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CYW943907AEVAL1F

Evaluation Kit User Guide

Doc. No. 002-18703 Rev. **

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Contents



Saf	ety Info	ormation	5
1.	Intro	duction	6
	1.1	CYW943907AEVAL1F EVK Contents	6
	1.2	CYW943907AEVAL1F Board Details	8
	1.3	WICED Studio Development System Overview	9
	1.4	WICED Studio Code Examples	10
	1.5	Kit Code Examples	12
	1.6	Getting Started	12
	1.7	IOT Resources and Technical Support	12
	1.8	Additional Learning Resources	12
	1.9	Document Conventions	13
	1.10	Acronyms	13
2.	Softw	vare Installation	14
	2.1	Before You Begin	14
	2.2	Install Software	14
3.	Kit O	peration	18
	3.1	Theory of Operation	18
	3.2	On-board programmer/Debugger and Serial interface Chip	18
	3.3	CYW943907AEVAL1F Kit Connection	19
		3.3.1 Verifying Driver Installation	19
		3.3.2 Troubleshooting	20
		3.3.3 External Power Supply	20
	3.4	Building, Programming, and Debugging CYW943907AEVAL1F EVK	21
		3.4.1 Building and Programming a Project for CYW943907AEVAL1F in WICED Studio IDE	21
		3.4.2 Troubleshooting	24
		3.4.3 Debugging a Project using Breakpoints	25
4.	Hard	ware	29
	4.1	Bootstrap	29
	4.2	User Switches	30
	4.3	LED	30
	4.4	Reset Control	31
	4.5	Ethernet	
	4.6	Micro SD Connector/Slot	
	4.7	JTAG Connector	
		4.7.1 On-board Programmer/Debugger and Serial Interface Chip	
		4.7.2 External JTAG	35



Contents

	4.8	Connectors	
		4.8.1 WICED Header	
		4.8.2 Arduino-Compatible Headers	
	4.9	UART Port Configuration on CYW943907AEVAL1F Kit	
	4.10	External ADC	
	4.11	PWM	40
5.	Code	e Examples	42
	5.1	Using Code Examples	
	5.2	GPIO	42
		5.2.1 Project Description	42
		5.2.2 Hardware Connections	42
		5.2.3 Verify Output	43
	5.3	Config_join_ping	43
		5.3.1 Project Description	43
		5.3.2 Hardware Connections	43
		5.3.3 Flow Chart	44
		5.3.4 Verify Output	45
	5.4	Adc_measure	47
		5.4.1 Project Description	47
		5.4.2 Hardware Connections	47
		5.4.3 Flow Chart	48
		5.4.4 Access Point Credentials	49
		5.4.5 Verify Output	
	5.5	Publish_subscribe_aws	50
		5.5.1 Project Description	
		5.5.2 Hardware Connections	
		5.5.3 Flow Chart	
		5.5.4 Verify Output	52
Rev	vision l	History	59
	Docu	ument Revision History	59

Safety Information



The CYW943907AEVAL1F EVK is intended for use as a development platform for hardware or software in a laboratory environment. The board is an open-system design, which does not include a shielded enclosure. Due to this reason, the board may cause interference with other electrical or electronic devices in close proximity. In a domestic environment, this product may cause radio interference. In such cases, take adequate preventive measures. Also, do not use this board near any medical equipment or RF devices.

Attaching additional wiring to this product or modifying the product operation from the factory default may affect its performance and cause interference with other apparatus in the immediate vicinity. If such interference is detected, suitable mitigating measures must be taken.



The CYW943907AEVAL1F contains electrostatic discharge (ESD)-sensitive devices. Electrostatic charges readily accumulate on the human body and any equipment, and can discharge without detection. Permanent damage may occur on devices subjected to high-energy discharges. Proper ESD precautions are recommended to avoid performance degradation or loss of functionality. Store unused CYW943907AEVAL1F in the protective shipping package.



End-of-Life/Product Recycling

This kit has an end-of-life cycle of five years from the year of manufacturing mentioned on the back of the box. Contact your nearest recycler for discarding the kit.

General Safety Instructions

ESD Protection

ESD can damage boards and associated components. Cypress recommends that the user perform procedures only at an ESD workstation. If an ESD workstation is not available, use appropriate ESD protection by wearing an antistatic wrist strap attached to the chassis ground (any unpainted metal surface) on the board when handling parts.

