

SENSE • CONNECT • CONTROL





Wireless Internet Connectivity for Embedded Devices

WICED Studio: The SDK for IoT

To develop an IoT application, you need an SDK that:

- Integrates multiple wireless technologies



- Includes support for necessary protocols



- Offers connectivity to leading cloud services



- Provides the flexibility to work with popular MCUs



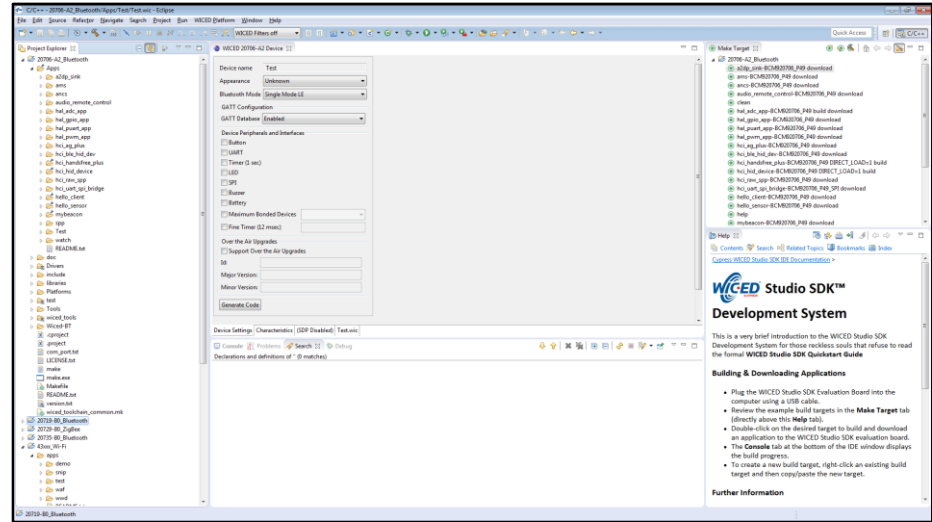
WICED Studio is the only SDK that provides all of the above and enables ease-of-use



WICED Studio SDK: Overview

Main Components

- Single, automated installer for Wi-Fi, Bluetooth (BR/EDR and BLE), and ZigBee (802.15.4)
- Eclipse-based IDE runs on Windows, OS X, and Linux
- Works with either ThreadX or FreeRTOS
- Software libraries for wireless connectivity
- Abstracted WICED APIs for code compatibility across different platforms, MCUs, RTOSes, etc.
- Single-step Thread Aware Debugger
- Example applications and code snippets for understanding WICED APIs

