SDK_0_5\cc3100-sdk\platform\msr \TI\CC3100SDK_0_5\cc3100-sdk\platform\u						
	with_wlan_ap [C:\TI\CC3100SDK_0_5\cc31(
	with_wlan_station [C:\TI\CC3100SDK_0_5\c						
	TI\CC3100SDK_0_5\cc3100-sdk\platform\m						
	[C:\TI\CC3100SDK_0_5\cc3100-sdk\platfo +						
	•						
	erenced projects found in same search-director	y					
Copy projects into works	pace						
On an the Decourse Fundament							
Open the Resource Explorer and browse available example projects							
(?)	Back Next > Finish	Cancel					

Figure 15. Select CCS Projects to Import

- 5. Open the main.c file of the getting_started_with_wlan project for editing (C:\T/\CC3100SDK\cc3100sdk\examples\getting_started_with_wlan_station\main.c).
- Edit main.c to use the SSID, security type and security key of the Access Point being used. Edit the macros SSID_NAME, SEC_TYPE and PASSKEY to contain the Access Point's information as shown in Figure 16. The security types supported for this demo are WPA/WPA2 and Open. For Open security, define SEC_TYPE as SL_SEC_TYPE_OPEN. For WPA and WPA2 security, define it as SL_SEC_TYPE_WPA.

<pre>#include "simplelink.h"</pre>				<pre>#include "simplelink.h"</pre>		
<pre>#define SSID_NAME #define SEC_TYPE #define PASSKEY</pre>	" <ap-name>" / SL_SEC_TYPE_OPEN / "" /</ap-name>	* AP name to connect * Seculity type of th * Password in case of	<pre>#define SSI #define SEC #define PAS</pre>	TYPE	"Your_AP_Name_Here" /* A? SL_SEC_TYPE_WPA /* Security ty "Your_AP_Security_Key_Here" /*	
<pre>#define PING_INTERVAL #define PING TIMEOUT</pre>	1000 3000		#define PIN #define PIN	-	1000 3000	

Figure 16. Define SSID_Name

- 7. Select the *getting_started_with_wlan_station* project in Project Explorer and select *Project>Build Project* from the menu.
- 8. Press F11on the CCS window to start debugging.

Option 2. IAR Workbench

- 1. Install IAR Workbench for MSP430 version 6.10 or later: <u>http://www.iar.com/en/Products/IAR-</u> Embedded-Workbench/TI-MSP430/.
- 2. Open IAR Workbench and select *File>Open>Workspace* from the menu.
- Select the project: C:\TI\CC3100SDK\cc3100sdk\platform\msp430f5529lp\example_project_iar\getting_started_with_wlan_station\ getting_started_with_wlan.eww.
- 4. Open the main.c file of the getting_started_with_wlan project for editing (C:\TI\CC3100SDK\cc3100sdk\examples\getting_started_with_wlan_station\main.c).
- Edit main.c to use the SSID, security type and security key of the Access Point being used. Edit the macros SSID_NAME, SEC_TYPE and PASSKEY to contain the Access Point's information as shown in Figure 17. The security types supported for this demo are WPA/WPA2 and Open. For Open security, define SEC_TYPE as SL_SEC_TYPE_OPEN. For WPA and WPA2 security, define it as SL_SEC_TYPE_WPA.

<pre>#include "simplelink.h'</pre>			<pre>#include "simplelink.h"</pre>		
<pre>#define SSID_NAME #define SEC_TYPE #define PASSKEY</pre>		/* AP name to connect /* Seculity type of th /* Password in case of	<pre>#define SSID_NAME #define SEC_TYPE #define PASSKEY</pre>	"Your_AP_Name_Here" /* A? SL_SEC_TYPE_WPA /* Security t n "Your_AP_Security_Key_Here" /*	
<pre>#define PING_INTERVAL #define PING TIMEOUT</pre>	1000 3000		<pre>#define PING_INTERVAL #define PING TIMEOUT</pre>	1000 3000	

Figure 17. Macro Definition of SSID_Name

- 6. Select Project>Rebuild All from the menu.
- 7. After building is finished, select Project>Download and Debug from the menu to start debugging.



5 Summary

After the development environment has been set up, see the following resources for further assistance in development:

Summary

- <u>CC3100 Programmer's Guide</u> This guide contains information on how to use the SimpleLink API for writing WLAN-enabled applications.
- <u>Uniflash</u> The Uniflash tool is used for manually storing files on the external serial flash. This includes the SimpleLink firmware patch file and any configuration files, security certificates, web pages, and so forth.
- <u>CC3100 Wiki</u> All information and tools for the CC3100, including the above, can be found on the CC3100 Wiki page.



Acronyms Used

6 Acronyms Used

STA – Wi-Fi Station

AP – Wi-Fi Access Point

WLAN – Wireless LAN

CCS - Code Composer Studio

GCC - GNU Compiler Collection

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Wireless Connectivity	www.ti.com/wirelessconnectivity		

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