Handling Boards

CYW943907AEVAL1F boards are sensitive to ESD. Hold the board only by its edges. After removing the board from its box, place it on a grounded, static-free surface. Use a conductive foam pad if available. Do not slide the board over any surface. Any physical action on CYW943907AEVAL1F such as changing wires, jumper settings, or measuring voltages can cause stress on the CYW943907AEVAL1F printed circuit board assembly (PCBA). You must ensure that the PCBA has proper support on the bottom side to avoid stress on the PCBA when the EVK is in operation.

1. Introduction



Thank you for your interest in the CYW943907AEVAL1F Evaluation Kit (EVK). The CYW943907AEVAL1F EVK enables customers to evaluate and develop single-chip Wi-Fi applications using CYW43907 devices.

The CYW943907AEVAL1F EVK uses WICED[™] Studio 5.0 (or later) to develop and debug your CYW43907 project. CYW943907AEVAL1F EVK offers footprint-compatibility with Arduino shields. In addition, the kit features an RJ-45 Ethernet connector, a Micro-SD-card slot, and onboard programmer/debugger and serial bridge chip. The CYW943907AEVAL1F EVK supports only 3.3 V as the operating voltage.

Older revisions of the same kit were named BCM943907AEVAL1F_2 and BCM943907AEVAL1F. CYW43907 and BCM43907 refer to the same device.

WICED Studio 5.0 (or later) supports application development using a WICED development board (CYW943907AEVAL1F). The development system is compatible with the Windows, OS X, and Linux operating systems. This document provides instructions for utilizing peripherals, such as I2C or SPI, in WICED sample applications using the WICED Studio Integrated Development Environment (IDE).

Note: This document applies to WICED Studio 5.0 (or later).

The CYW943907AEVAL1F EVK is available through the Cypress Online Store or through our distributors.

1.1 CYW943907AEVAL1F EVK Contents

The CYW943907AEVAL1F EVK includes the following:

- One CYW943907AEVAL1F Evaluation Board with assembled Arduino headers
- One USB 2.0 Type-A to Micro-B cable



Figure 1-1. CYW943907AEVAL1F Kit Contents



Inspect the contents of the kit. If you find any part missing, contact your nearest Cypress sales office for assistance: www.cypress.com/support.

Hardware Not Included With the Kit

The CYW943907AEVAL1F EVK does not come with all the hardware needed to perform the demonstrations documented in this guide.

The following hardware is not included with this kit:

- RJ-45 Ethernet cable
- SD-Card
- External power supply
- Dual external antenna
- Potentiometer
- Jumper Wires



1.2 CYW943907AEVAL1F Board Details

The CYW943907AEVAL1F board consists of the blocks shown in Figure 1-2 and Figure 1-3.

- 1. Reset Switch (SW2)
- 2. RJ45 Connector (J14)
- 3. Micro USB (Programming and Debugging) (J5)
- 4. 5-12V Power Input (J8)
- 5. WICED Header (J6)
- 6. Arduino Header (J13)
- 7. User Switch 1 (SW3)
- 8. User Switch 2 (SW1)
- 9. Arduino Header (J9)
- 10. PCB Antenna-Main (ANT1)
- 11. Connector for External Antenna 1 (J1)
- 12. CYW43907 Type 1GC Module (Murata) (U14)
- 13. PCB Antenna-Diversity (ANT0)
- 14. Connector for External Antenna 0 (J2)
- 15. On-board /External JTAG Switch (SW4)
- 16. External JTAG Header (J3)
- 17. Arduino Header (J10)
- 18. Arduino Header (J12)
- 19. External PHY chip(U12) BCM5241
- 20. External ADC Chip (U3)
- 21. µSD Connector/slot (J7)











1.3 WICED Studio Development System Overview

WICED Studio 5.0 (or later) supports application development using the WICED Evaluation Board (CYW943907AEVAL1F EVK). Tabs and their location in the WICED IDE are as shown in Figure 1-4.

Figure 1-4 illustrates the following:

- 1. Edit your application firmware.
- 2. Help Window that contains instructions on building and downloading applications.
- 3. Explore existing applications/firmware and library of the Software Development Kit (SDK).
- 4. View Build messages in the Console window.
- 5. Create and edit Make Targets for the platform to build your Application/Project.