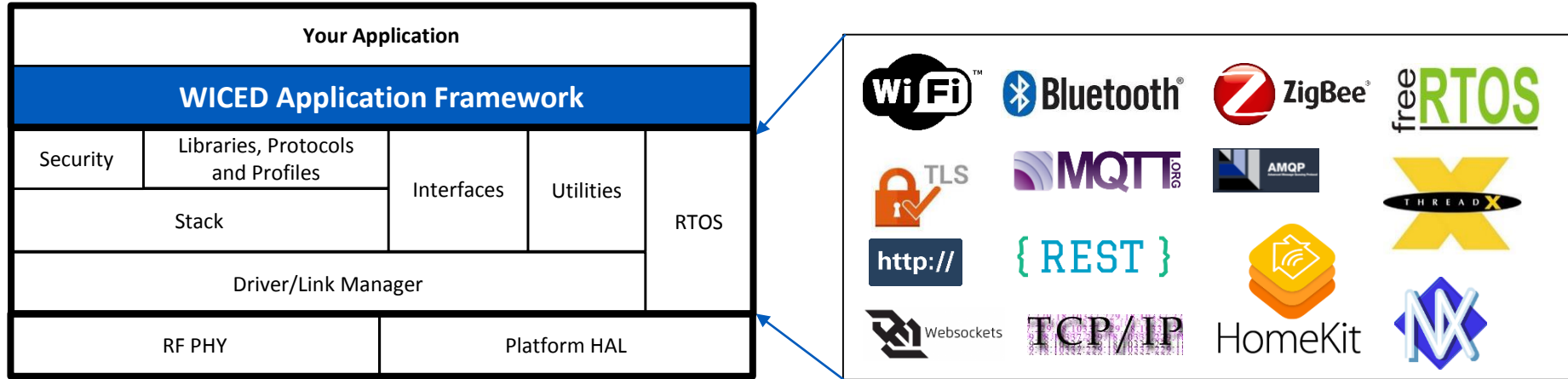


USB-JTAG



WICED Studio Is Built To Reduce Development

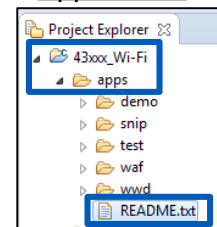
The WICED APIs and example applications make complex project development easy!



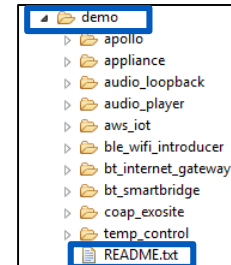
Additional Resources

- The *doc* folder inside the WICED SDK
- The *README.txt* files to learn about the contents of the respective folder inside the SDK
- The Cypress Developer Community: <https://community.cypress.com>

Apps folder



Demo folder





WICED Walkthrough

WICED Studio SDK: Download

Download WICED Studio 5.2.0 from here for Windows:

<https://community.cypress.com/docs/DOC-13651>

For all other OS:

<https://community.cypress.com/community/wiced-wifi/wiced-wifi-documentation>

The screenshot shows a forum post on the Cypress Developer Community website. The post title is "WICED-Studio 5.2.0 Installer (Windows)". It was created by user 'mifo' on Sep 5, 2017. The post content includes:

- Release Notes:** WICED Studio 5.2.0
- Windows Install:**
 - Download the attached .zip file
 - Extract the installer.exe and config.xml file from the zip file to temp folder on your computer; do not execute the installer from the zip file
 - Double click the installer.exe to install WICED Studio
 - After installation is completed, launch WICED Studio IDE from shortcut on desktop
- Windows Uninstall:**
 - Uninstall "WICED Studio" from Control Panel -> Programs and Features OR (in Win 10)
 - Start Menu -> Settings -> System -> Apps & features -> WICED-Studio -> Uninstall
 - To clean up all WICED components manually, delete files and folders for the IDE and SDK, typically in "C:\Users\<name>\Documents\WICED" and "C:\Users\<name>\AppData\Local\WICED"

At the bottom of the post, there is a download link for "WICED-Studio-5.2.0-IDE-Installer.zip (555.1 KB)" which is highlighted with a green box. Below the download link, there are user ratings and a "Report abuse" button.

