CC3200 SimpleLink Wi-Fi and IoT Solution With MCU LaunchPad Getting Started Guide

User's Guide

Literature Number: SWRU376C
June 2014–Revised July 2015

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User's Guide

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CC3200 SimpleLink™ Wi-Fi® and IoT Solution With MCU LaunchPad™ Getting Started Guide

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 CC3200-LAUNCHXL
- An 802.11b/g/n (2.4 GHz) Wireless Access Point (AP).
- A computer running the Microsoft® Windows® 7 or XP operating systems.

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Wi-Fi is a registered trademark of WiFi Alliance.

2 Getting Started

2.1 Download and Install Software

Download and install the following software:

- CC3200 SDK package.
  - – This guide assumes the use of the default installation folder *C:\TI\CC3200SDK_1.1.0*\.
- Tera Term (or similar software)
  - – Tera Term link: http://en.sourceforge.jp/projects/ttssh2/releases/

2.2 Configure Board

The jumpers on the CC3200-LAUNCHXL should be connected as shown in Figure 1. It may be necessary to move a jumper from P58-VCC to SOP2.

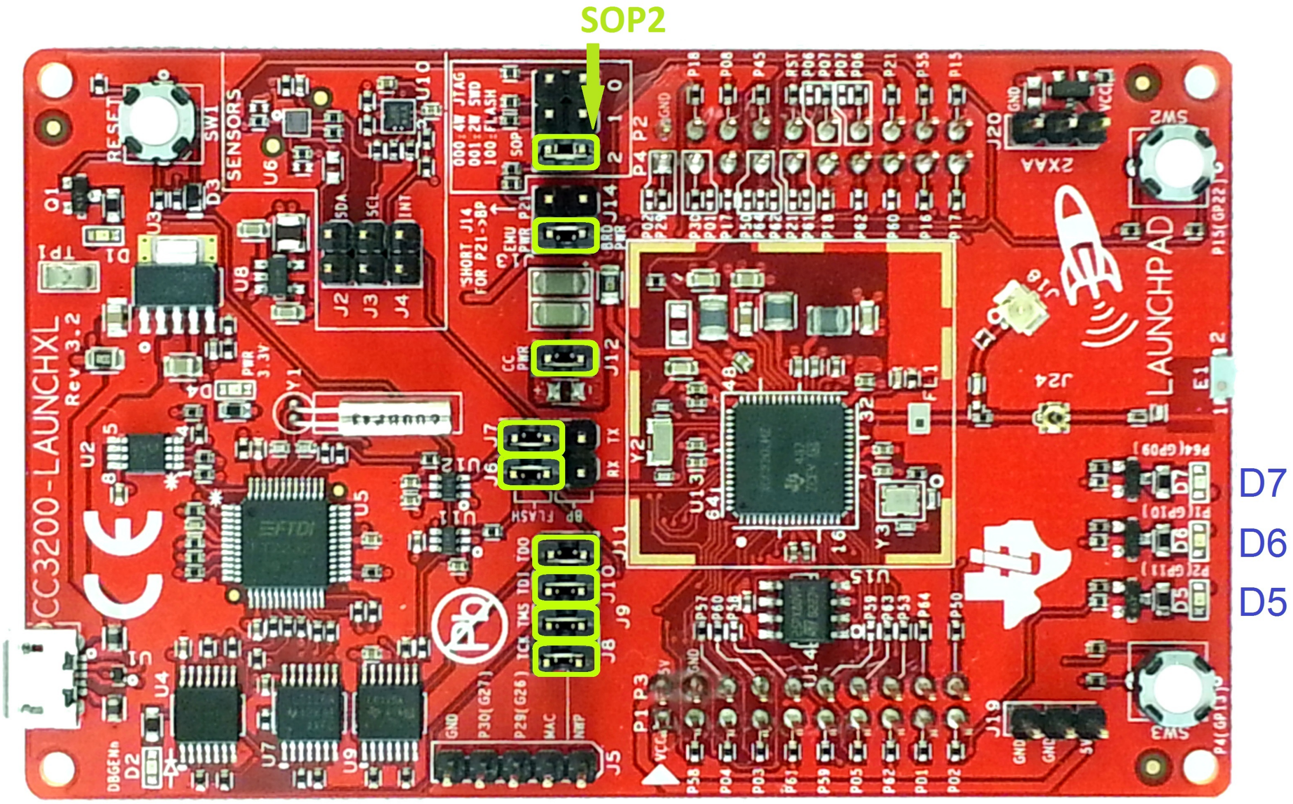


Figure 1. Jumpers on the CC3200-LAUNCHXL

1. Connect the CC3200-LAUNCHXL to the PC using the provided micro-USB cable.
2. The CC3200-LAUNCHXL is now visible in the Device Manager as shown in Figure 2. Note the COM port number that appears.

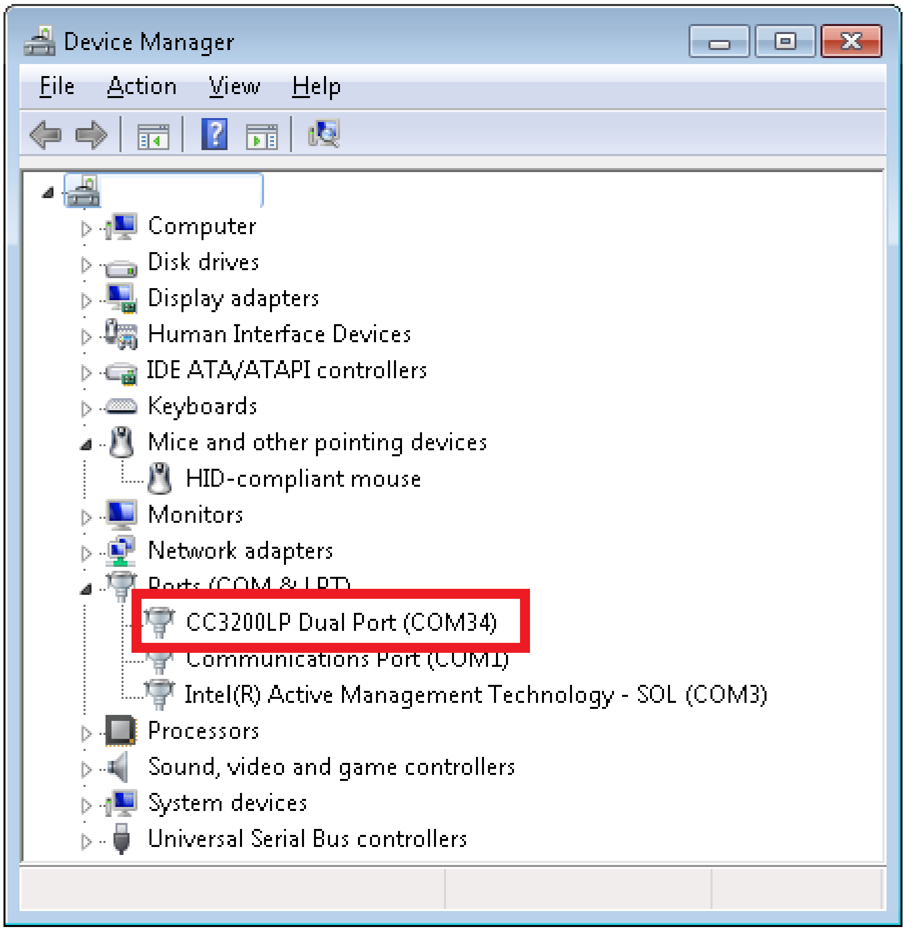

Device Manager
File
Action
View
Help
Computer
Disk drives
Display adapters
Human Interface Devices
IDE ATA/ATAPI controllers
Keyboards
Mice and other pointing devices
HID-compliant mouse
Monitors
Network adapters
Ports (COM & LPT)
CC3200LP Dual Port (COM34)
Communications Port (COM1)
Intel(R) Active Management Technology - SOL (COM3)
Processors
Sound, video and game controllers
System devices
Universal Serial Bus controllers

Figure 2. Device Manager

2.3 Update Service Pack

If the board is not already flashed with the service pack for SDK 1.1.0, the latest service pack for SDK 1.1.0 must be flashed on the CC3200. The latest service pack can be downloaded from http://www.ti.com/tool/cc3200sdk. Refer to the UNIFLASH Quick start guide for details on flashing the service pack to the CC3200 (http://processors.wiki.ti.com/index.php/CC31xx_%26_CC32xx_UniFlash#Service_Pack_Programming).

3 Compile, Download, and Debug

The CC3200 SDK supports CCS 6.0.1, IAR 7.30, and GCC IDE/compiler. The example shown here is *Getting Started with WLAN Station*, and performs the following functions:

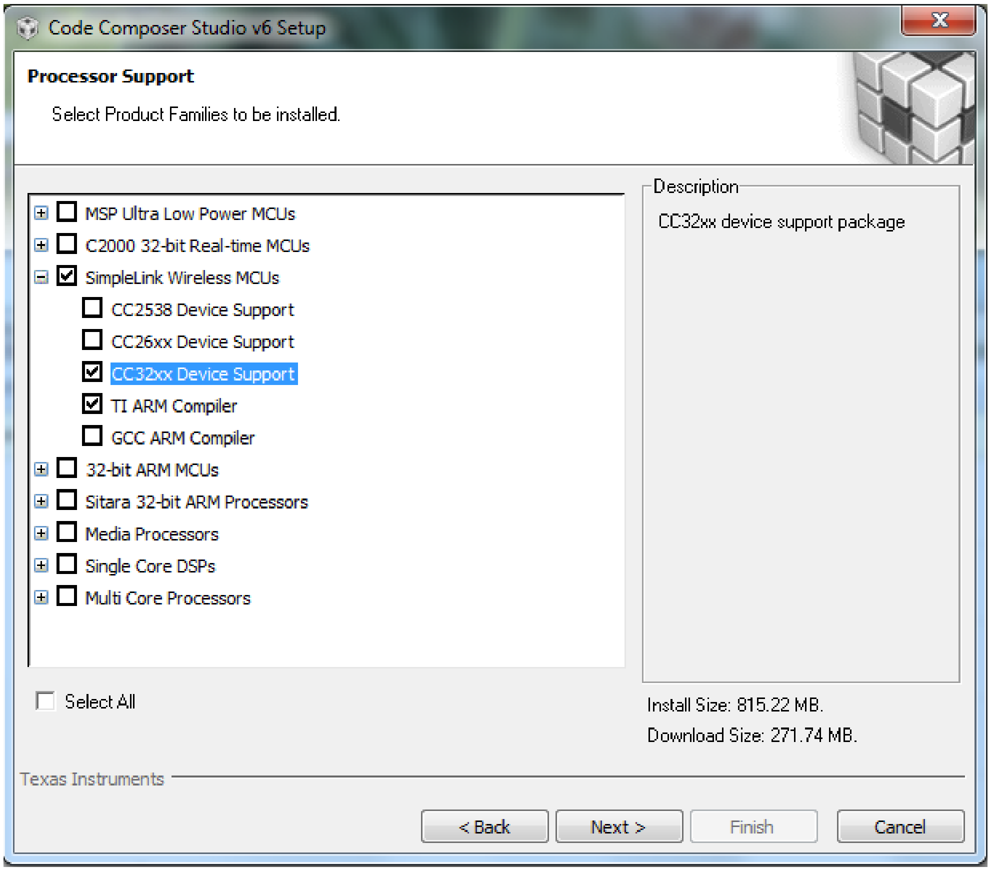
1. Program restores WLAN configuration to factory default.
2. Switches to Station mode if the device is in AP mode.
3. Connects to the user's Access Point (default SSID is ‘cc3200demo’). If the connection to the AP is successful, the red LED (D7) switches on.
4. Pings the user's AP. If the ping test is successful, the green LED (D5) switches on.
5. Pings to www.ti.com to check Internet connectivity. If the ping test is successful, the orange LED (D6) switches on.

This example uses a Real-Time Operating System (RTOS).

3.1 *Option 1: Code Composer Studio (CCS)*

3.1.1 Download and Install

Download and run the Code Composer Studio 6.0.1 (CCS) installation wizard (*ccs_setup_win32.exe*) from http://processors.wiki.ti.com/index.php/Category:Code_Composer_Studio_v6. The program must be Version 6.0.1.00040 or later. Select the Wireless Connectivity MCUs option for processor support. The remaining options for the installer should be left as the default. Installation time is typically 20 minutes, but can vary based on internet connection speed.



Code Composer Studio v6 Setup

Processor Support

Select Product Families to be installed.

- ⊞ ☐ MSP Ultra Low Power MCUs
- ⊞ ☐ C2000 32-bit Real-time MCUs
- ⊟ ☑ SimpleLink Wireless MCUs
  - ☐ CC2538 Device Support
  - ☐ CC26xx Device Support
  - ☑ CC32xx Device Support
  - ☑ TI ARM Compiler
  - ☐ GCC ARM Compiler
- ⊞ ☐ 32-bit ARM MCUs
- ⊞ ☐ Sitara 32-bit ARM Processors
- ⊞ ☐ Media Processors
- ⊞ ☐ Single Core DSPs
- ⊞ ☐ Multi Core Processors

☐ Select All

Description: CC32xx device support package

Install Size: 815.22 MB.

Download Size: 271.74 MB.

Figure 3. Code Composer Studio v6 Setup

3.1.2 Install TI-RTOS for SimpleLink and CC3200 Support Package

Install TI-RTOS for SimpleLink from the CCS App Center:

1. Start CCS, and choose a Workspace folder where the projects will reside.
2. Open the App Center from the *Help->Getting Started* screen.
3. Search 'CC3200' in the App Center to find 'TI-RTOS for SimpleLink' and 'CC3200 Add-On'
4. Select TI-RTOS
5. The CC3200 Add-On should already be installed. If not, select it.
6. Press 'Install Software'