Introduction

Figure 1-4. WICED IDE



1.4 WICED Studio Code Examples

WICED Studio includes libraries and code examples supporting both Bluetooth and Wi-Fi platforms. Selecting the 43xxx_Wi-fi Filter will show only Wi-Fi platform related files in the project explorer as shown in Figure 1-5.

Application examples can speed up the design process by serving as templates for development. Code examples are located under the apps category (in the Project explorer window), as shown in Figure 1-6. Code examples under apps are further grouped into demo, snip, test, waf (WICED Application Framework), and wwd (WICED Wi-Fi Driver Application) directories.

The demo directory contains applications that combine various WICED features into a single application. The snip directory contains application snippets that demonstrate how to use various WICED libraries and API functions. The test directory contains applications that are used for simple test and utility. The waf directory contains applications that are part of WICED Application framework, for instance, the bootloader. The www directory contains applications that are developed using the low level www API calls and do not rely on higher level WICED APIs. Located within each subdirectory in the apps folder is a README.txt that lists and summarizes the applications located within the folder. It should also be noted that not all applications are supported in all platforms. For more details on the WICED software stack and APIs, review the Application notes and documents available in the doc folder *WICED SDK installation folder/WICED-Studio-5.0/43xxx_Wi-Fi/doc*. WICED-QSG204 available in the same path is a good document to start with.



Figure 1-5. Filter for Wi-Fi Code Example in WICED Studio

C/C++ - 43xx_Wi-Fi/apps/snip/scan/scan.c - Eclipse

<u>File Edit Source Refactor Navigate Search Project Run WICED Platform Window Help</u>





🔹 C/C++ - 43xxx_Wi-Fi/apps/snip/scan/scan.c - Eclipse

🏠 Project Explorer 🙁 🛛 🔲 🐲	🗢 🗖 📄 README.txt 🕑 platform.c 🎧 Makefile 📄 make 📄 README.txt 🔯 scan.c 🕱
🗸 😂 43xxx Wi-Fi	92@ /************************************
V 🗁 apps	93 * Function Definitions
> 🗁 demo	94 ************************************
> onip	95
> 🗁 test	960 void application_start()
6 L 1 1	97 { 98 wiced init();
> 🗁 waf	99
> 🗁 wwd	100 while(1)
README.txt	101 {
> 🧀 doc	102 wiced time t scan start time;
> 🗁 include	103 wiced_time_t scan_end_time;
> 🗁 libraries	104 app_scan_data_t scan_data;
> 🗁 platforms	105
> 🤭 resources	106 /* Initialize the semaphore that will tell us when the scan is complete */
> 🗁 tools	<pre>107 wiced_rtos_init_semaphore(&scan_data.semaphore); 108 scan_data.result_count = 0;</pre>
> 🕞 WICED	<pre>109 WPRINT APP INFO("Waiting for scan results\n"));</pre>
.cproject	110 WPRINT APP INFO((" # Type BSSID RSSI Rate Chan Security SSID\n"));
gdbinit_attach	111 WPRINT APP INFO(("
,project	112
CHANGELOG.txt	113 /* Start the scan */
	<pre>114 wiced_time_get_time(&scan_start_time);</pre>
LICENSE.txt	<pre>115 wiced_wifi_scan_networks(scan_result_handler, &scan_data);</pre>
make	116 117 /* Wait until scan is complete */
make.exe	117 / Walt until star is complete / 118 wiced rtos get semaphore(&scan_data.semaphore, WICED_WAIT_FOREVER);
🗋 Makefile	<pre>iii wiced time get time(&scan end time);</pre>
README.txt	120
📄 version.txt	121 WPRINT_APP_INFO(("\nScan complete in %lu milliseconds\n", (unsigned long)(scan_end_time - s
	122



1.5 Kit Code Examples

In addition to the examples available in WICED Studio, this EVK includes a few additional code examples, which can be used to quickly evaluate CYW43907 using this kit. These examples are described in the Code Examples chapter.

1.6 Getting Started

To learn quickly about CYW943907AEVAL1F EVK, refer to the CYW943907AEVAL1F Quick Start Guide inside the kit box.

This user guide will help you get acquainted with CYW943907AEVAL1F EVK:

- The Software Installation chapter describes the installation of the kit software. This includes extracting the required files for WICED Studio 5.0 (or later).
- The Kit Operation chapter describes the major sections of the kit such as the on-board programmer/debugger chip, reset control, headers, programming and debugging of the kit, SD card interface, and Ethernet interface.
- The Hardware chapter describes the CYW943907AEVAL1F EVK hardware and its different blocks.
- The Code Examples chapter describes code examples that will help you understand how to get started with WLAN basic examples.