WICED Studio: IDE Overview

Device Selector

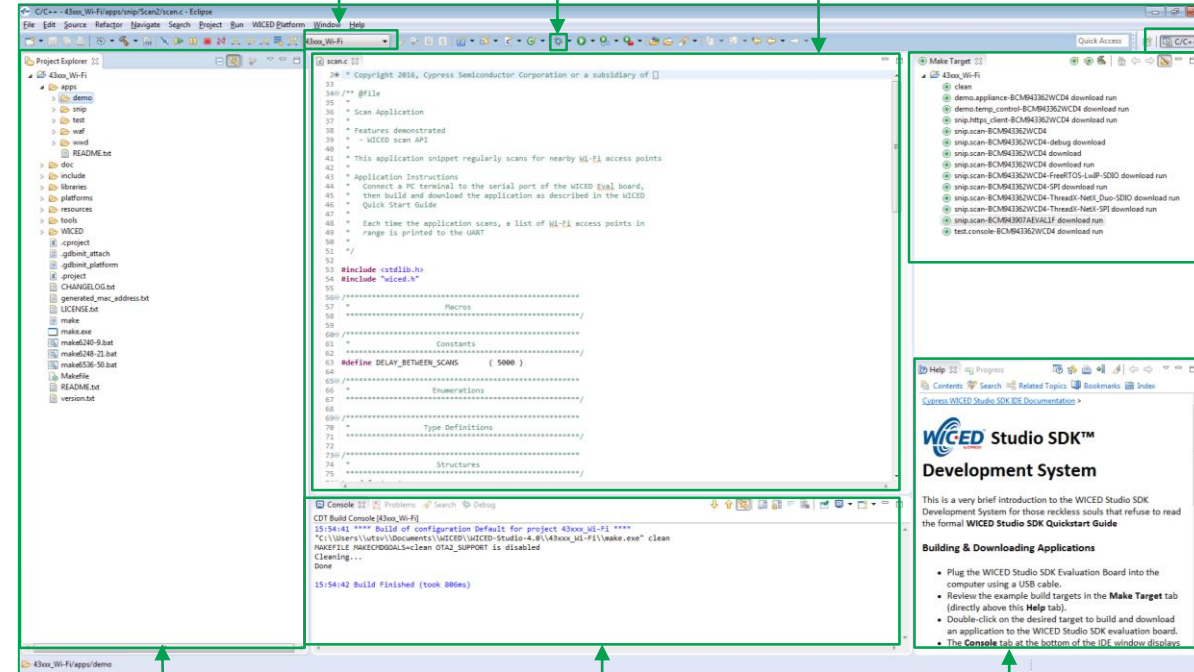
Choose your device

Debug Icon

Launch debugger

Editor

Edit the firmware



Project Explorer

Explore the SDK

Console Window

View the build output

Help

Learn how to build/run an application

Workspace Perspective

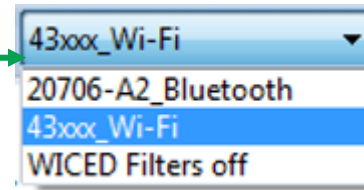
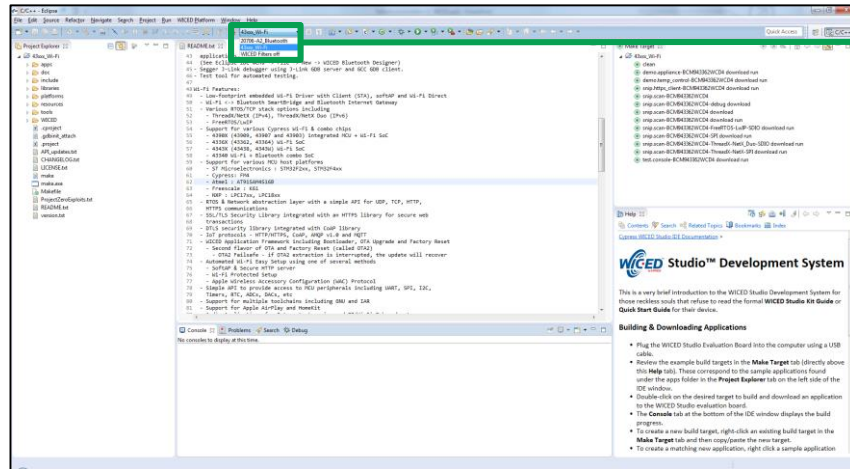
Switch between editor and debug views

Make Target

Build your application

WICED Studio SDK: Device Selection

Use the pull-down menu to change the device



Pull-down menu options:

20706-A2_Bluetooth – Bluetooth (BR/EDR/BLE) SoC with ARM® Cortex® M3

43xxx_Wi-Fi – Wi-Fi + Bluetooth Combo SoCs, Wi-Fi SoCs with integrated MCU and Wi-Fi-only SoCs

WICED Filters off – Show all available devices

WICED Studio SDK: Example Applications

Choose the relevant sub-folder from the *43xxx_Wi-Fi -> Apps* folder in the *Project Explorer*

Demo – Advanced applications that combine multiple WICED features

Snip – Application snippets that use various WICED APIs

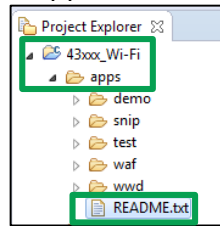
Test – Manufacturing/certification-related test applications and utilities

WAF – Applications that are part of the WICED Application Framework (WAF) like bootloaders

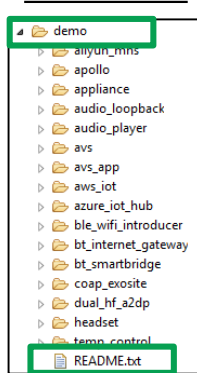
WWD – Applications that use low-level APIs provided by the WICED Wi-Fi Driver (WWD) and do not use the WICED APIs provided by the WICED Application Framework