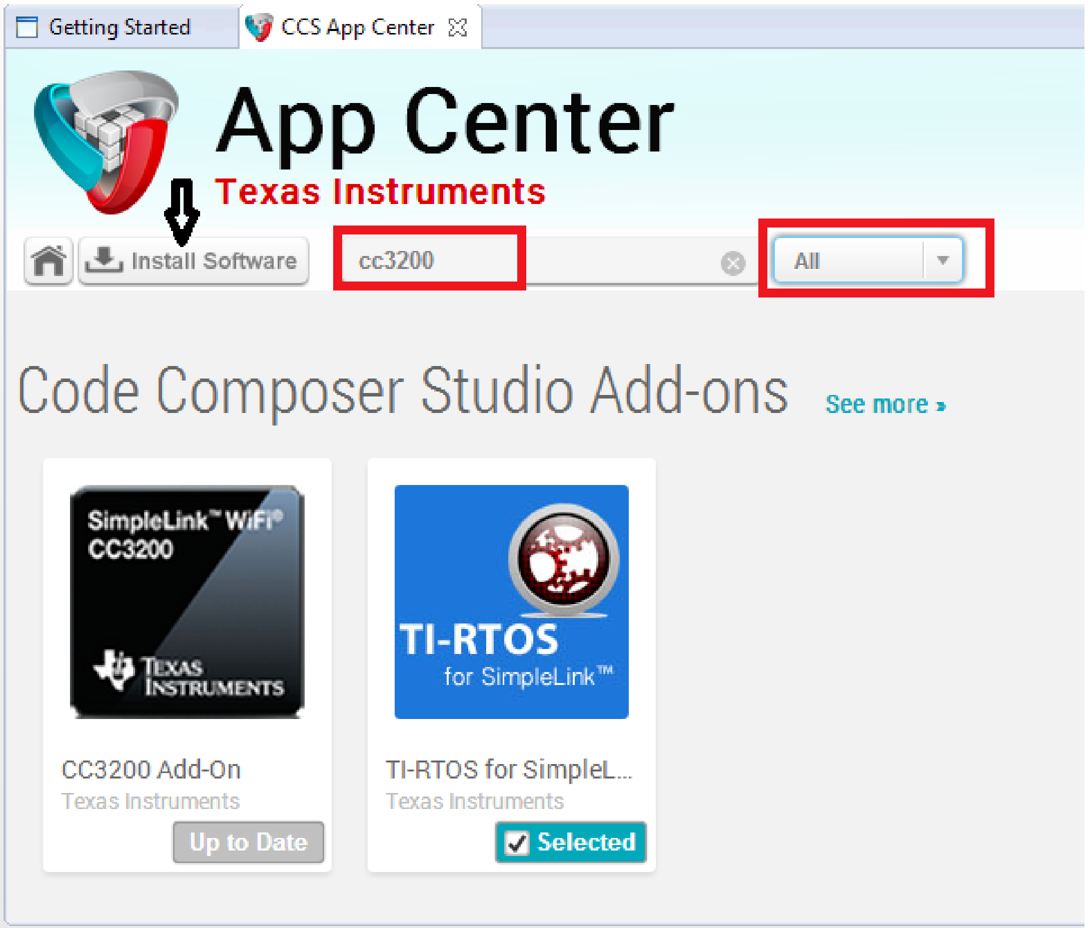
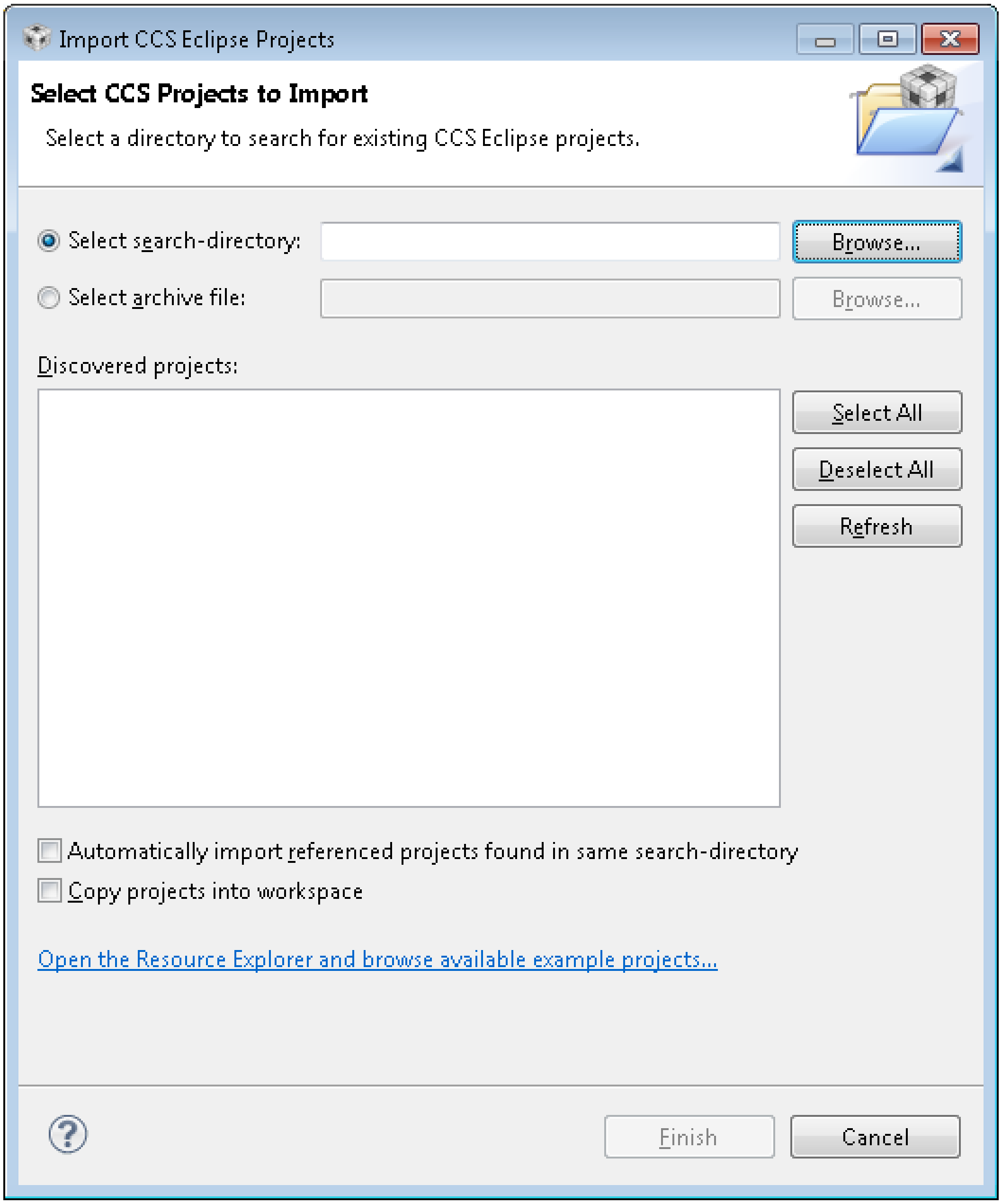


Figure 4. CCS App Center

3.1.3 Import and Configure Project

1. Choose *Project>Import CCS Projects* from the menu.
2. Select the Browse button in the Import CCS Eclipse Projects dialog, and Select the directory *C:\TI\CC3200SDK_1.1.0\cc3200-sdk*.



Import CCS Eclipse Projects

Select CCS Projects to Import

Select a directory to search for existing CCS Eclipse projects.

● Select search-directory: [ ] Browse...

○ Select archive file: [ ] Browse...

Discovered projects:

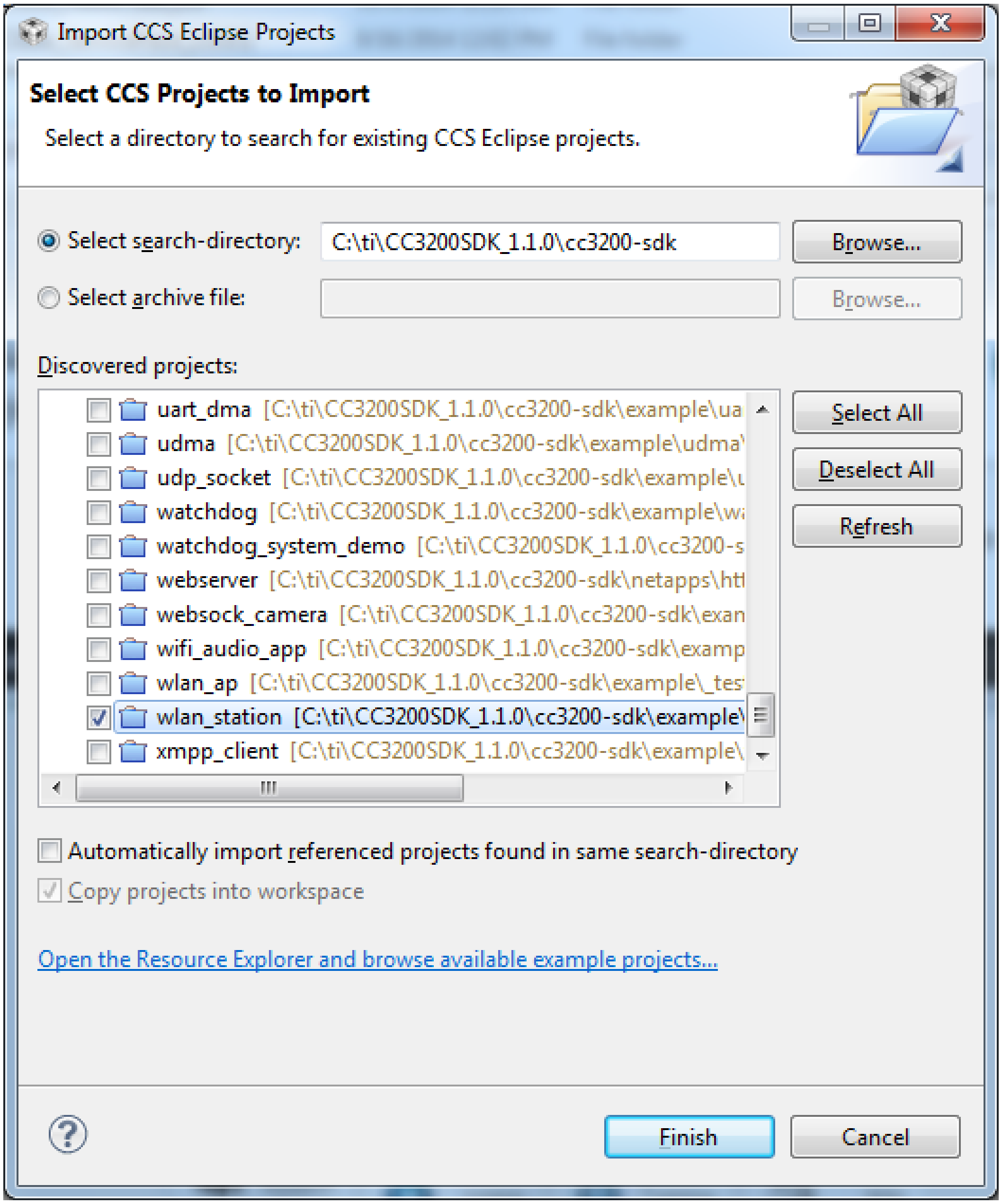
□ Automatically import referenced projects found in same search-directory

□ Copy projects into workspace

Open the Resource Explorer and browse available example projects...

Figure 5. Select CCS Projects to Import

3. Select the *wlan_station*, *driverlib*, *simplelink*, *oslib*, and *ti_rtos_config* projects. Click Finish. For any library import, do not check the 'Copy projects into workspace' option. This breaks the links from the libraries to their dependencies. The wlan_station project will automatically be copied to the workspace.



Import CCS Eclipse Projects

Select CCS Projects to Import

Select a directory to search for existing CCS Eclipse projects.

● Select search-directory: C:\ti\CC3200SDK_1.1.0\cc3200-sdk

○ Select archive file:

Discovered projects:

□ uart_dma [C:\ti\CC3200SDK_1.1.0\cc3200-sdk\example\ua
□ udma [C:\ti\CC3200SDK_1.1.0\cc3200-sdk\example\udma\
□ udp_socket [C:\ti\CC3200SDK_1.1.0\cc3200-sdk\example\u
□ watchdog [C:\ti\CC3200SDK_1.1.0\cc3200-sdk\example\wa
□ watchdog_system_demo [C:\ti\CC3200SDK_1.1.0\cc3200-s
□ webserver [C:\ti\CC3200SDK_1.1.0\cc3200-sdk\netapps\htt
□ websock_camera [C:\ti\CC3200SDK_1.1.0\cc3200-sdk\exan
□ wifi_audio_app [C:\ti\CC3200SDK_1.1.0\cc3200-sdk\examp
□ wlan_ap [C:\ti\CC3200SDK_1.1.0\cc3200-sdk\example_tes
☑ wlan_station [C:\ti\CC3200SDK_1.1.0\cc3200-sdk\example\
□ xmpp_client [C:\ti\CC3200SDK_1.1.0\cc3200-sdk\example\

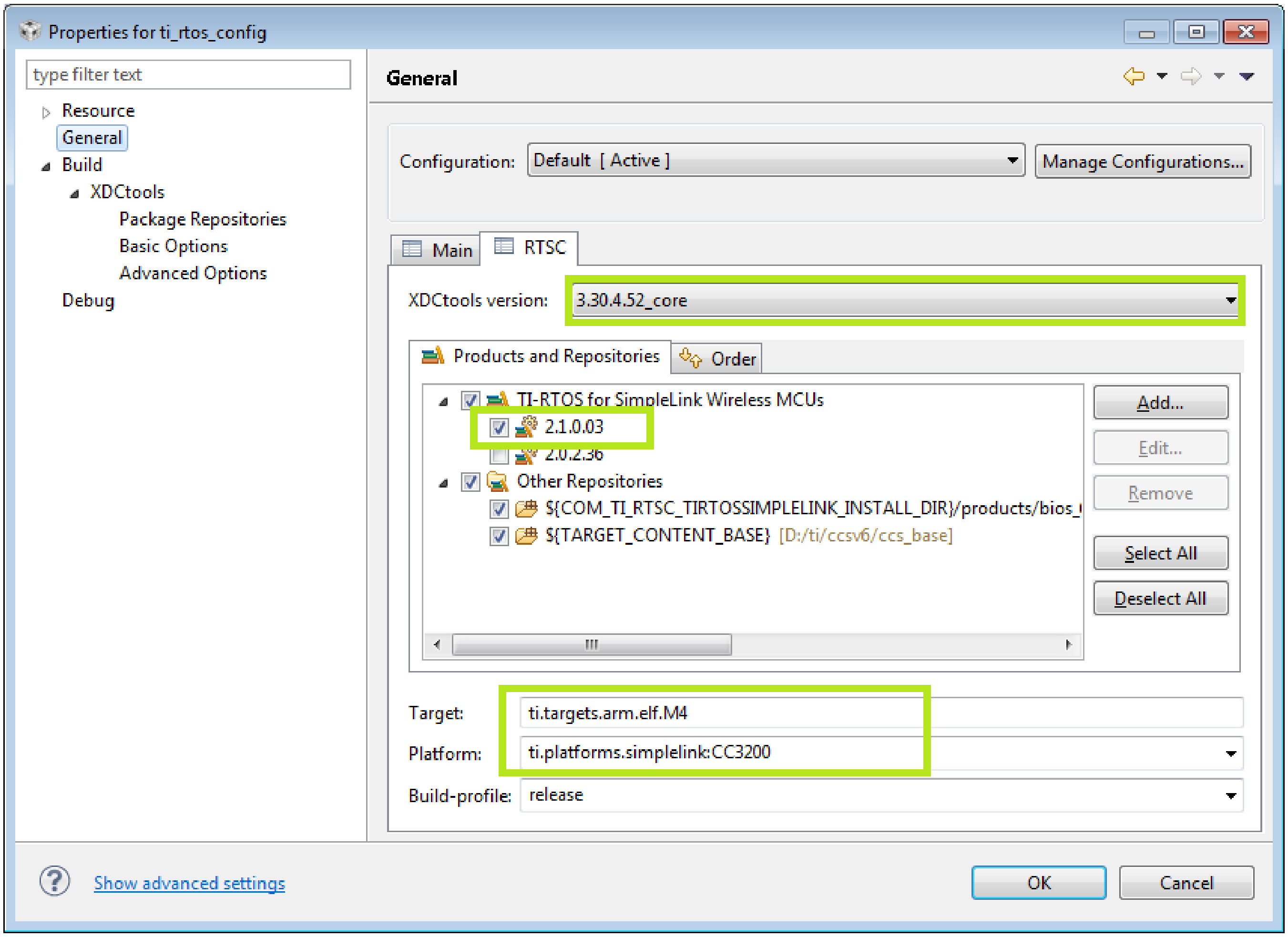
□ Automatically import referenced projects found in same search-directory

☑ Copy projects into workspace

Open the Resource Explorer and browse available example projects...

Figure 6. Select CCS Projects to Import

4. Select the *ti_rtos_config* project in Project Explorer, and select *Project>Properties* from the menu. Under *General*, select the RTSC tab as shown in Figure 7. Select the latest versions of XDCtools and TI-RTOS for SimpleLink (not shown in Figure 7). Also verify the platform is selected as ti.platforms.simplelink:CC3200.