1.7 IOT Resources and Technical Support

Cypress provides a wealth of data at www.cypress.com/internet-things-iot to help you to select the right IoT device for your design, and quickly and effectively integrate the device into your design. Cypress provides customer access to a wide range of information, including technical documentation, schematic diagrams, product bill of materials, PCB layout information, and software updates. Customers can acquire technical documentation and software from the Cypress Support Community website (https://community.cypress.com).

For assistance, go to: www.cypress.com/support, or contact our customer support at +1(800) 541-4736 Ext. 2 (in the USA), or +1 (408) 943-2600 Ext. 2 (International).

1.8 Additional Learning Resources

Visit CYW943907AEVAL1F EVK and CYW43907 for additional learning resources including datasheets and application notes.



1.9 Document Conventions

Convention	Usage
Courier New	Displays file locations, user entered text, and source code: C:\cd\icc\
Italics	Displays file names and reference documentation.
[Bracketed, Bold]	Displays keyboard commands in procedures: [Enter] or [Ctrl] [C]
File > Open	Represents menu paths: File > Open > New Project
Bold	Displays commands, menu paths and icon names in procedures: Click the File icon and then click Open .
Times New Roman	Displays an equation: 2 + 2 = 4
Text in gray boxes	Describes Cautions or unique functionality of the product.

Table 1-1. Document Conventions for Guides

1.10 Acronyms

Acronym	Definition
SPI	Serial Peripheral Interface
EVK	Evaluation Kit
SDK	Software Development Kit
WICED	Wireless Internet Connectivity for Embedded Devices
JTAG	Joint Test Action Group
l ² C	Inter-Integrated Circuit
MQTT	Message Queue Telemetry Transport
POR	Power-on-Reset
PMU	Power Management Unit
VTRIM	Voltage Trimming
LPO	Low Power Oscillator
GPIO	General Purpose Input Output
UART	Universal Asynchronous Receiver/Transmitter
AWS	Amazon Web Services
IDE	Integrated Development Environment
WLAN	Wireless Local Area Network

2. Software Installation



This chapter describes the steps to install the software tools and packages on a PC for using the CYW943907AEVAL1F EVK. This includes the WICED IDE in which the projects will be built and used for programming.

2.1 Before You Begin

All Cypress software installations require administrator privileges. Ensure that you have the required privileges on the system for successful installation. Before you install the kit software, close any other Cypress software that is currently running. Ensure you have installed WICED Studio 5.0 (or later).

2.2 Install Software

Follow these steps to install the CYW943907AEVAL1F Evaluation Kit software:

1. Download and install WICED Studio 5.0 (or later) from this web page. Following is a screenshot of the Installer Window when opened.

nat you quit all programs before on. eed to the next screen. If you want to ous screen, click the 'Previous' button.
on at any time by clicking the 'Cancel'



- 2. Select two Folders, one for the IDE and the other for the SDK. The folder for the SDK contains the Framework for developing Wi-Fi applications.
- 3. As a last step in installation, installer will ask to select between Wi-Fi and Bluetooth platform. Select 43xxx_Wi-Fi as default.
- 4. Download the CY943907AEVAL1F_KitPackage.zip software from here. The software is available as a zip file.
- 5. Locate the WICED Wi-Fi-SDK directory in your PC. The default location is *C:\Users\<user name>\Documents\WICED-Studio-5.0\43xxx_Wi-Fi*, as shown in Figure 2-1. However, it may be in a different location depending on the path you choose when installing WICED Studio.