Read the **README.txt** files to learn about the contents of the respective folder

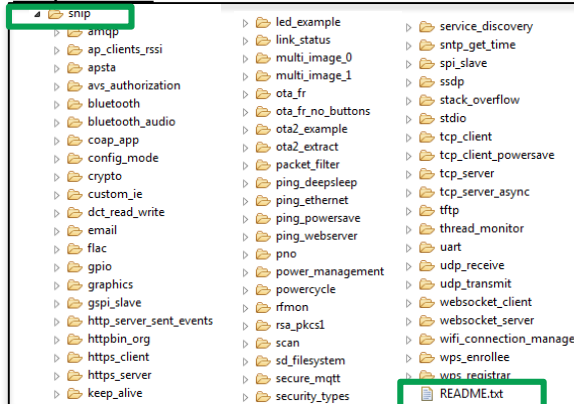
Apps folder



Demo folder



Snip folder

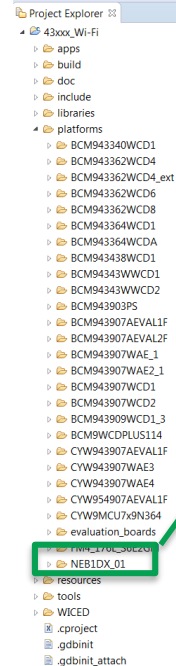


WICED Studio SDK: Platform Selection

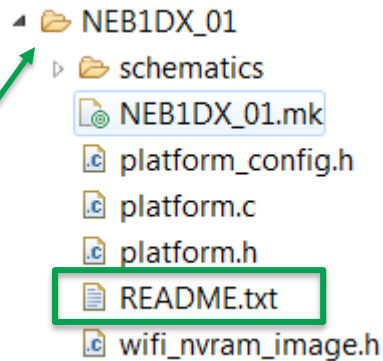
Browse the **43xxx_Wi-Fi** device folder to the **Platforms** folder in your **Project Explorer** to view the hardware platforms available for your device.

Read the README.txt file located within the folder for every platform for details about each hardware platform.

Wi-Fi/Wi-Fi + BT Platforms



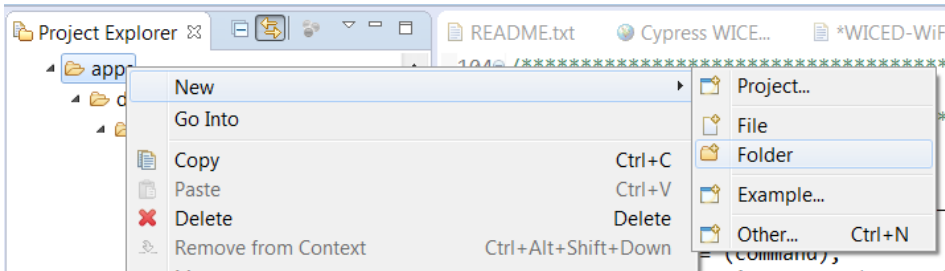
Nebula Platform Folder with README.txt file



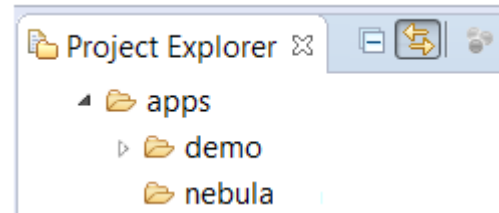
WICED Studio SDK: Create and Build your Own Application