Configuration: Default [Active]

XDCtools version: 3.30.4.52_core

- ☑ TI-RTOS for SimpleLink Wireless MCUs
  - ☑ 2.1.0.03
  - □ 2.0.2.36
- ☑ Other Repositories
  - ☑ ${COM_TI_RTSC_TIRTOSSIMPLELINK_INSTALL_DIR}/products/bios_
  - ☑ ${TARGET_CONTENT_BASE} [D:/ti/ccsv6/ccs_base]

Target: ti.targets.arm.elf.M4

Platform: ti.platforms.simplelink:CC3200

Build-profile: release

Figure 7. Properties for *ti_rtos_config*

5. Select the *simplelink* project and build it as shown in Figure 8.

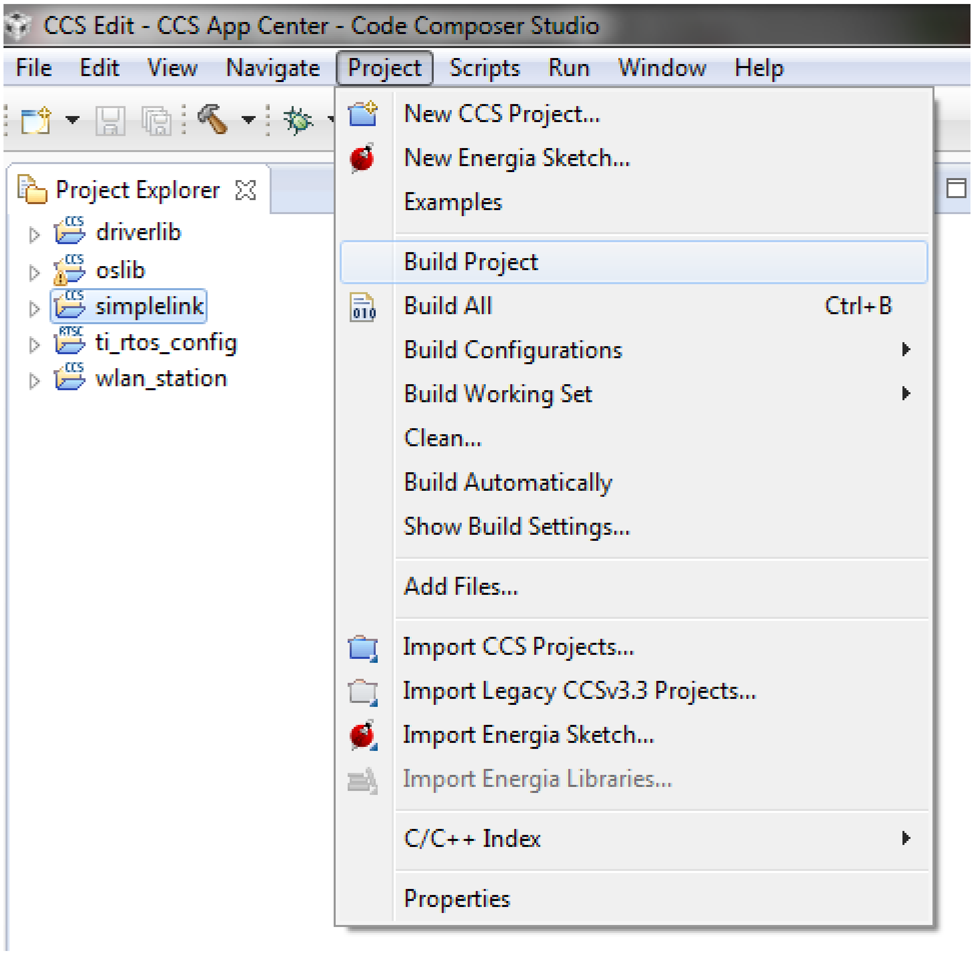
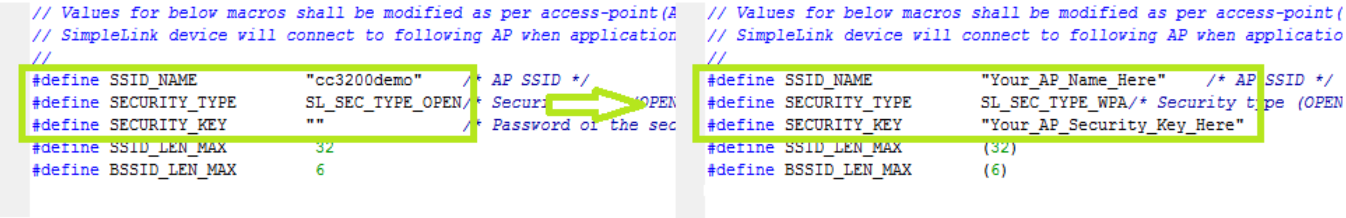


Figure 8. Select *simplelink* Project

6. Select the *ti_rtos_config* project and build it.
7. Select the *driverlib* project and build it.
8. Select the *oslib* project and build it.
9. Open the *common.h* file located at the path *C:\TI\CC3200SDK_1.1.0\cc3200-sdk\example\common\*.
10. Edit *common.h* to use the SSID, security type, and security key of the AP. Edit the macros SSID_NAME, SECURITY_TYPE, and SECURITY_KEY to contain the AP information as shown in Figure 9. The security types supported for this demo are WPA/WPA2 and Open. For Open security, define SECURITY_TYPE as SL_SEC_TYPE_OPEN. For WPA and WPA2 security, define it as SL_SEC_TYPE_WPA. Alternatively, the SSID and security of the AP can be changed to match the default (SSID: cc3200demo, Security: Open). For the SSID_NAME and SECURITY_KEY, the quotation marks must remain as part of the macro definition.



```
// Values for below macros shall be modified as per access-point(A
// SimpleLink device will connect to following AP when application
//
#define SSID_NAME           "cc3200demo"      /* AP SSID */
#define SECURITY_TYPE       SL_SEC_TYPE_OPEN/* Securi          OPEN
#define SECURITY_KEY        ""                /* Password of the sec
#define SSID_LEN_MAX         32
#define BSSID_LEN_MAX        6
```

```
// Values for below macros shall be modified as per access-point(
// SimpleLink device will connect to following AP when applicatio
//
#define SSID_NAME           "Your_AP_Name_Here"     /* AP SSID */
#define SECURITY_TYPE       SL_SEC_TYPE_WPA/* Security type (OPEN
#define SECURITY_KEY        "Your_AP_Security_Key_Here"
#define SSID_LEN_MAX        (32)
#define BSSID_LEN_MAX       (6)
```

Figure 9. Editing *common.h*

11. Save *common.h*.

12. Select the *wlan_station* project and build it.
13. The target configuration must be set before debugging from CCS. Navigate to *View>Target Configurations*.

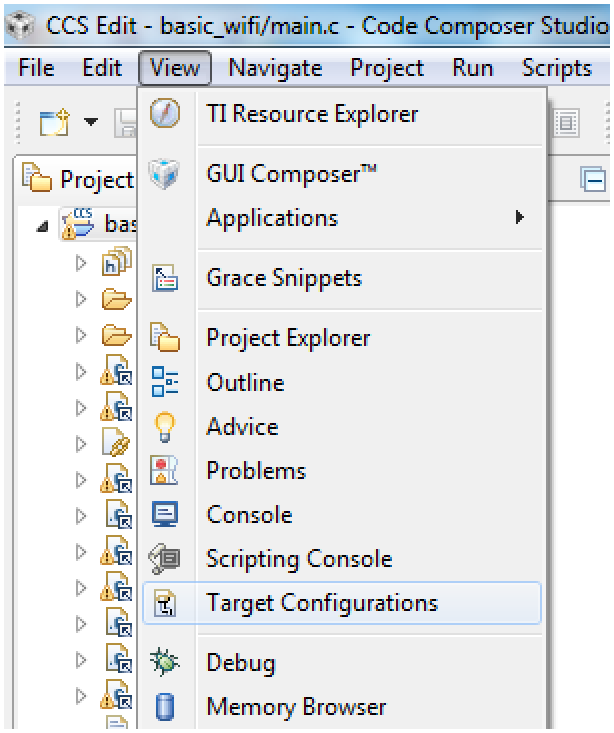


Figure 10. Target Configurations

14. Right Click on User Defined, select Import Target Configuration and select the file CC3200.ccxml from *C:\TI\CC3200SDK_1.1.0\cc3200-sdk\tools\ccs_patch*\. Select the Copy files option when prompted.

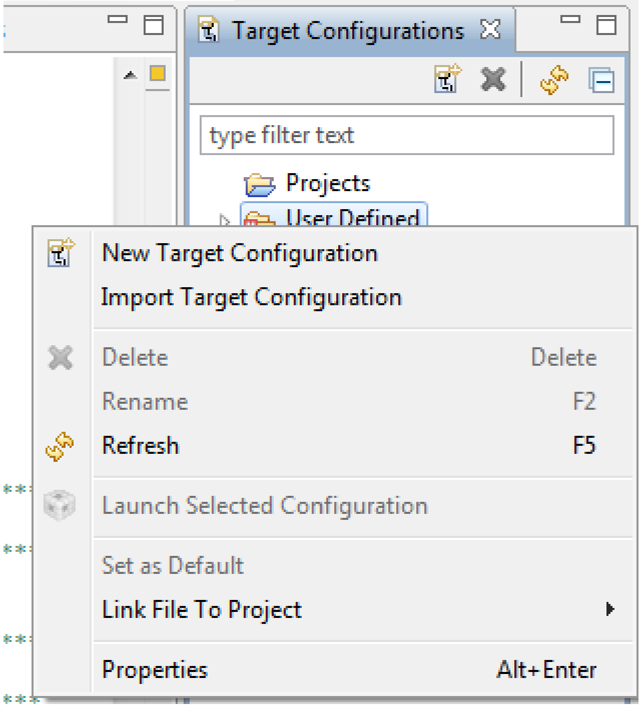


Figure 11. Import Target Configuration

15. Set this new configuration as the default by right clicking on the file name as shown in Figure 12.

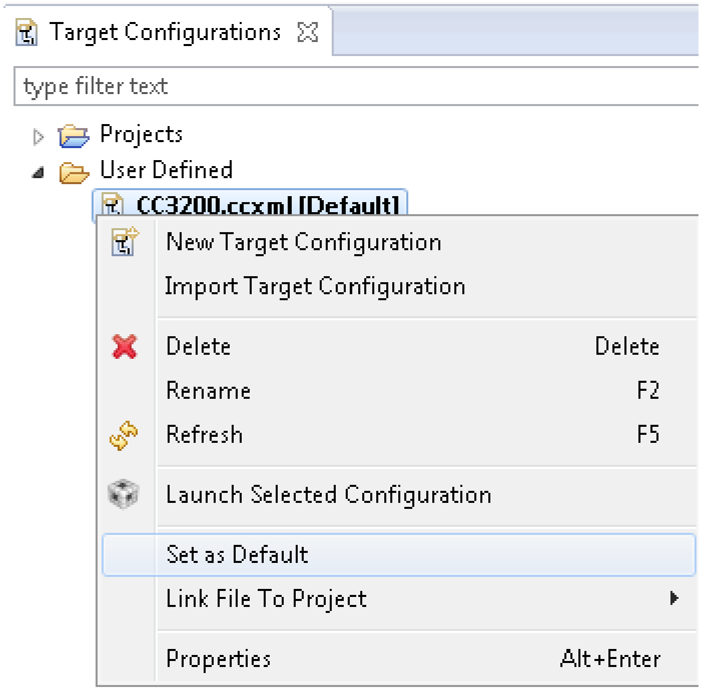
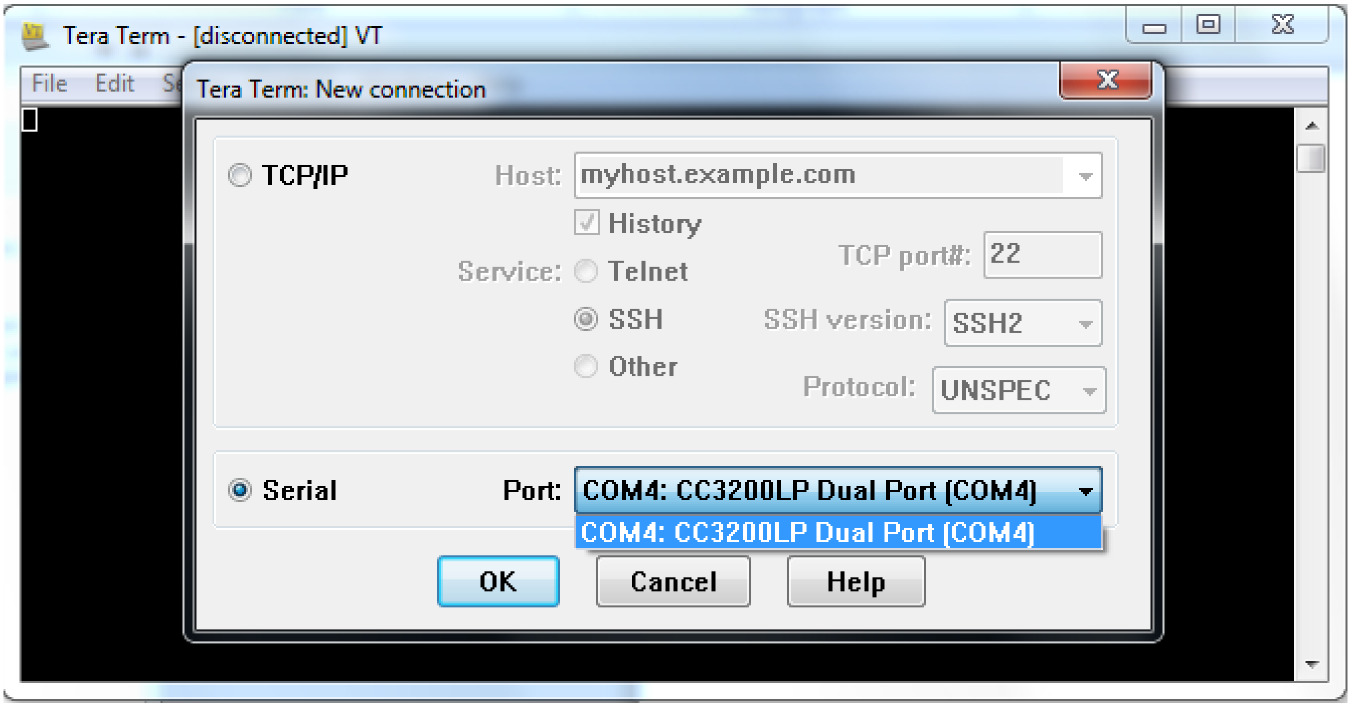


Figure 12. Set as Default

Caution: Only one FTDI board should be connected to the PC while CCS downloads code to the device.