• -> • 🔨 🔤 « V	VICED-Studio-5.0 > 43xxx_Wi-F	i ~ č	Search 43xxx_Wi-	Fi ,
^	Name	Date modified	Туре	Size
📌 Quick access	apps	5/29/2017 5:17 PM	File folder	
🚆 Documents 🖈	doc	5/29/2017 5:17 PM	File folder	
👆 Downloads 🖈	include	5/29/2017 5:17 PM	File folder	
📰 Pictures 🛛 🖈	libraries	5/29/2017 5:17 PM	File folder	
Desktop 💉	platforms	5/29/2017 5:17 PM	File folder	
pesit	resources	5/29/2017 5:17 PM	File folder	
Rev04	tools	5/29/2017 5:17 PM	File folder	
	WICED	5/29/2017 5:17 PM	File folder	
🔜 wifi	.cproject	5/29/2017 5:17 PM	CPROJECT File	14 KB
痜 OneDrive - Cypres] .gdbinit_attach	5/29/2017 5:17 PM	GDBINIT_ATTACH	1 KB
This PC	.project	5/29/2017 5:17 PM	PROJECT File	3 KB
and a second	API_updates.txt	5/29/2017 5:17 PM	Text Document	10 KB
Desktop	CHANGELOG.txt	5/29/2017 5:17 PM	Text Document	65 KB
🖶 Documents	LICENSE.txt	5/29/2017 5:17 PM	Text Document	7 KB
👆 Downloads	🗋 make	5/29/2017 5:17 PM	File	4 KB
💧 Music	📧 make.exe	5/29/2017 5:17 PM	Application	71 KB
E Pictures	🗋 Makefile	5/29/2017 5:17 PM	File	17 KB
Videos	ProjectZeroExploits.txt	5/29/2017 5:17 PM	Text Document	3 KB
Windows7_OS (README.txt	5/29/2017 5:17 PM	Text Document	15 KB
Lenovo_Recover	version.txt	5/29/2017 5:17 PM	Text Document	1 KB

Figure 2-1. WICED SDK Directory



6. Copy the CY943907AEVAL1F_KitPackage.zip file and extract to a temporary location such as "temp". The "apps" zip file will extract two directories called and "resources" inside the temp/CYW943907AEVAL1F_KitPackage/ directory. Select both of them, Copy (CTRL+C) and paste (CTRL+V) into C:\Users\<user name>\Documents\WICED-Studio-5.0\43xxx Wi-Fi. Choose the option to merge with existing folders.

Alternately, copy the *CY943907AEVAL1F_KitPackage.zip* to the location specified above and use the **Extract Here** option if you have 7-Zip or other unzip utility. The zip file should be merged to the existing folders. If WICED Studio 5.0 (or later) is opened with *43xxx_Wi-Fi* as the WICED Filter (Figure 1-5), then the new folders appear as shown in Figure 2-2.

C/C++ - Eclipse File Edit Source Refactor Navigate Search Project Run WICED Platform Window Help 📸 🕶 🔄 🐘 🗁 🦓 🕶 📸 🔌 🕪 💷 🔳 🙌 🚴 😳 🛒 🐴 🐼 Wi-Fi ✓ / ※ ■ ■ ☆ + ѽ + ĉ + ⊙ + ☆ + ○ + ♀ + ♀ README.txt Di Makefile README.txt c scan.c 💥 Project Explorer 🔀 platform.c make ✓ [™] 43xxx_Wi-Fi 61 * Constants ***************** 62 🗸 🗁 apps 63 #define DELAY_BETWEEN_SCANS (5000) 😕 demo 64 🗸 🗁 kits CYW943907AEVAL1F 66 Enumerations > 🗁 adc_measure 67 68 > 🗁 config_join_ping publish_subscribe_aws Type Definitions 70 > 🕞 snip ************** ****************************** 71 > 🕞 test > 🗁 waf 74 Structures > 🗁 wwd 75 README.txt 76 typedef struct > 🖂 doc 77 { /* Semaphore used for signaling scan complete */ > 🗁 include 78 wiced_semaphore_t semaphore; uint32 t result_count; /* Count to measure the total scan results > 🗁 libraries 79 80 } app_scan_data_t; platforms 81 🗁 resources * Static Function Declarations 🗸 🗁 apps 83 *********** ✓ → adc_measure 84 🎯 data.html 86 wiced_result_t scan_result_handler(wiced_scan_handler_result_t* malloced_scan_result); main.html 87 > 🕞 amqps > 🗁 appliance 89 Variable Definitions ****************** > 🕞 apsta 90 > 🗁 avs 91 > 🕞 aws_iot 93 * Function Definitions > 🗁 azure_iot_hub 94 > 🕞 bt smartbridge 95 > 🕞 duktape void application_start() 966 > 🕞 flac > http_server_sent_events 📮 Console 🔀 🕌 Problems 🛷 Search 🕸 Debug > > https server > 🗁 ping_webserver No consoles to display at this time. > 🗁 secure_mqtt > 🕞 temp_control > 🗁 certificates > 🗁 config

Figure 2-2. Setup Package in WICED Studio 5.0 (or later)

7. The CY943907AEVAL1F_KitPackage.zip package contains three code examples which add to the existing set of examples available in WICED Studio 5.0 or later. Unzipping creates the kits directory under apps, and *adc_measure* in the *resources*\apps directory.