1 Create a new Folder in the *apps* folder called *nebula*

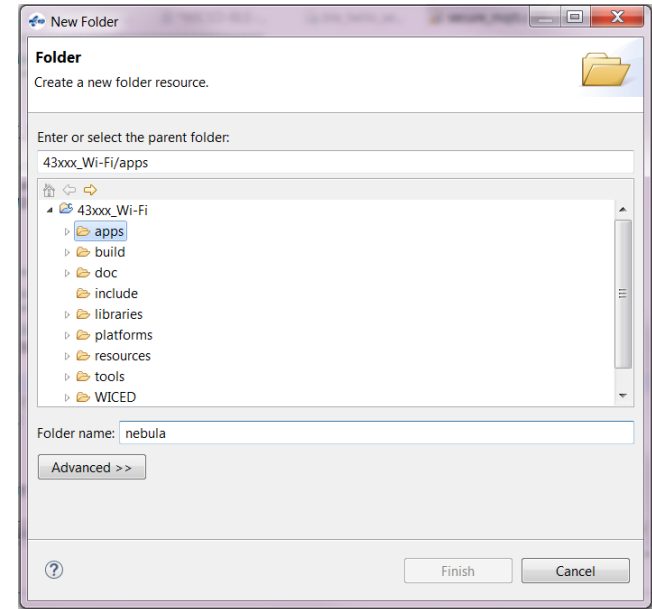
Creating a new folder in the *apps* directory



Expected result:



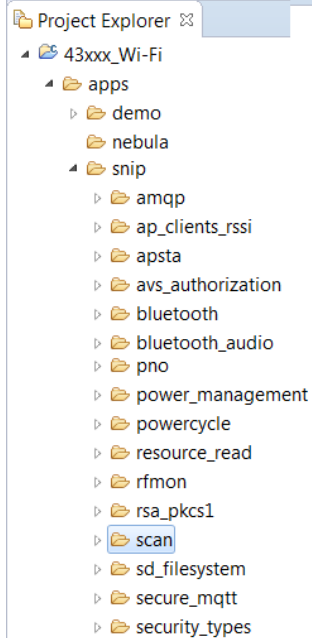
Creating a new folder in the *apps* directory



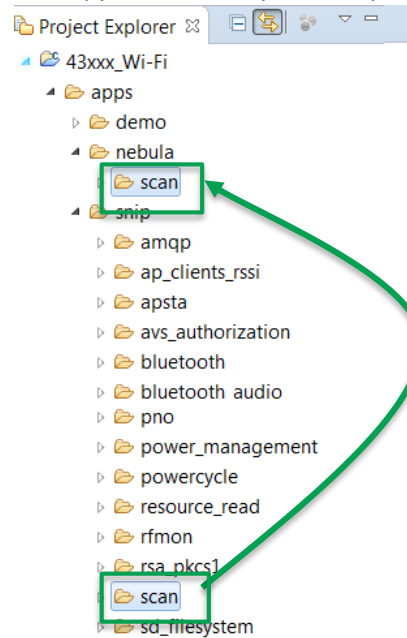
WICED Studio SDK: Create and Build your Own Application

2 Copy the example “**Scan**” application from the snip folder and paste it into the new “**nebula**” folder we just created.

Scan application



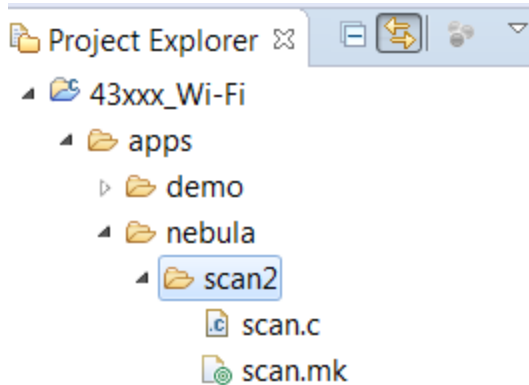
Scan application is copied and pasted under 43xxx_Wi-Fi → Apps → nebula