16. Launch Tera Term, and create a new serial connection to the CC3200 Launchpad COM port as shown in Figure 13.

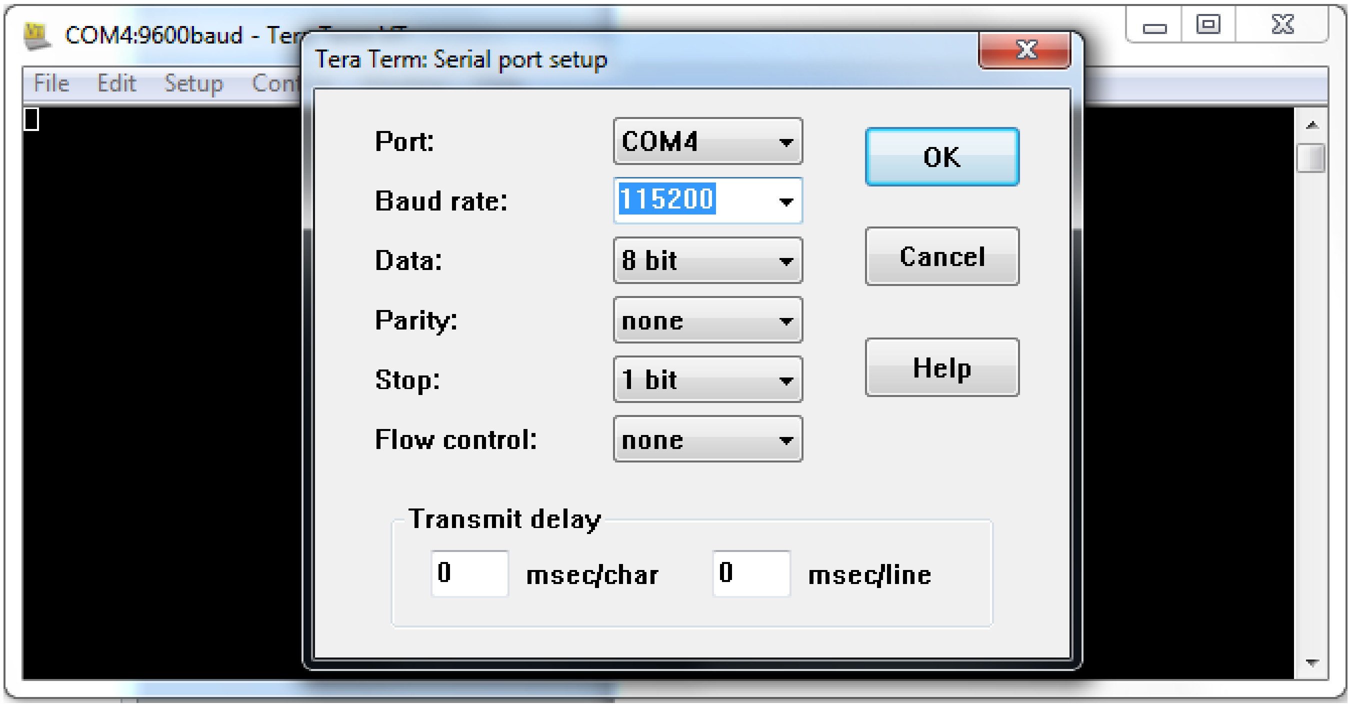


○ TCP/IP Host: myhost.example.com
☑ History
Service: ○ Telnet TCP port#: 22
● SSH SSH version: SSH2
○ Other Protocol: UNSPEC

● Serial Port: COM4: CC3200LP Dual Port (COM4)
COM4: CC3200LP Dual Port (COM4)

Figure 13. Launch Tera Term

17. In the menu, select Setup>Serial Port, and change the baud rate to 115200 as shown in Figure 14.



Tera Term: Serial port setup

Port: COM4

Baud rate: 115200

Data: 8 bit

Parity: none

Stop: 1 bit

Flow control: none

Transmit delay

0 msec/char 0 msec/line

Figure 14. Tera Term Serial Port Setup

18. Launch application. Select the *wlan_station* project in Project Explorer, then click the debug icon as shown in Figure 15 to download code to the device and begin debugging. Press F8 to begin execution.

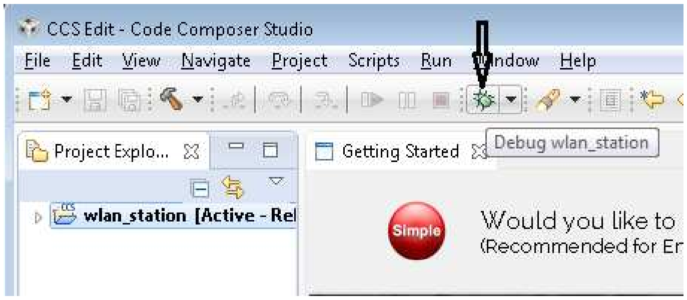
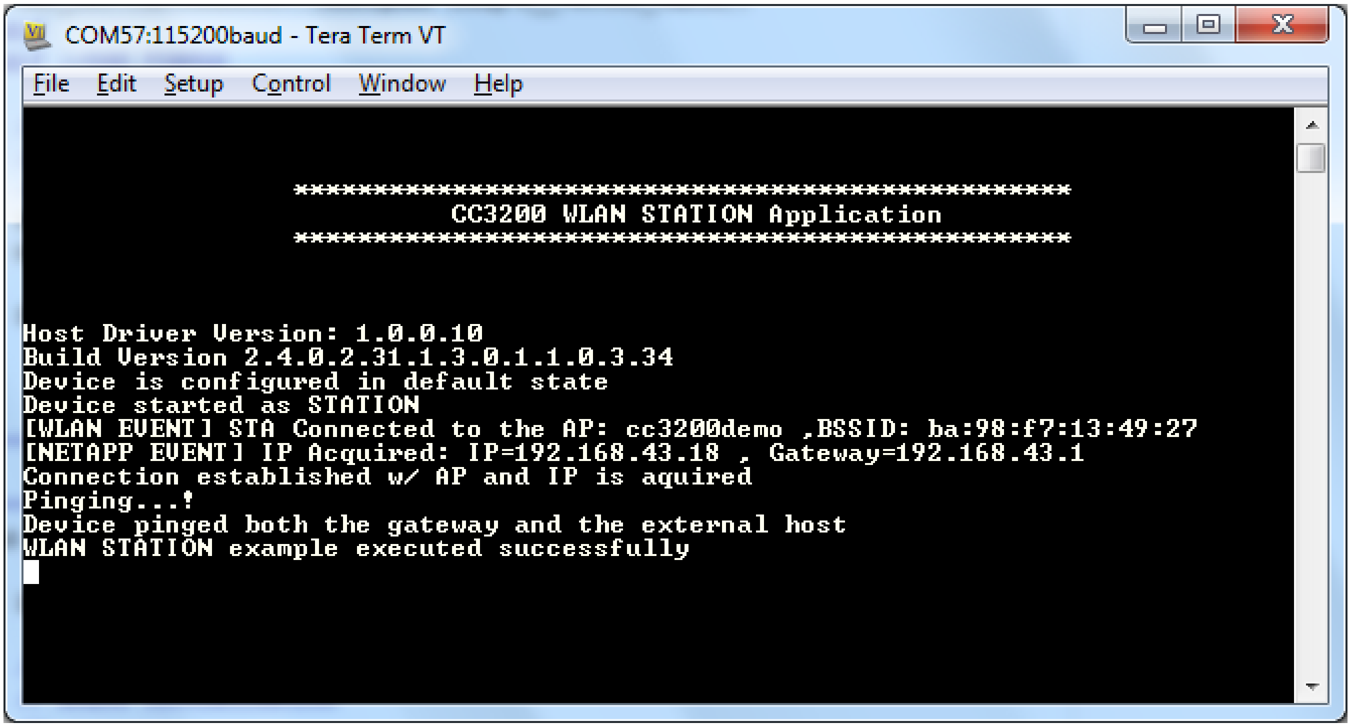

CCS Edit - Code Composer Studio
File Edit View Navigate Project Scripts Run Window Help
Project Explo...
wlan_station [Active - Rel
Getting Started
Debug wlan_station
Simple
Would you like to
(Recommended for Er

Figure 15. Debug *wlan_station*

19. If the CC3200 successfully completes all steps, the serial output appears as shown in Figure 16.


COM57:115200baud - Tera Term VT
File Edit Setup Control Window Help

```
                    ************************************************
                             CC3200 WLAN STATION Application
                    ************************************************


Host Driver Version: 1.0.0.10
Build Version 2.4.0.2.31.1.3.0.1.1.0.3.34
Device is configured in default state
Device started as STATION
[WLAN EVENT] STA Connected to the AP: cc3200demo ,BSSID: ba:98:f7:13:49:27
[NETAPP EVENT] IP Acquired: IP=192.168.43.18 , Gateway=192.168.43.1
Connection established w/ AP and IP is aquired
Pinging...!
Device pinged both the gateway and the external host
WLAN STATION example executed successfully
```

Figure 16. Tera Term VT

3.2 *Option 2: IAR Workbench*

3.2.1 Download IAR

The CC3200 SDK has been built and tested with IAR 7.30, and older versions of IAR projects might not work properly on IAR 7.30. Most examples will only run with the fully licensed IAR Workbench.

1. Download IAR for ARM processors from the IAR System website, and install it using the installation wizard.
2. If using IAR version 7.20 or earlier, copy the file *C:\TI\CC3200SDK_1.1.0\CC3200-sdk\tools\iar_patch\armLMIFTDI.dll* into the folder *C:\Program Files (x86)\IAR Systems\Embedded Workbench 7.0\arm\bin* (the user must replace the existing file).

3.2.2 Rebuild the SimpleLink Driver

1. Start IAR and select *File>Open>Workspace* from the menu.

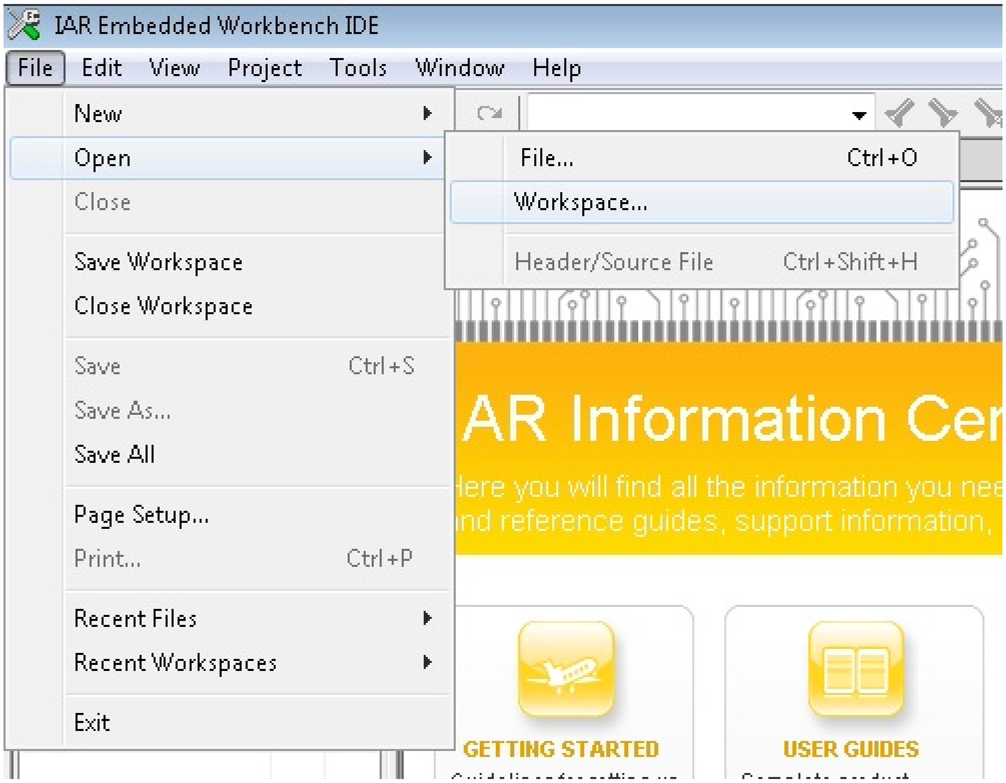
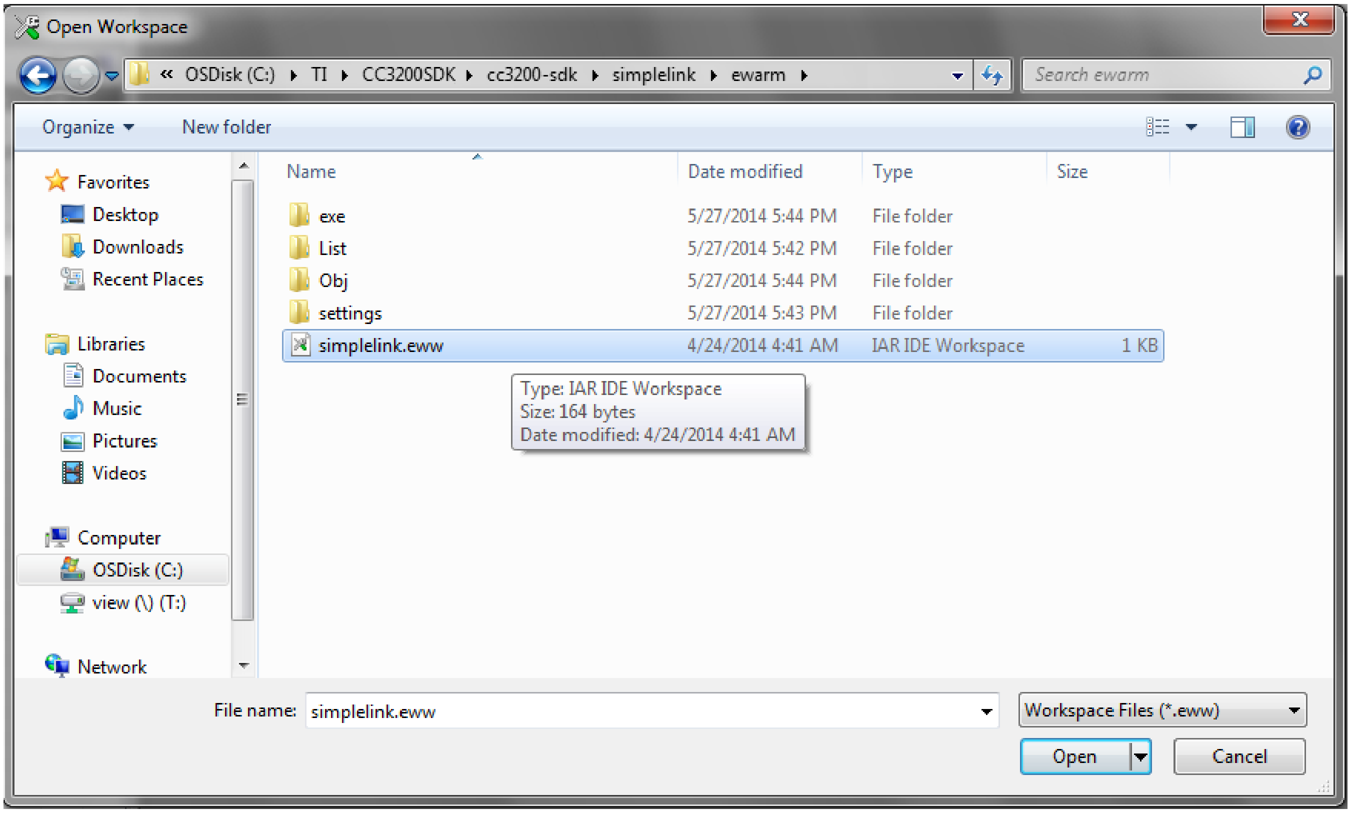


Figure 17. IAR Embedded Workbench IDE

2. Open the *simplelink* project by navigating to *C:\TI\CC3200SDK_1.1.0\cc3200-sdk\simplelink\ewarm* and opening *simplelink.eww*.