After unzipping, if the projects are not visible in WICED Studio 5.0 (or later), then right-click the top most folder (*43xxx_Wi-Fi*) and click **Refresh**, as shown in Figure 2-3.



Figure 2-3. Refresh Top Folder

Project Explorer		
29 43xxx_Wi-Fi		avright 2017, Cypress Semiconductor Corporation or a subsidiary of []
✓ → apps → → c	New	`
> 🗁 k	Go Into	pplication
🗸 👝 s 🗈	Copy Ctrl+	pplication
> 🖉 🛅	Paste Ctrl+	
> 🖉 🗙	Delete Delet	ED scan API
> 2 3	Remove from Context Ctrl+Alt+Shift+Dow	pplication snippet regularly scans for nearby <u>Wi-Fi</u> access points
	Move	ation Instructions
× C	Rename F	ect a PC terminal to the serial port of the WICED Eval board,
> 6	Import	build and download the application as described in the WICED k Start Guide
> 🖉 🔛	Export	K Start Guide
> @ 🖄		time the application scans, a list of Wi-Fi access points in
2	Refresh F	e is printed to the UART
S e	Close Project	
> @	Close Unrelated Projects	<stdlib.h></stdlib.h>
> 6	Build Configurations	> "wiced.h"
> 6	Make Targets	>
	Index	> Macros
50		***************************************
> 6	Validate	*********
> 6	Show in Remote Systems view	Constants
> 6	Profiling Tools	> ***********************************
> 6	Profile As	
2 6	Debug As	> ************************************
> @	Run As	***************************************
> 6	Compare With	2
> 6	Restore from Local History	Problems 🛷 Search 🕸 Debug
> 6 💖	Run C/C++ Code Analysis	
> 6	Team	ay at this time.
> 6	Source	>
> 6	Properties Alt+Ente	r ·
> 2	ng_webserver	
> 🗁 pi	2 - Andrew Charles and Charles	

3. Kit Operation



This chapter introduces you to the CYW943907AEVAL1F EVK and the features that will be used as part of Kit operation. Features such as Wi-Fi connection and programming/debugging are discussed in this chapter. The chapter also describes the USB-UART that can be used to communicate with the CYW43907 device on this EVK.

3.1 Theory of Operation

Figure 3-1 illustrates the block diagram of the CYW943907AEVAL1F EVK. This board contains BCM943907/CYW43907 based SiP which is a Type1GC Wireless module. This module is an embedded network controller solution from Murata. This board also contains a USB-Serial interface / JTAG programmer / debugger.

This board features Arduino form-factor compatible headers, which enables Arduino shields to be plugged on top, extending its capabilities. This board also features two user switches, two user LEDs, an RJ-45 connector for Ethernet, and a reset switch for the wireless module.



Figure 3-1. Block Diagram of CYW943907AEVAL1F EVK

3.2 On-board programmer/Debugger and Serial interface Chip

An FT-2232-HQ chip is used for onboard programming, debugging and USB-Serial functionality. It connects to the computer over a USB interface and connects to the CYW43907 based SiP module over JTAG and UART pins. Alternately, you can use the External JTAG connector (J3) along with switch **SW4** (in all closed positions) in order to use JTAG from connectors such as Olimex.



3.3 CYW943907AEVAL1F Kit Connection

The CYW943907AEVAL1F EVK can be powered by the following options:

- External power supply
- USB

When using external power supply, you should use a 5 V – 12 V, 2A power supply with 2.1 mm DC Jack (center pin positive). When powered from USB, there are two logical USB devices: a USB-JTAG device and a USB-UART device. Drivers for the CYW943907AEVAL1F EVK are automatically installed during the WICED SDK installation process. When you connect the kit for first time to your PC, it will initiate the driver search as shown in Figure 3-2.