WICED Studio SDK: Create and Build your Own Application

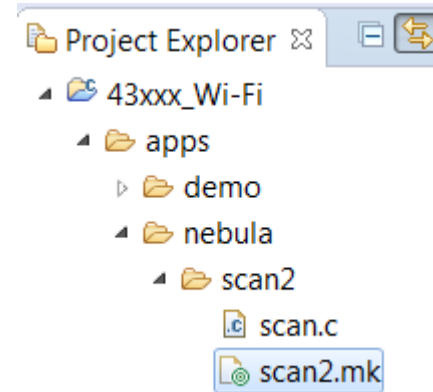
3 Rename the new application folder

Scan application renamed to scan2



4 Rename the new *<application>*.mk file to match the name of the application folder

Scan.mk is renamed to *scan2.mk*

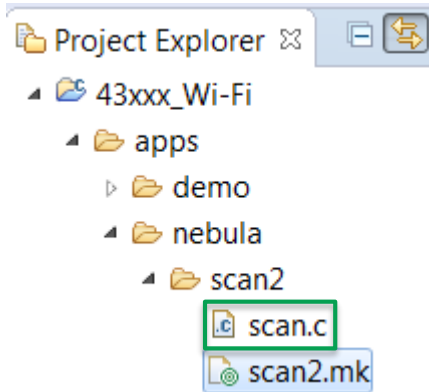


Tip: Select the file, press F2 on your keyboard to rename it

WICED Studio SDK: Create and Build your Own Application

5 Double-click the **scan.c** file to open and edit it in the **Editor** window

Scan.c file in the scan2 folder



6 Use the Ctrl+S keyboard shortcut to save your modified files

```

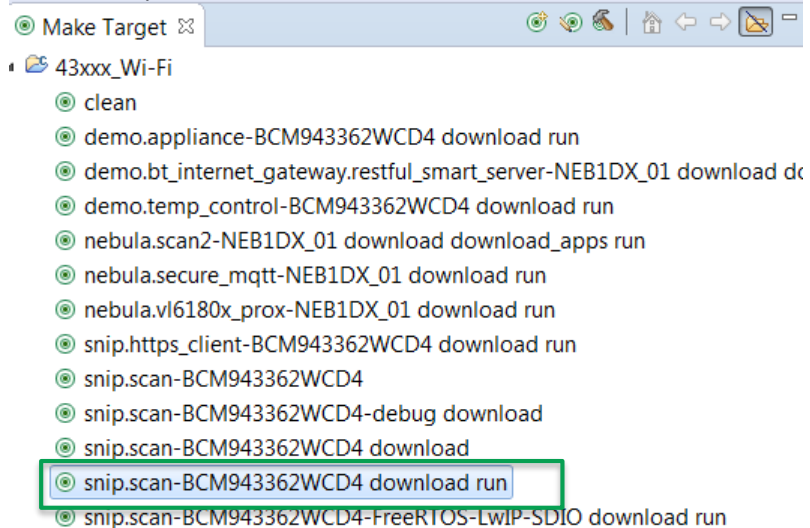
77 {
78     wiced_semaphore_t semaphore; /* Semaphore used for signaling scan complete */
79     uint32_t result_count; /* Count to measure the total scan results */
80 } app_scan_data_t;
81
82@ .....
83 * Static Function Declarations
84 .....
85
86 wiced_result_t scan_result_handler( wiced_scan_handler_result_t* malloced_scan_result );
87
88@ .....
89 * Variable Definitions
90 .....
91
92@ .....
93 * Function Definitions
94 .....
95
96@ void application_start( )
97 {
98     wiced_init( );
99
100     while(1)
101     {
102         wiced_time_t scan_start_time;
103         wiced_time_t scan_end_time;
104         app_scan_data_t scan_data;
105
106         /* Initialize the semaphore that will tell us when the scan is complete */
107         wiced_rtos_init_semaphore(&scan_data.semaphore);
108         scan_data.result_count = 0;
109         WPRINT_APP_INFO( \"This is a customized application\\n\" );
110         WPRINT_APP_INFO( \"Waiting for scan results...\\n\" );
111         WPRINT_APP_INFO( \" # Type BSSID RSSI Rate Chan Security SSID\\n\" );
112         WPRINT_APP_INFO( \"-----\\n\" );
113
114         /* Start the scan */
115         wiced_time_get_time(&scan_start_time);
116         wiced_wifi_scan_networks(scan_result_handler, &scan_data );
117
118         /* Wait until scan is complete */
119         wiced_rtos_get_semaphore(&scan_data.semaphore, WICED_WAIT_FOREVER);
120         wiced_time_get_time(&scan_end_time);
121     }
122 }