Name	Date modified	Type	Size
exe	5/27/2014 5:44 PM	File folder	
List	5/27/2014 5:42 PM	File folder	
Obj	5/27/2014 5:44 PM	File folder	
settings	5/27/2014 5:43 PM	File folder	
simplelink.eww	4/24/2014 4:41 AM	IAR IDE Workspace	1 KB

Type: IAR IDE Workspace
Size: 164 bytes
Date modified: 4/24/2014 4:41 AM

File name: simplelink.eww

Workspace Files (*.eww)

Figure 18. Open *simplelink.eww*

3. Rebuild the *simplelink* project by selecting *Project>Rebuild All* from the menu as shown in Figure 19.

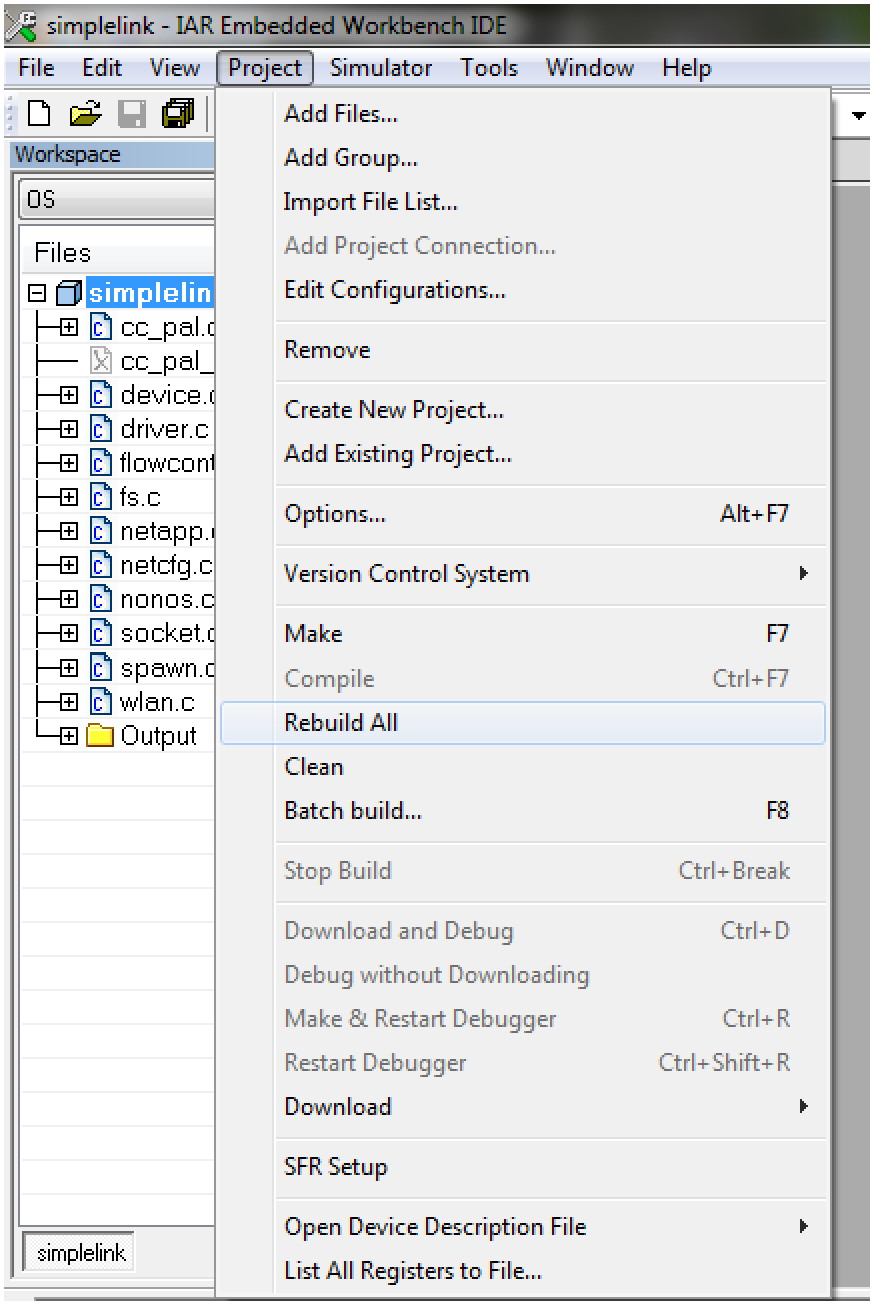
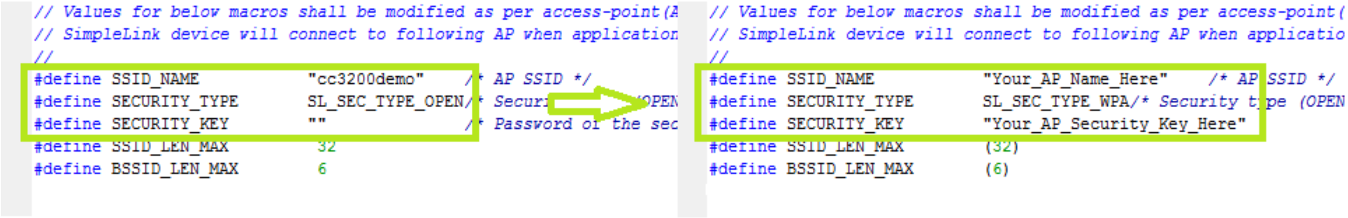


Figure 19. Rebuild the *simplelink* Project.

3.2.3 Rebuild, Download and Debug the WLAN Station Example

1. Open the *wlan_station* project by selecting *File>Open>Workspace* from the menu, navigating to *C:\TI\CC3200SDK_1.1.0\cc3200-sdk\example\ getting_started_with_wlan_station\ewarm*, and opening *wlan_station.eww*.
2. Open the *common.h* file located at the path *C:\TI\CC3200SDK_1.1.0\cc3200-sdk\example\common\*.
3. Edit *common.h* to use the SSID, security type, and security key of the AP. Edit the macros SSID_NAME, SECURITY_TYPE, and SECURITY_KEY to contain the AP information as shown in Figure 20. The security types supported for this demo are WPA/WPA2 and Open. For Open security, define SECURITY_TYPE as SL_SEC_TYPE_OPEN. For WPA and WPA2 security, define it as SL_SEC_TYPE_WPA.

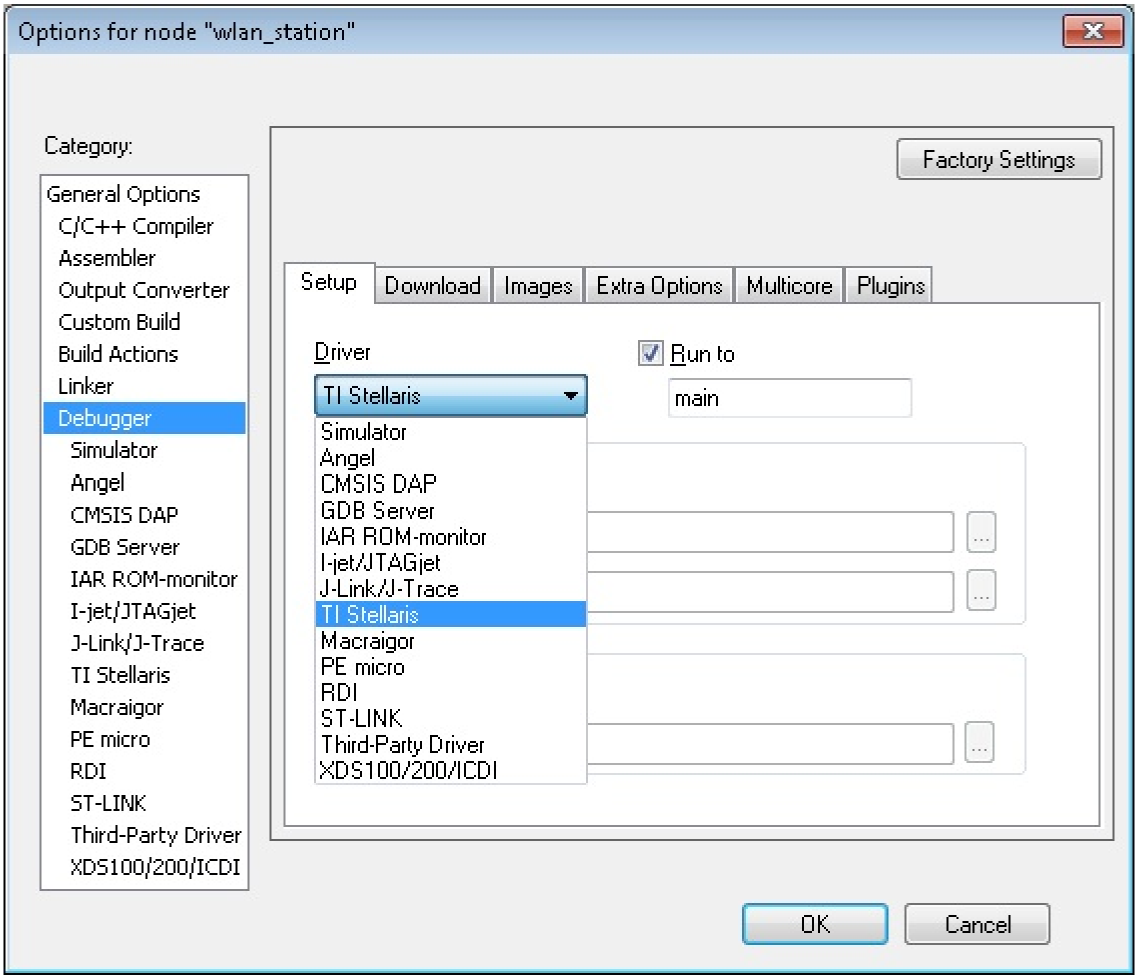


```
// Values for below macros shall be modified as per access-point(A
// SimpleLink device will connect to following AP when application
//
#define SSID_NAME           "cc3200demo"     /* AP SSID */
#define SECURITY_TYPE       SL_SEC_TYPE_OPEN/* Securi         OPEN
#define SECURITY_KEY        ""               /* Password of the sec
#define SSID_LEN_MAX         32
#define BSSID_LEN_MAX        6
```

```
// Values for below macros shall be modified as per access-point(
// SimpleLink device will connect to following AP when applicatio
//
#define SSID_NAME           "Your_AP_Name_Here"    /* AP SSID */
#define SECURITY_TYPE       SL_SEC_TYPE_WPA/* Security type (OPEN
#define SECURITY_KEY        "Your_AP_Security_Key_Here"
#define SSID_LEN_MAX        (32)
#define BSSID_LEN_MAX       (6)
```

Figure 20. Editing *common.h*

4. Save *common.h*.
5. Rebuild the *wlan_station* project by selecting *Project>Rebuild All* from the menu.
6. The debugger must be configured to download code to the device. Select *Project>Options* from the menu, and select the Debugger category. In the Setup tab, choose TI Stellaris as the driver, as shown in Figure 21, and press OK.



Options for node "wlan_station"

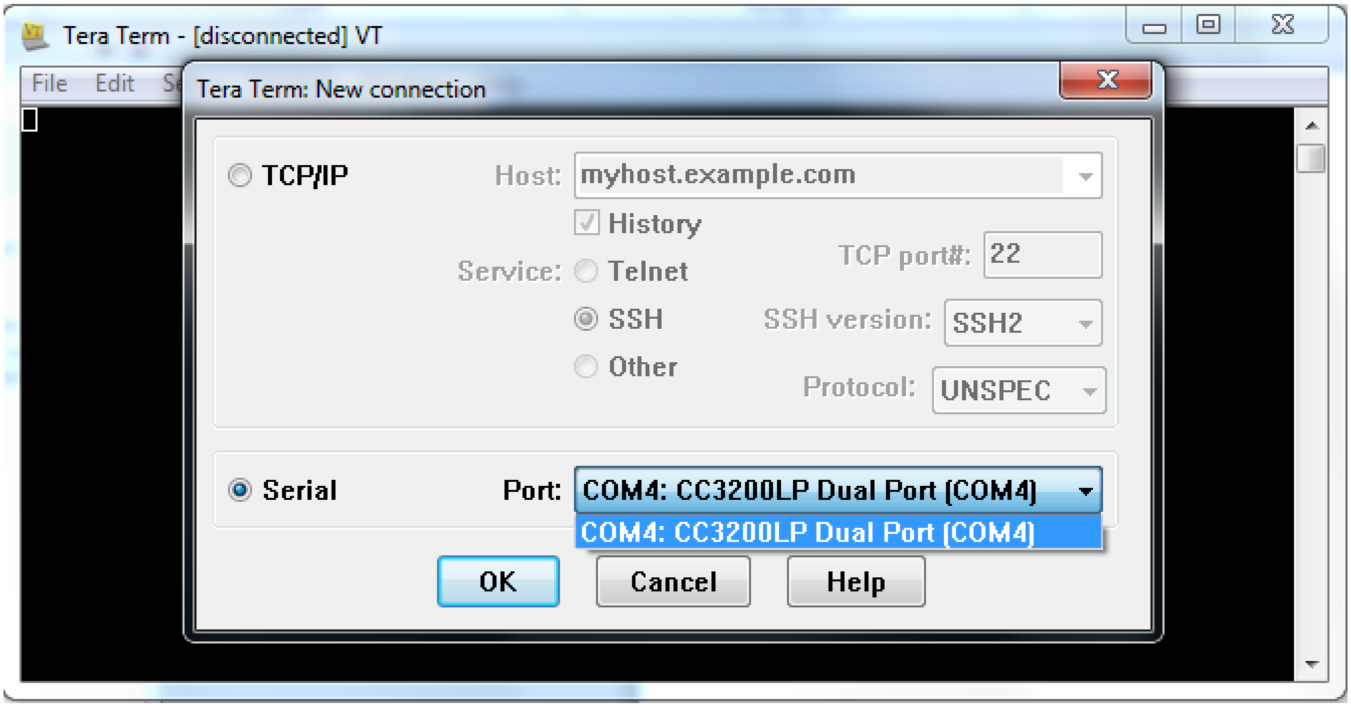
Category: Debugger

Setup — Driver: TI Stellaris

☑ Run to: main

Figure 21. Select TI Stellaris Driver

7. Launch Tera Term, and create a new serial connection to the CC3200 Launchpad COM port as shown in Figure 22.



Tera Term - [disconnected] VT

Tera Term: New connection

○ TCP/IP Host: myhost.example.com

☑ History

Service: ○ Telnet TCP port#: 22

● SSH SSH version: SSH2

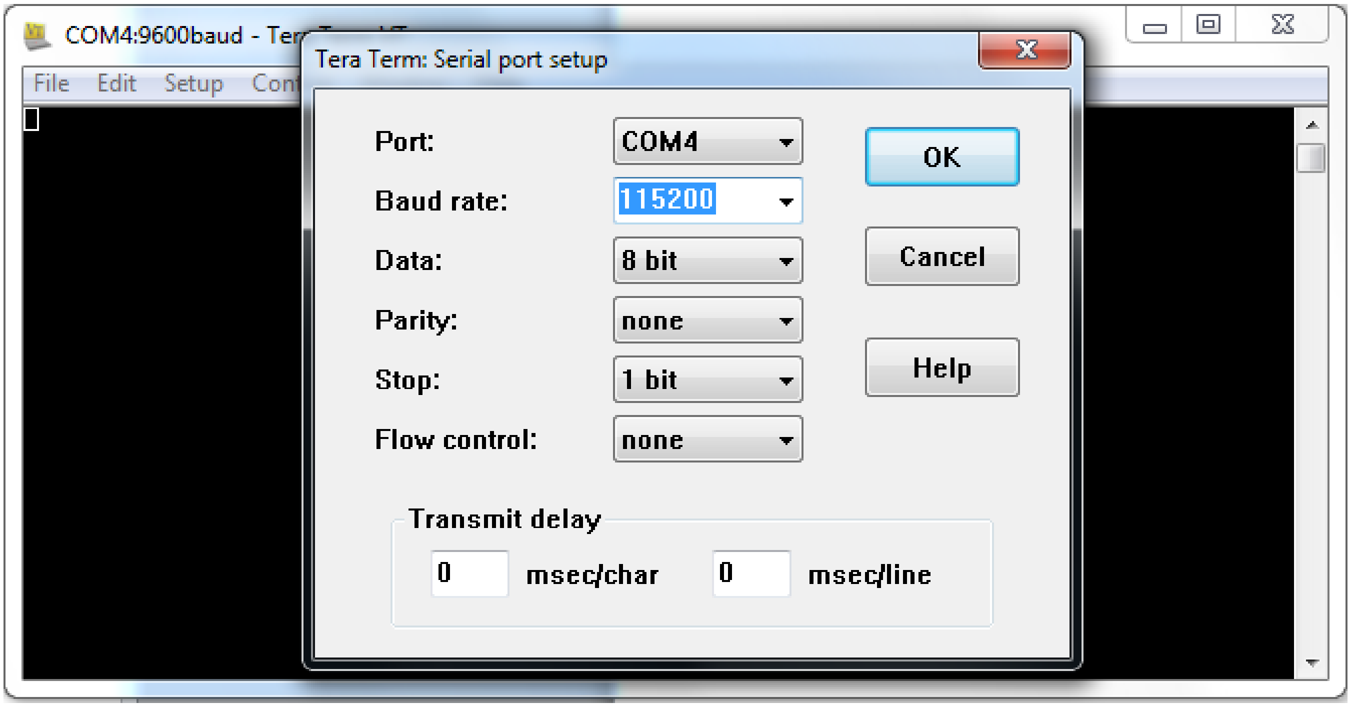
○ Other Protocol: UNSPEC

● Serial Port: COM4: CC3200LP Dual Port (COM4)

COM4: CC3200LP Dual Port (COM4)

Figure 22. Launch Tera Term

8. In the menu, select Setup>Serial Port, and change the baud rate to 115200 as shown in Figure 23.



COM4:9600baud - Tera Term VT

Tera Term: Serial port setup

Port: COM4

Baud rate: 115200

Data: 8 bit

Parity: none

Stop: 1 bit

Flow control: none

Transmit delay

0 msec/char 0 msec/line

Figure 23. Tera Term Serial Port Setup

9. Click the debug icon as shown in Figure 24 to download code to the device and start debugging. Select *Debug>Go* from the menu or press F5 to begin execution.