Driver Software Installation		X
Your device is ready to use		
USB Composite Device WICED USB JTAG Port WICED USB Serial Port B WICED USB Serial Port (COM53)	Ready to use Ready to use Ready to use Ready to use	
		Close

Figure 3-2. Driver Software Installation

3.3.1 Verifying Driver Installation

To verify the successful completion of driver installation, perform these steps:

- 1. Right-click My Computer > Properties.
- 2. In the System Properties window, select **Device Manager**.
 - a. The WICED USB Serial Port is listed under Ports (COM & LPT) as shown in Figure 3-3.
 - b. The WICED USB JTAG Port is listed under WICED USB JTAG Devices as shown in Figure 3-3.

In Figure 3-3, the Device Manager window identifies the WICED USB Serial COM port as COMXX. The assigned port number varies between systems. If the device displays two WICED USB Serial Ports (WICED USB Serial port and WICED USB JTAG Port) instead of one, then follow the link mentioned in this post.



Figure 3-3. Verifying Device Driver Installation

File A	ction View Help
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× ∄ L	APWIN10-KAVS
> 4	Audio inputs and outputs
> 着	Batteries
> 🕷	Biometric devices
> 8	Bluetooth
	Computer
> _	Disk drives
> 4	Display adapters
>	Firmware
> =	IDE ATA/ATAPI controllers
> =	Imaging devices
> 🔤	Keyboards
> [Memory technology devices
> (Mice and other pointing devices
> 🗖	Monitors
> 🖕	Network adapters
× 4	Ports (COM & LPT)
	Intel(R) Active Management Technology - SOL (COM3)
	WICED USB Serial Port (COM15)
> 🖻	Print queues
> 🗖	Processors
>	Security devices
> 🖪	Sensors
> 🗖	SM Driver
>	Software devices
> 4	Sound, video and game controllers
> 😫	Storage controllers
> 🖬	System devices
> 🖗	Universal Serial Bus controllers
- v 🖗	WICED USB JTAG Devices
	WICED USB JTAG Port

3.3.2 Troubleshooting

If an error occurred during the automatic driver installation process, the driver may be manually installed from the following directory: *<WICED-SDK>\Drivers\Windows\wiced_uart*.

If the CYW943907AEVAL1F EVK does not appear in the Device Manager, verify that the +3V3 LED is turned ON and check the USB cable.

3.3.3 External Power Supply

The CYW943907AEVAL1F EVK can be supplied using an external power supply (5V-12V, 2A), using a 2.5 mm DC Jack with center pin positive. When using external power supply and also connecting a USB cable (for programming/debugging or USB-UART), the voltage on the external power supply should be greater than that of the USB supply, if not the kit will be actually sourcing its power from USB rather than the external power supply.



3.4 Building, Programming, and Debugging CYW943907AEVAL1F EVK

3.4.1 Building and Programming a Project for CYW943907AEVAL1F in WICED Studio IDE

To build and program a project for CYW943907AEVAL1F EVK, perform the following steps:

- 1. To open the WICED IDE on Windows PC, go to Start > All Programs > Cypress > WICED-Studio.
- 2. Select 43xxx_Wi-Fi in the WICED Target selector drop-down box as shown in Figure 1-5. Building a project requires a corresponding make target, located in the Make Target window. All Applications should go under the apps directory. The make target path will contain the directory hierarchy starting from apps with directory names separated by a period. The project name is followed by a hyphen and then the platform name. Finally, the actions to be performed after the build are specified such as download and run. For example, to build, download, and run the application scan which exists in apps\snip\scan, create the following make target:

snip.scan-CYW943907AEVAL1F download run

This project will periodically scan for Wi-Fi access points and will list them using the serial to USB connection on the kit.

Note: By default, kit comes pre-programmed with the same snip.scan example.

Perform these steps to create the make target, build, program, and test application scan:

3. Right-click 43xxx_Wi-Fi in Make Target window as shown in Figure 3-4 and click New...

Figure 3-4. Creating New Make Target

ð X





4. Enter snip.scan-CYW943907AEVAL1F download run in the Target name field and click the OK button Note: The list of all commands that can be provided in the Make target is listed in *<WICED-SDK installation directory>/43xxx_Wi-Fi/Makefile*.

snip.scan-CYW943907AEVAL1F download run indicates the following:

snip = directory inside apps folder

scan = Sub-directory and name of the application to be built. For example, to build the console application
under test directory in apps, then use test.console instead of snip.scan.

CYW943907AEVAL1F = Board/platform name

download = Indicates download to target

run = Resets the target and starts execution

5. Double-click (alternately, right-click and select **Build Target**) the Clean Make Target to remove any output from the previous build. It is recommended to do Make clean when any new files are added or removed to the corresponding Target.