```

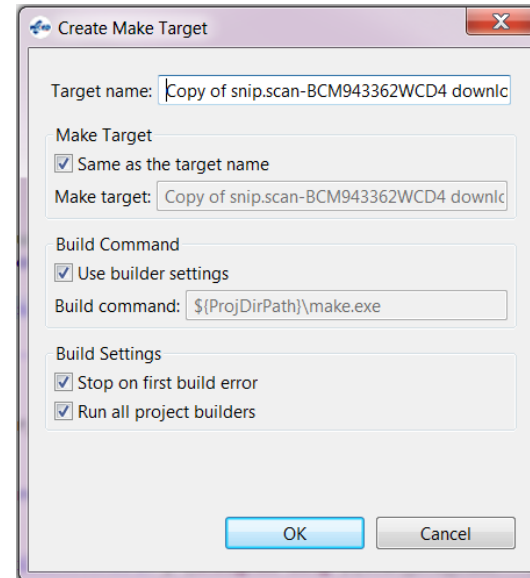
WICED Studio SDK: Create and Build your Own Application

- 7 In the **Make Target** window right-click and copy an example build target that ends with **download run**

Select “snip.scan-BCM943362WCD4 download run”



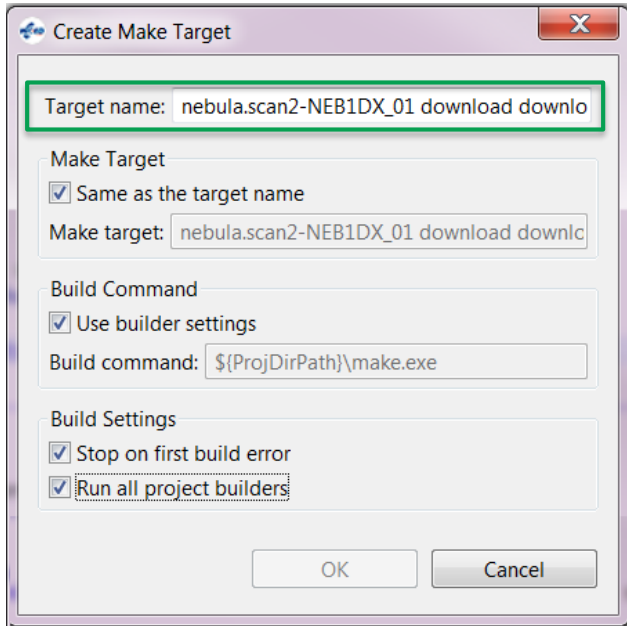
- 8 Paste the example build target in the **Make Target** window. The **Create Make Target** window opens automatically to enable you to edit build options



WICED Studio SDK: Create and Build your Own Application

- 9 Modify the **Target name** to match the following format: *<new application folder name>-<target platform> download download_apps run* and press *OK*

The target name is modified to “nebula.scan2-NEB1DX_01 download download_apps run”

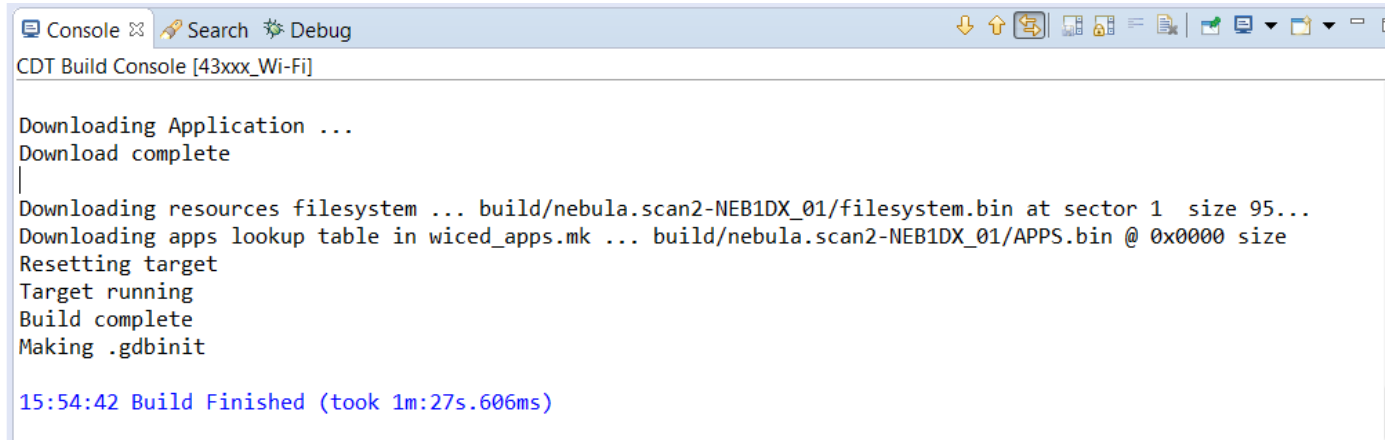


You only need to include the **download_apps** option if you expect that the external flash needs to be updated. Since this is our first build and the Wi-Fi module firmware is a resource stored in the external flash, we need to include this to make sure it is properly programmed.