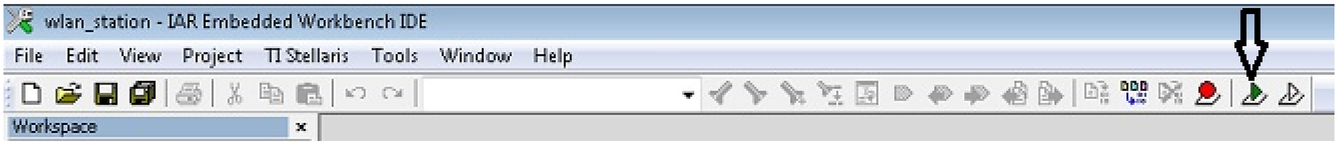
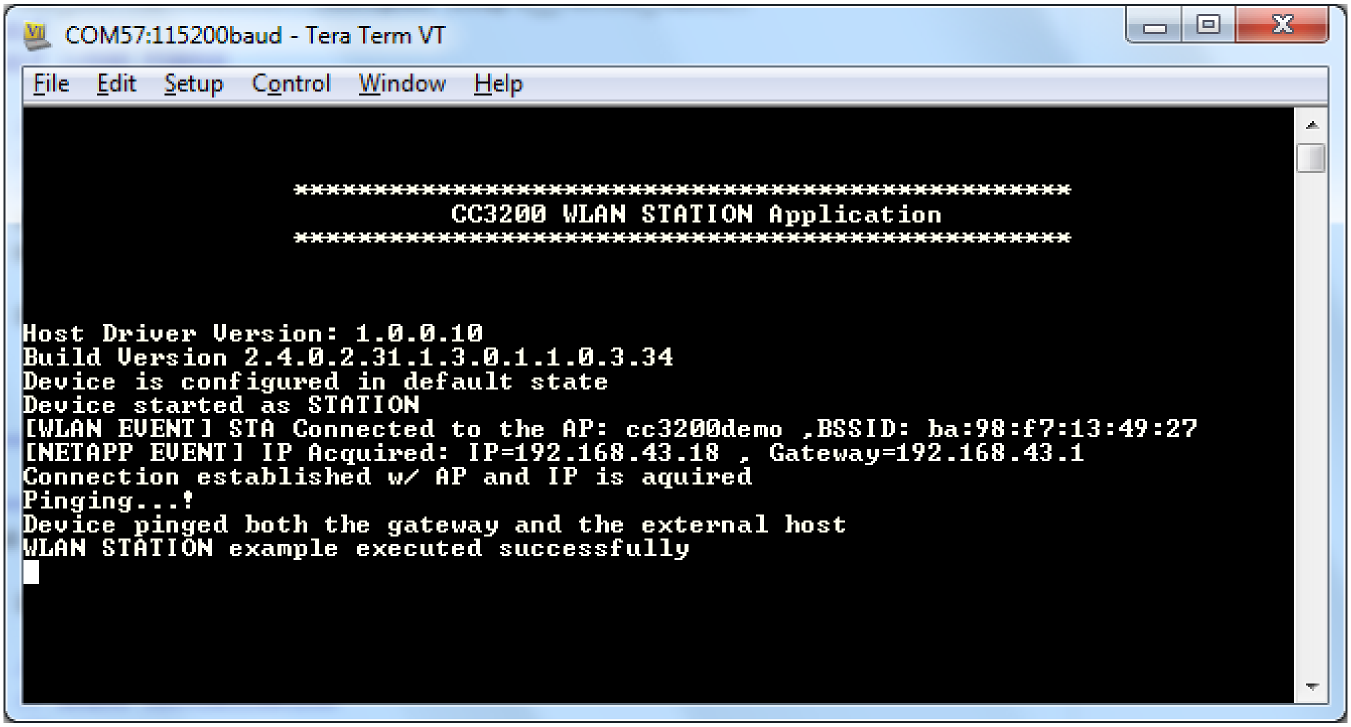

wlan_station - IAR Embedded Workbench IDE
File Edit View Project TI Stellaris Tools Window Help
Workspace

Figure 24. Debug Icon

10. If the CC3200 successfully completes all steps, the serial output appears as shown in Figure 25.


COM57:115200baud - Tera Term VT
File Edit Setup Control Window Help

```
                 ************************************************
                           CC3200 WLAN STATION Application
                 ************************************************


Host Driver Version: 1.0.0.10
Build Version 2.4.0.2.31.1.3.0.1.1.0.3.34
Device is configured in default state
Device started as STATION
[WLAN EVENT] STA Connected to the AP: cc3200demo ,BSSID: ba:98:f7:13:49:27
[NETAPP EVENT] IP Acquired: IP=192.168.43.18 , Gateway=192.168.43.1
Connection established w/ AP and IP is aquired
Pinging...!
Device pinged both the gateway and the external host
WLAN STATION example executed successfully
```

Figure 25. Tera Term VT

3.3 Option 3: GCC

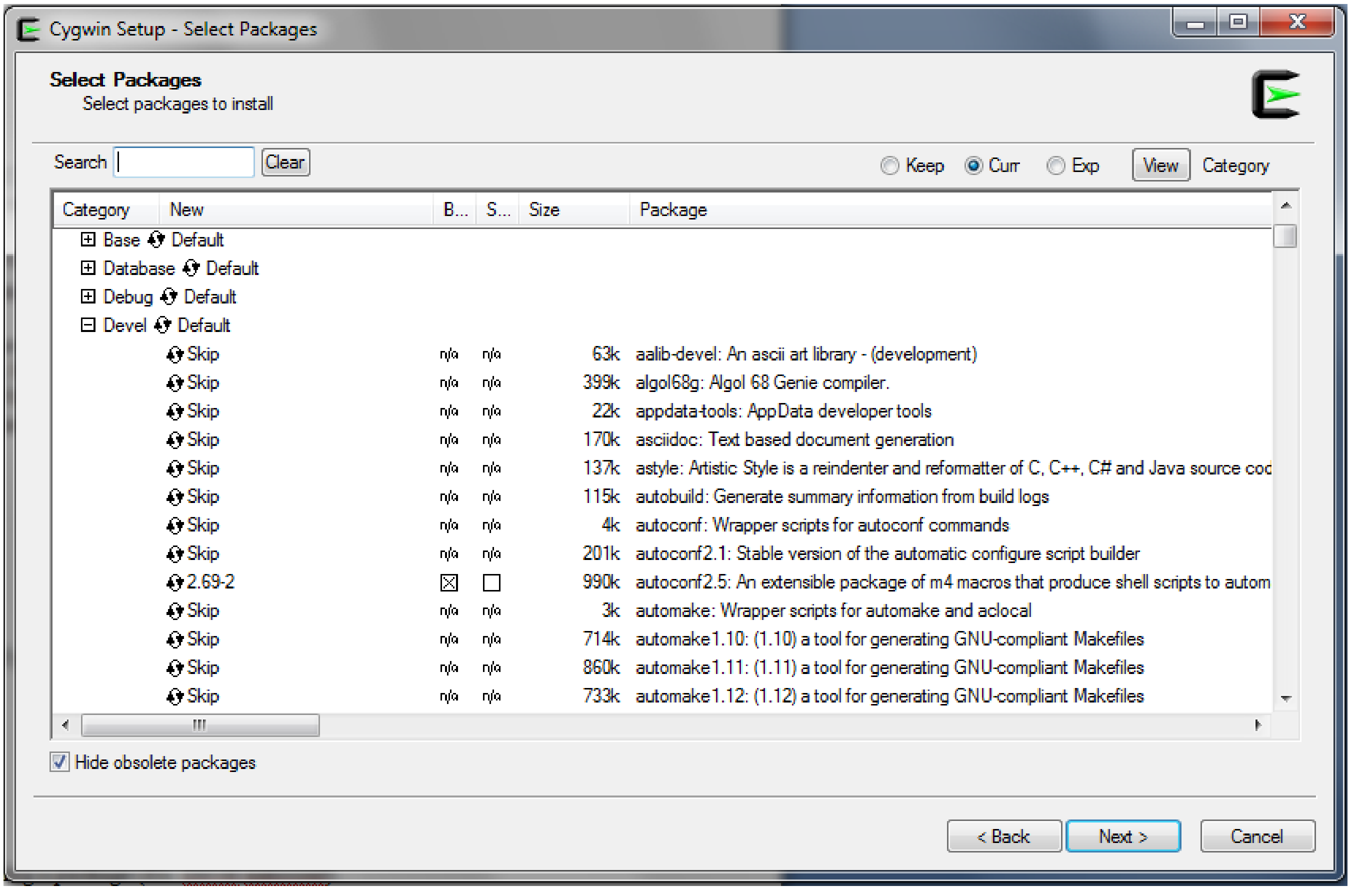
This section demonstrates the GCC setup for the Windows 7 environment. GCC installation requires other dependencies to be installed to work with ARM-based devices.

3.3.1 Install Cygwin (Windows)

1. Download *setup-x86.exe* from http://cygwin.com/install.html and run it. Select the Install from Internet option.
2. Specify a proxy if necessary, depending on the network.
3. Choose a download site (for example, http://mirrors.kernel.org).
4. Include the latest versions of the following packages in the Cygwin installation (in addition to those included in the base installation):
   - Archive/unzip
   - Archive/zip
   - Devel/autoconf
   - Devel/automake
   - Devel/libtool
   - Devel/make
   - Devel/subversion (**Note**: if using TortoiseSVN/Windows7, skip this file)

- Devel/gcc-core
- Devel/gcc-g++
- Devel/mingw-gcc-core
- Devel/mingw-gcc-g++
- Devel/mingw-runtime

See Figure 26 for an example of selecting a package (as example: Devel/autoconf).



Category	New	B...	S...	Size	Package
⊞ Base Default					
⊞ Database Default					
⊞ Debug Default					
⊟ Devel Default					
	Skip	n/a	n/a	63k	aalib-devel: An ascii art library - (development)
	Skip	n/a	n/a	399k	algol68g: Algol 68 Genie compiler.
	Skip	n/a	n/a	22k	appdata-tools: AppData developer tools
	Skip	n/a	n/a	170k	asciidoc: Text based document generation
	Skip	n/a	n/a	137k	astyle: Artistic Style is a reindenter and reformatter of C, C++, C# and Java source coc
	Skip	n/a	n/a	115k	autobuild: Generate summary information from build logs
	Skip	n/a	n/a	4k	autoconf: Wrapper scripts for autoconf commands
	Skip	n/a	n/a	201k	autoconf2.1: Stable version of the automatic configure script builder
	2.69-2	☒	□	990k	autoconf2.5: An extensible package of m4 macros that produce shell scripts to autom
	Skip	n/a	n/a	3k	automake: Wrapper scripts for automake and aclocal
	Skip	n/a	n/a	714k	automake1.10: (1.10) a tool for generating GNU-compliant Makefiles
	Skip	n/a	n/a	860k	automake1.11: (1.11) a tool for generating GNU-compliant Makefiles
	Skip	n/a	n/a	733k	automake1.12: (1.12) a tool for generating GNU-compliant Makefiles

Figure 26. Cygwin Setup

5. The system will find dependencies. Press Next.
6. After a successful Cygwin installation, add its path (*c:\cygwin\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:\cygwin\bin\” to the end of the line and press Ok.

3.3.2 Get GNU Tools for ARM Embedded Processors

Download and run the latest version of *gcc-arm-none-eabi-<version>-win32.exe* from https://launchpad.net/gcc-arm-embedded. The link to the file should be on the right side of the page and will appear as a green button with the text: ”gcc-arm-non...4-win32.exe.” Install under the Cygwin root directory (default: *c:\cygwin*).

3.3.3 Build OpenOCD for FTDI Interface

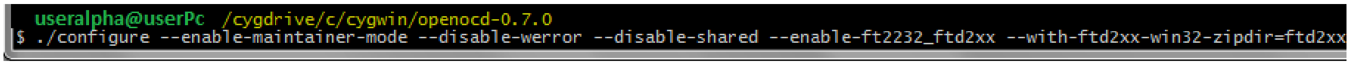
1. Download the Open On-Chip Debugger (OpenOCD) source from http://sourceforge.net/projects/openocd/files/openocd/0.7.0/ Look for the zip file *openocd-0.7.0.zip*.
2. Extract the OpenOCD source into the Cygwin directory (*c:\cygwin*). This creates a directory called *openocd-<version>* (for example, *c:\cygwin\openocd-0.7.0*) under the Cygwin directory containing all

the OpenOCD source contents.

3. Download the FTDI driver library (x86 [32-bit] zip version) at http://www.ftdichip.com/Drivers/CDM/CDM%20v2.10.00%20WHQL%20Certified.zip.
4. Extract the FTDI source into the path *c:\cygwin\openocd-<version> ftd2xx* (for example, *c:\cygwin\openocd-0.7.0\ ftd2xx*).
5. Run the Cygwin terminal and change the directory to *openocd-<version>* (for example, by using a command such as: *cd c:cygwin/openocd-0.7.0*).
6. Run the following command:

```
./configure --enable-maintainer-mode --disable-werror --disable-shared --enable-ft2232_ftd2xx -
-with-ftd2xx-win32-zipdir=ftd2xx
```

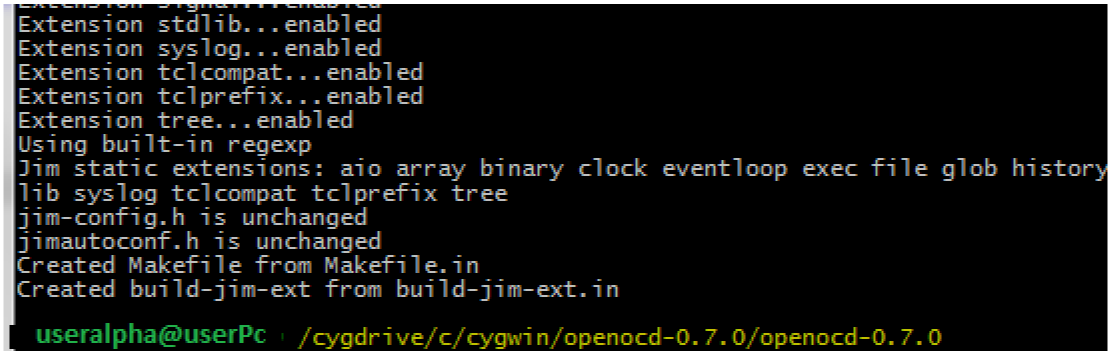
The command should look similar to Figure 27.



```
 useralpha@userPc  /cygdrive/c/cygwin/openocd-0.7.0
$ ./configure --enable-maintainer-mode --disable-werror --disable-shared --enable-ft2232_ftd2xx --with-ftd2xx-win32-zipdir=ftd2xx
```