WICED Studio SDK: Create and Build your Own Application

- 10 Double-click “*nebula.scan2-NEB1DX_01 download download_apps run*” to build, download and run your application

Console window showing build output



```
CDT Build Console [43xxx_Wi-Fi]

Downloading Application ...
Download complete
|
Downloading resources filesystem ... build/nebula.scan2-NEB1DX_01/filesystem.bin at sector 1 size 95...
Downloading apps lookup table in wiced_apps.mk ... build/nebula.scan2-NEB1DX_01/APPS.bin @ 0x0000 size
Resetting target
Target running
Build complete
Making .gdbinit

15:54:42 Build Finished (took 1m:27s.606ms)
```

WICED Studio SDK: Create and Build your Own Application

11 Open a terminal program, observe output

Expected result

```
Starting WICED vWiced_005.002.000.0022
Platform NEB1DX_01 initialised
Started ThreadX v5.6
Initialising NetX_Duo v5.7_sp2
Creating Packet pools
WLAN MAC Address : DC:EF:CA:00:99:B3
WLAN Firmware   : wl0: Aug 30 2017 03:10:52 version 7.45.98.32 (r666781 CV) FWID 01-4e8b86d2
WLAN CLM        : API: 12.2 Data: 9.10.39 Compiler: 1.29.4 ClmImport: 1.36.3 Creation: 2017-08-30 02:59:33
This is a customized application...
Waiting for scan results...
```

#	Type	BSSID	RSSI	Rate	Chan	Security	SSID	CCode	Flag
0	Infra	00:22:88:02:D4:38	-21	11.0	1	Open	FutureIOTRouter1	US	PROBE
1	Infra	CC:F9:54:9C:5B:D0	-72	144.4	2	Open	FE_INTERNET	CA	PROBE
2	Infra	CC:F9:54:9C:5B:D3	-73	144.4	2	WPA2 Mixed PSK	FE_IOT	CA	PROBE
3	Infra	04:A1:51:16:AB:27	-83	216.7	3	WPA2 AES PSK	CJEOIH3B	CA	BEACON
4	Infra	CC:F9:54:9C:28:30	OFF	144.4	6	Open	FE_INTERNET	CA	PROBE
5	Infra	40:A8:F0:CF:E9:C6	-81	58.5	6	Open	HP-Print-C6-Photosmart 7520	CA	PROBE
6	Infra	CC:F9:54:9C:28:33	-73	144.4	6	WPA2 Mixed PSK	FE_IOT	CA	PROBE
7	Infra	CC:F9:54:9B:EC:90	-58	144.4	6	Open	FE_INTERNET	CA	PROBE
8	Infra	CC:F9:54:9B:EC:91	-56	144.4	6	WPA2 Mixed Enterprise		CA	BEACON
9	Infra	CC:F9:54:9B:EC:92	-58	144.4	6	Open		CA	BEACON
10	Infra	CC:F9:54:9B:EC:93	-58	144.4	6	WPA2 Mixed PSK	FE_IOT	CA	BEACON
11	Infra	CC:F9:54:9B:EC:94	-59	144.4	6	WPA2 Mixed PSK		CA	BEACON
12	Infra	CC:F9:54:9C:28:34	-79	144.4	6	WPA2 Mixed PSK		CA	BEACON
13	Infra	CC:F9:54:9B:4B:93	OFF	144.4	11	WPA2 Mixed PSK	FE_IOT	CA	PROBE
14	Infra	CC:F9:54:9B:4B:90	-70	144.4	11	Open	FE_INTERNET	CA	PROBE

```
Scan complete in 484 milliseconds
```



Baudrate: 115200
Data: 8 bit
Parity: none
Stop: 1bit
Flow control: none

THANK YOU!