Figure 27. Cygwin Terminal

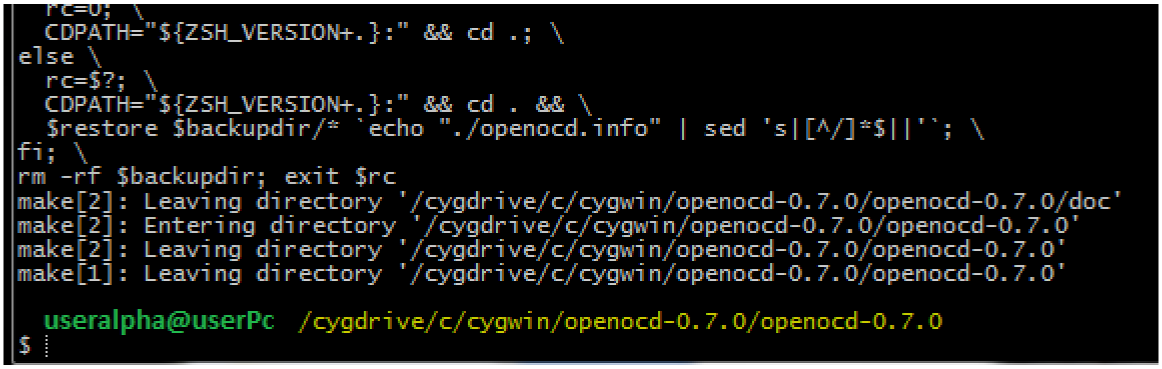
The last lines of the result should appear as in Figure 28.



```
Extension stdlib...enabled
Extension syslog...enabled
Extension tclcompat...enabled
Extension tclprefix...enabled
Extension tree...enabled
Using built-in regexp
Jim static extensions: aio array binary clock eventloop exec file glob history
lib syslog tclcompat tclprefix tree
jim-config.h is unchanged
jimautoconf.h is unchanged
Created Makefile from Makefile.in
Created build-jim-ext from build-jim-ext.in

 useralpha@userPc  /cygdrive/c/cygwin/openocd-0.7.0/openocd-0.7.0
```

Figure 28. Cygwin Terminal

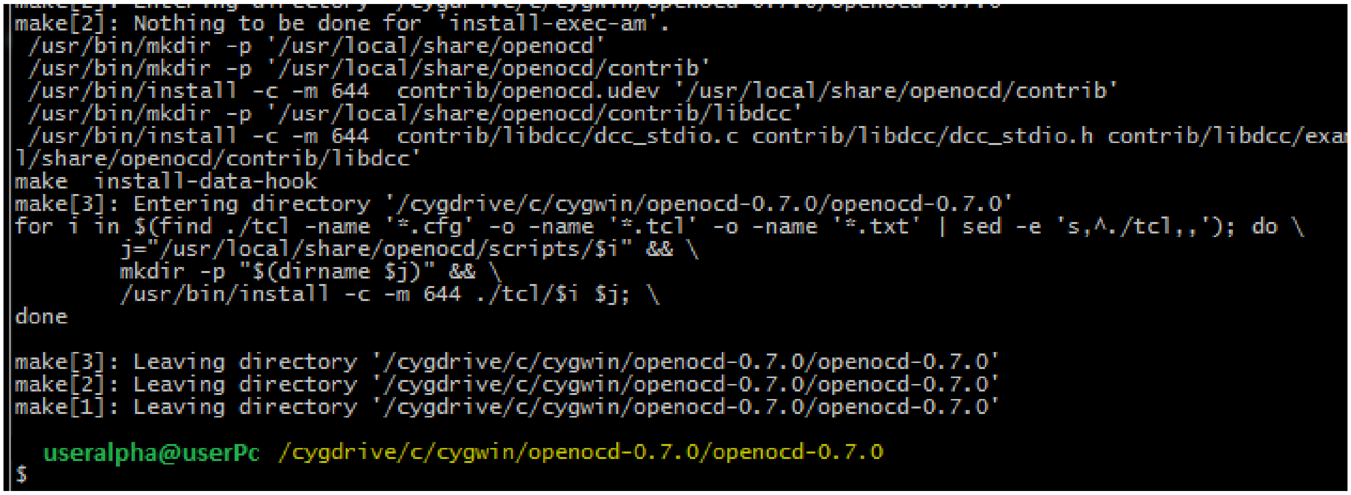
7. Run the command autoreconf --force --install.
8. Run the command 'make.' This may take several minutes. The last lines of the result should appear as in Figure 29.



```
  CDPATH="${ZSH_VERSION+.}:" && cd .; \
else \
  rc=$?; \
  CDPATH="${ZSH_VERSION+.}:" && cd . && \
  $restore $backupdir/* `echo "./openocd.info" | sed 's|[^/]*$||'`; \
fi; \
rm -rf $backupdir; exit $rc
make[2]: Leaving directory '/cygdrive/c/cygwin/openocd-0.7.0/openocd-0.7.0/doc'
make[2]: Entering directory '/cygdrive/c/cygwin/openocd-0.7.0/openocd-0.7.0'
make[2]: Leaving directory '/cygdrive/c/cygwin/openocd-0.7.0/openocd-0.7.0'
make[1]: Leaving directory '/cygdrive/c/cygwin/openocd-0.7.0/openocd-0.7.0'

  useralpha@userPc  /cygdrive/c/cygwin/openocd-0.7.0/openocd-0.7.0
$
```

Figure 29. Running the Make Command

9. Run the command 'make install.' The last lines of the result should appear as in Figure 30.



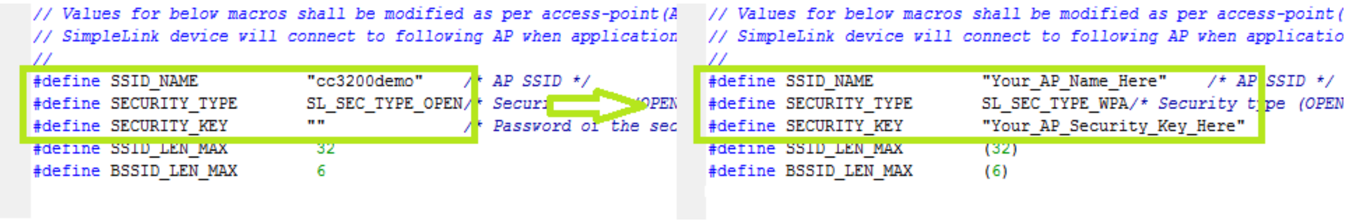
```
make[2]: Nothing to be done for 'install-exec-am'.
 /usr/bin/mkdir -p '/usr/local/share/openocd'
 /usr/bin/mkdir -p '/usr/local/share/openocd/contrib'
 /usr/bin/install -c -m 644  contrib/openocd.udev '/usr/local/share/openocd/contrib'
 /usr/bin/mkdir -p '/usr/local/share/openocd/contrib/libdcc'
 /usr/bin/install -c -m 644  contrib/libdcc/dcc_stdio.c contrib/libdcc/dcc_stdio.h contrib/libdcc/exa
l/share/openocd/contrib/libdcc'
make  install-data-hook
make[3]: Entering directory '/cygdrive/c/cygwin/openocd-0.7.0/openocd-0.7.0'
for i in $(find ./tcl -name '*.cfg' -o -name '*.tcl' -o -name '*.txt' | sed -e 's,^./tcl,,'); do \
        j="/usr/local/share/openocd/scripts/$i" && \
        mkdir -p "$(dirname $j)" && \
        /usr/bin/install -c -m 644 ./tcl/$i $j; \
done

make[3]: Leaving directory '/cygdrive/c/cygwin/openocd-0.7.0/openocd-0.7.0'
make[2]: Leaving directory '/cygdrive/c/cygwin/openocd-0.7.0/openocd-0.7.0'
make[1]: Leaving directory '/cygdrive/c/cygwin/openocd-0.7.0/openocd-0.7.0'

  useralpha@userPc /cygdrive/c/cygwin/openocd-0.7.0/openocd-0.7.0
$
```

Figure 30. Running the Make Install Command

10. After the command has run successfully, check that the file *openocd.exe* is generated at path *C:\cygwin\usr\local\bin*. Add this path to the Windows PATH environment variable.

3.3.4 Compile the GCC SDK project

1. Open the *common.h* file located at the path *C:\TI\CC3200SDK_1.1.0\cc3200-sdk\example\common\*.
2. Edit *common.h* to use the SSID, security type, and security key of the AP. Edit the macros SSID_NAME, SECURITY_TYPE, and SECURITY_KEY to contain the AP information as shown in Figure 31. The security types supported for this demo are WPA/WPA2 and Open. For Open security, define SECURITY_TYPE as SL_SEC_TYPE_OPEN. For WPA and WPA2 security, define it as SL_SEC_TYPE_WPA.



```
// Values for below macros shall be modified as per access-point(A
// SimpleLink device will connect to following AP when application
//
#define SSID_NAME           "cc3200demo"        /* AP SSID */
#define SECURITY_TYPE       SL_SEC_TYPE_OPEN/* Securi          OPEN
#define SECURITY_KEY        ""                  /* Password of the sec
#define SSID_LEN_MAX         32
#define BSSID_LEN_MAX        6
```

```
// Values for below macros shall be modified as per access-point(
// SimpleLink device will connect to following AP when applicatio
//
#define SSID_NAME           "Your_AP_Name_Here"     /* AP SSID */
#define SECURITY_TYPE       SL_SEC_TYPE_WPA/* Security type (OPEN
#define SECURITY_KEY        "Your_AP_Security_Key_Here"
#define SSID_LEN_MAX        (32)
#define BSSID_LEN_MAX       (6)
```

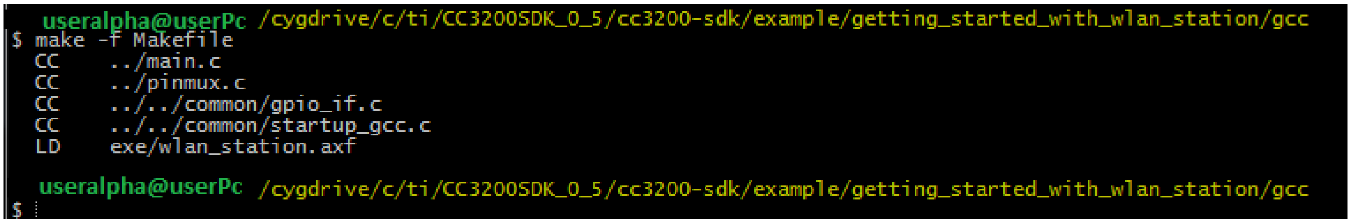
Figure 31. Editing *common.h*

3. Save *common.h*.

In the Cygwin terminal, change the directory to *C:\TI\CC3200SDK_1.1.0\cc3200-sdk\example\getting_started_with_wlan_station\gcc\* and run the following command:

```
make –f  Makefile
```

This command should appear as in Figure 32. Note that Cygwin uses forward slashes to separate directories.



```
  useralpha@userPc /cygdrive/c/ti/CC3200SDK_0_5/cc3200-sdk/example/getting_started_with_wlan_station/gcc
$ make -f Makefile
  CC    ../main.c
  CC    ../pinmux.c
  CC    ../../common/gpio_if.c
  CC    ../../common/startup_gcc.c
  LD    exe/wlan_station.axf

  useralpha@userPc /cygdrive/c/ti/CC3200SDK_0_5/cc3200-sdk/example/getting_started_with_wlan_station/gcc
$
```

Figure 32. Makefile Command

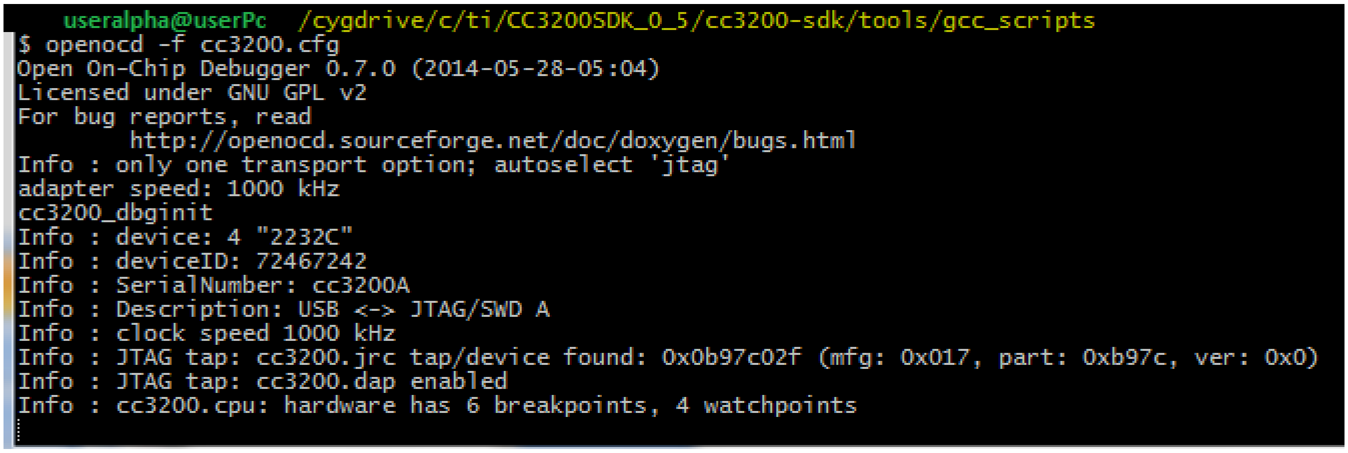
This generates the *wlan_station.axf* file under the *gcc\exe* folder.

3.3.5 Target Connection and Debug (GDB)

1. The OpenOCD configuration file for FTDI is present under the *C:\TI\CC3200SDK_1.1.0\cc3200-sdk\tools\gcc_scripts\* folder. To test the connection to the CC3200 FTDI Launchpad, navigate to the *<cc3200-sdk>\tools\gcc_scripts* folder in the Cygwin terminal, run the following command, and check the output to see if the connection happened properly.

   ```
   openocd -f cc3200.cfg
   ```

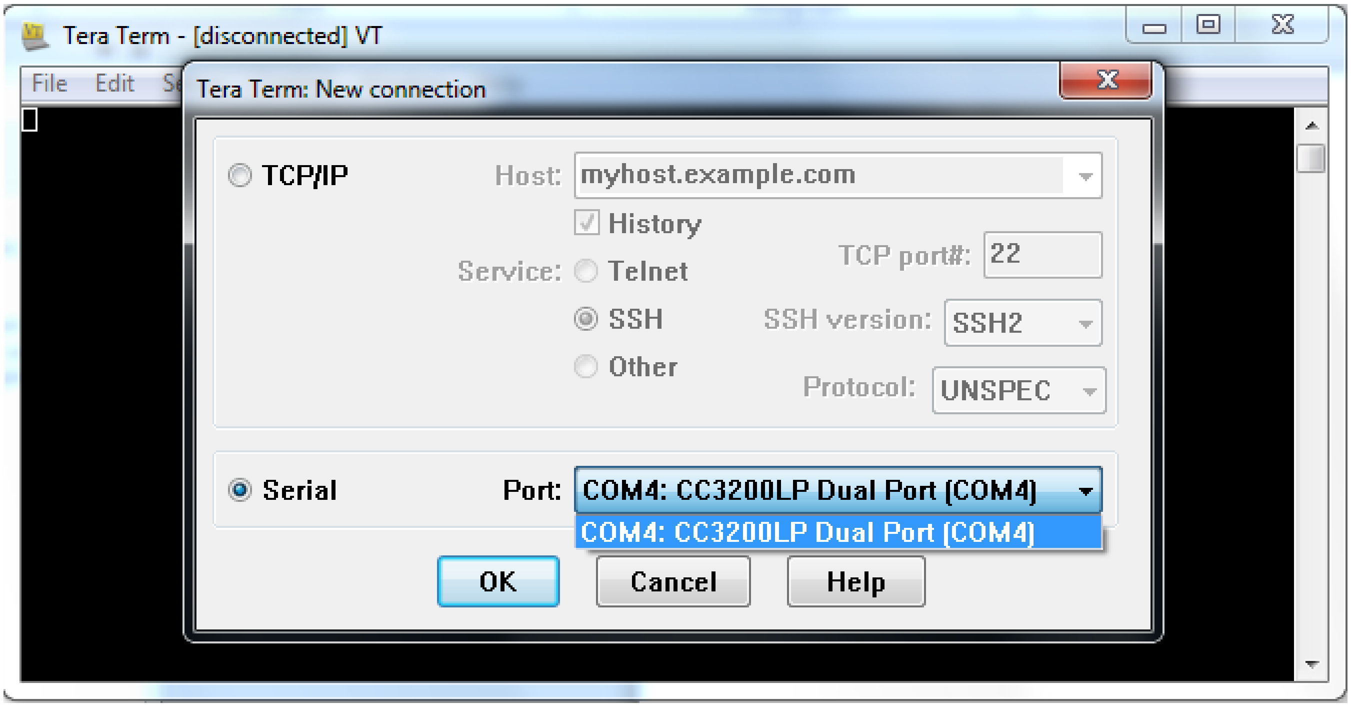
   See Figure 33 for the output screen while the CC3200 device is connected through GDB.



```
    useralpha@userPc  /cygdrive/c/ti/CC3200SDK_0_5/cc3200-sdk/tools/gcc_scripts
$ openocd -f cc3200.cfg
Open On-Chip Debugger 0.7.0 (2014-05-28-05:04)
Licensed under GNU GPL v2
For bug reports, read
        http://openocd.sourceforge.net/doc/doxygen/bugs.html
Info : only one transport option; autoselect 'jtag'
adapter speed: 1000 kHz
cc3200_dbginit
Info : device: 4 "2232C"
Info : deviceID: 72467242
Info : SerialNumber: cc3200A
Info : Description: USB <-> JTAG/SWD A
Info : clock speed 1000 kHz
Info : JTAG tap: cc3200.jrc tap/device found: 0x0b97c02f (mfg: 0x017, part: 0xb97c, ver: 0x0)
Info : JTAG tap: cc3200.dap enabled
Info : cc3200.cpu: hardware has 6 breakpoints, 4 watchpoints
```

Figure 33. Output Screen

2. Press <ctrl>+c to return to prompt.
3. Copy the *wlan_station.axf* file found in *C:\TI\CC3200SDK_1.1.0\cc3200-sdk\ \example\getting_started_with_wlan_station\gcc\exe\* to the directory *C:\TI\CC3200SDK_1.1.0\c3200-sdk\tools\gcc_scripts\*.
4. Launch Tera Term, and create a new serial connection to the CC3200 Launchpad COM port as shown in Figure 34.



Tera Term - [disconnected] VT

Tera Term: New connection

○ TCP/IP Host: myhost.example.com

☑ History

Service: ○ Telnet TCP port#: 22

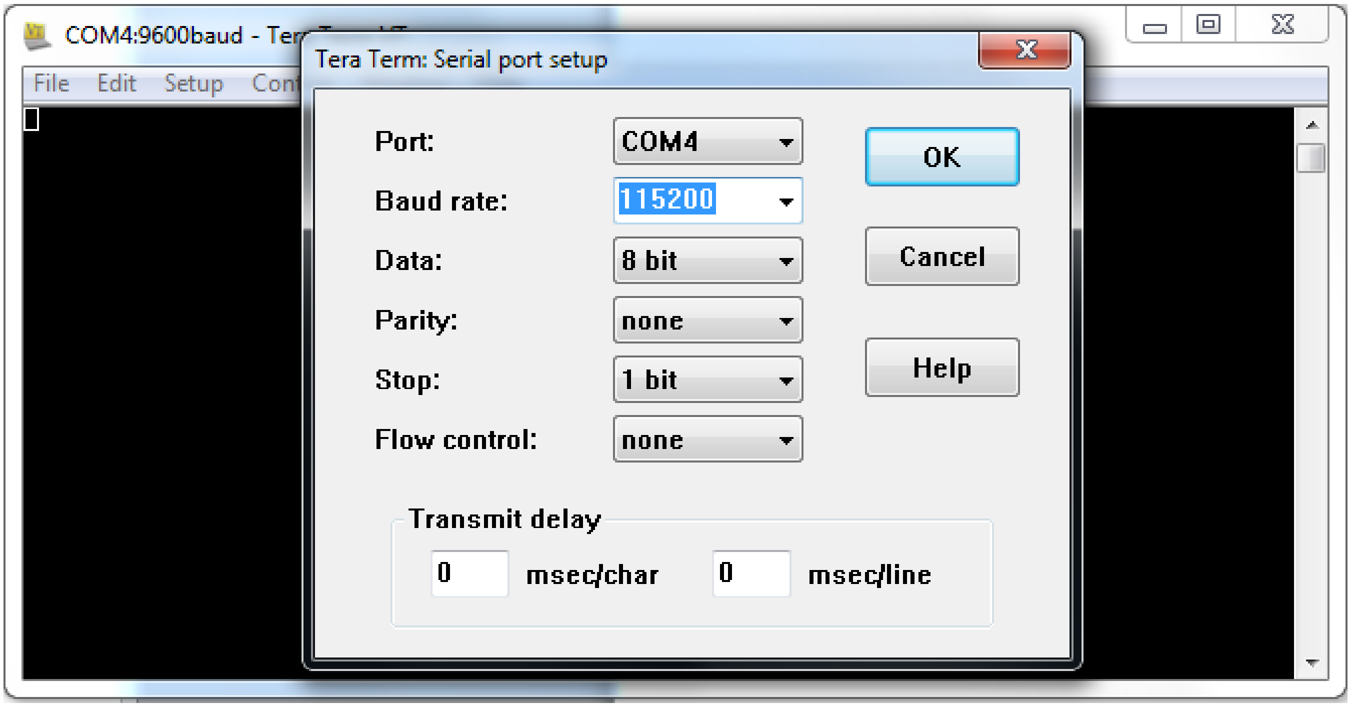
● SSH SSH version: SSH2

○ Other Protocol: UNSPEC

● Serial Port: COM4: CC3200LP Dual Port (COM4)

Figure 34. Launch Tera Term

5. In the menu, select Setup>Serial Port, and change the baud rate to 115200 as shown in Figure 35.



COM4:9600baud - Tera Term VT

Tera Term: Serial port setup

Port: COM4

Baud rate: 115200

Data: 8 bit

Parity: none

Stop: 1 bit

Flow control: none

Transmit delay

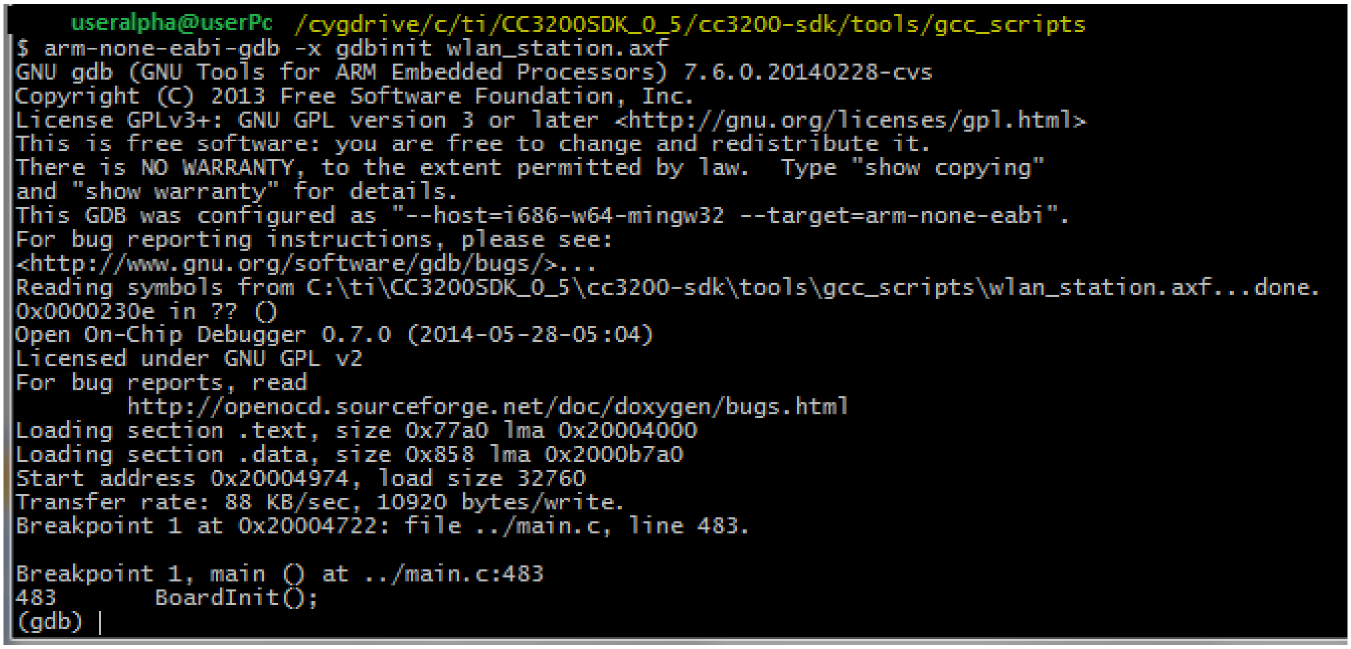
0 msec/char 0 msec/line

Figure 35. Tera Term Serial Port Setup

6. To start debugging using GDB on CC3200, go to *C:\TI\CC3200SDK_1.1.0\cc3200-sdk\tools\gcc_scripts\* and run the following command at the Cygwin prompt:

```
arm-none-eabi-gdb -x gdbinit wlan_station.axf
```

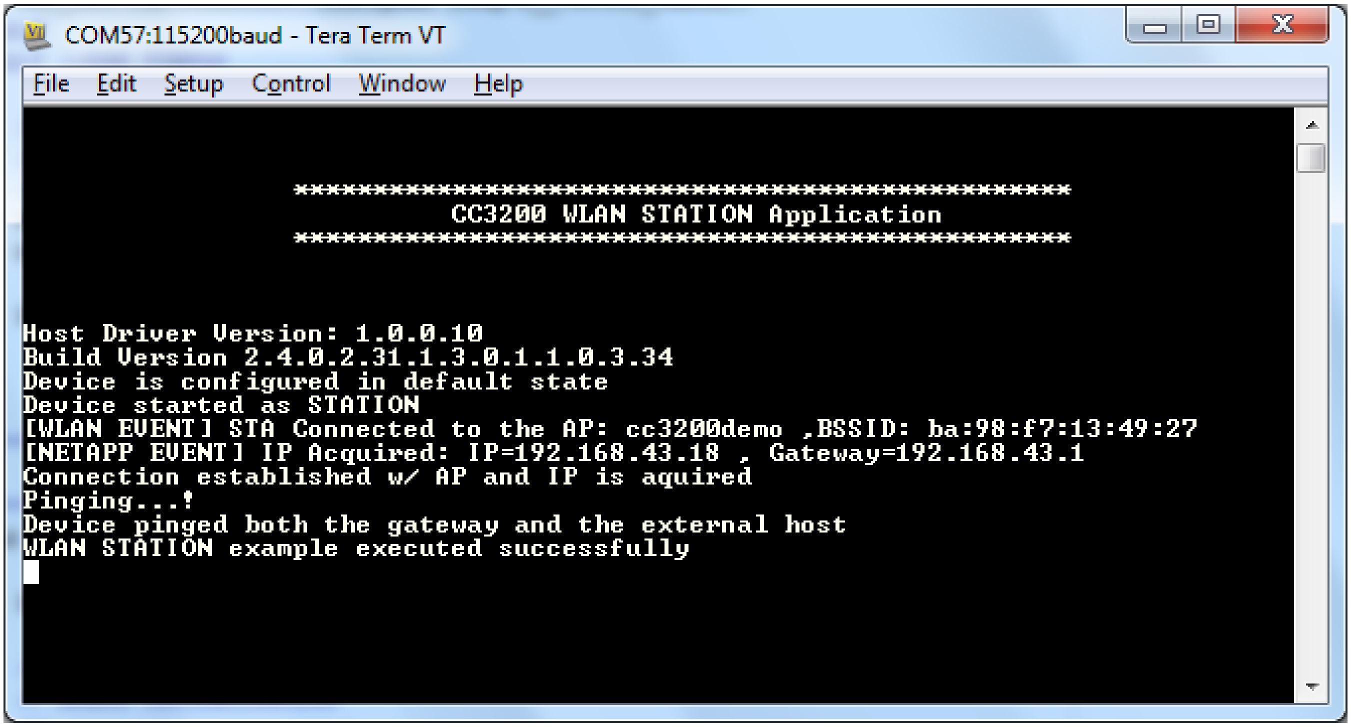
This results in a GDB prompt. To continue, type ‘continue’ and press enter. For other commands, consult the GDB Quick Guide. See Figure 36 for the result of debugging the *wlan_station* application from GCC.



```
    useralpha@userPc /cygdrive/c/ti/CC3200SDK_0_5/cc3200-sdk/tools/gcc_scripts
$ arm-none-eabi-gdb -x gdbinit wlan_station.axf
GNU gdb (GNU Tools for ARM Embedded Processors) 7.6.0.20140228-cvs
Copyright (C) 2013 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.  Type "show copying"
and "show warranty" for details.
This GDB was configured as "--host=i686-w64-mingw32 --target=arm-none-eabi".
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>...
Reading symbols from C:\ti\CC3200SDK_0_5\cc3200-sdk\tools\gcc_scripts\wlan_station.axf...done.
0x0000230e in ?? ()
Open On-Chip Debugger 0.7.0 (2014-05-28-05:04)
Licensed under GNU GPL v2
For bug reports, read
        http://openocd.sourceforge.net/doc/doxygen/bugs.html
Loading section .text, size 0x77a0 lma 0x20004000
Loading section .data, size 0x858 lma 0x2000b7a0
Start address 0x20004974, load size 32760
Transfer rate: 88 KB/sec, 10920 bytes/write.
Breakpoint 1 at 0x20004722: file ../main.c, line 483.

Breakpoint 1, main () at ../main.c:483
483          BoardInit();
(gdb) |
```

Figure 36. Debugging ***wlan_station***

7. If the CC3200 successfully completes all steps, the serial output appears as shown in Figure 37.



```
                  ************************************************
                           CC3200 WLAN STATION Application
                  ************************************************


Host Driver Version: 1.0.0.10
Build Version 2.4.0.2.31.1.3.0.1.1.0.3.34
Device is configured in default state
Device started as STATION
[WLAN EVENT] STA Connected to the AP: cc3200demo ,BSSID: ba:98:f7:13:49:27
[NETAPP EVENT] IP Acquired: IP=192.168.43.18 , Gateway=192.168.43.1
Connection established w/ AP and IP is aquired
Pinging...!
Device pinged both the gateway and the external host
WLAN STATION example executed successfully
```

Figure 37. Tera Term VT

4 Summary

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

- CC3200 Programmer's Guide – This guide contains information on how to use the SimpleLink API for writing WLAN-enabled applications.
- PinMux Tool – This utility helps determine how to best assign peripherals to the appropriate CC3200 package pins.
- Uniflash – The Uniflash tool manually stores files on the external serial flash. This includes the application binary and SimpleLink firmware patch files. Also, any configuration files, security certificates, web pages, and so forth can be stored using this tool.
- CC3200 Wiki – All information and tools for the CC3200, including the above, can be found on the CC3200 Wiki page.

5 Acronyms Used

STA – Wi-Fi Station

AP – Wi-Fi Access Point

WLAN – Wireless LAN

CCS – Code Composer Studio

GCC – GNU Compiler Collection

Revision History

Changes from March 4, 2015 to July 8, 2015 (from B Revision (March 2015) to C Revision) **Page**

- Updated Step Four.. 11

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
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Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
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