Note: Ensure that you have connected CYW943907AEVAL1F EVK to the same PC via USB prior to executing the build target.

6. Double-click (alternatively right-click and select **Build Target**) the snip.scan-CYW943907AEVAL1F download run make target to build and download it to the CYW943907AEVAL1F EVK. The project is built and programmed into the CYW943907AEVAL1F EVK, as shown in Figure 3-5.

Figure 3-5. Successful Build and Program

🖳 Console 🕱 💦 Problems 🛷 Search 🕸 Debug 🔏 Remote Systems 🛛 🐥 🎓 🔄 📰 👪 🚝 🔩 📑 🖳 🚽 🖘 🖘 🖘 🗖
CDT Build Console [43xxx_Wi-Fi]
Creating Filesystem BCM94390x_targets.mk Downloading DCT build/snip.scan-CYW943907AEVAL1F/DCT.bin @ SFLASH_DCT_LOC=0x00008000 ./tools/common/Win32/mk_wicedfs32 build/snip.scan-CYW943907AEVAL1F/filesystem.bin build/snip.scan-CYW94390 Creating Filesystem Done Building apps lookup table Downloading Bootloader Finished Downloading Bootloader Downloading resources filesystem build/snip.scan-CYW943907AEVAL1F/filesystem.bin at sector 17 size 12 Downloading APP0 build/snip.scan-CYW943907AEVAL1F/binary/snip.scan-CYW943907AEVAL1F.stripped.elf @ sector Downloading apps lookup table in wiced_apps.mk build/snip.scan-CYW943907AEVAL1F/APPS.bin @ 0x10000 siz Resetting target Target running Build complete Making .gdbinit
20:06:45 Build Finished (took 2m:35s.858ms)

- 7. To view output messages with a terminal emulation program (such as Tera Term), follow these steps:
 - a. Start the terminal emulation program.
 - Set the Terminal ID to VT100 and New-Line Receive to AUTO. Other settings should be left at the default settings.



Kit Operation

Terminal size	New-line					
80 X 24	Receive: AUTO -					
Term size = win size	Transmit: CR Cancel					
Terminal ID: VT100 -	Local echo					
Answerback:	Auto switch (VT<->TEK)					
Coding (receive)	Coding (transmit)					
UTF-8 🔻	UTF-8 •					
locale: american	CodePage: 65001					

c. In the Terminal Emulator, initiate a connection with the Serial port number from the Device Manager on the PC as shown in Figure 3-3.

Note: Exact Port number will vary with the corresponding PC port.

Port:	COM8	ок
Baud rate:	115200 🔹	
)ata:	8 bit 🔹	Cancel
Parity:	none	•
Stop:	1 bit 🔹	Help
Flow control:	none 🔹	•

- d. Press the **Reset** button (see Figure 1-1) on the CYW943907AEVAL1F EVK to view the application startup messages.
- 8. The output of the Terminal Emulation program should be similar to what is shown in Figure 3-6.





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ιÂΝ	Firm	Jare		ωī	Ø: Anr	18 21	117 17	:21:53	vers	ion 7	.15.168	.87 (r6	6465	4) FWID 01-d4eac	896
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					:E2:31	-76	216.7	1 1	Open				HP21	UN_GUESI	
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	nfra	98:	E7:F4	:20	:8A:83	-74	72.2	6	WPA2	AES	PSK		DIRE	CT-82-HP DeskJet	4530 seri
2 I		PG-	CC-10	- 00	:8B:60	_07	916 9	5	WPA2	OFC	Enton	prise	CYFI		
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					:9A:31	-76	216.7 54.0	36	WEP					HONE	
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					:8C:D4	-58	54.0	149	WEP					stNexus	
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					:8C:D2	(off	-chan)	150.0	149	Open WPA2	AES	Enterpr	ise	CYPGUESI	
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9 I	nfra	FØ:	50:19	:8A	:9A:32 :9A:30		-chan) -chan)		36 36	Open WPA2	470	Enterpr	20220	CYPGUEST CYFI	

3.4.2 Troubleshooting

If a download_dct error message is displayed despite connecting the board, follow the steps outlined in this post.



3.4.3 Debugging a Project using Breakpoints

After programming a project, it is possible to debug it in CYW943907AEVAL1F EVK using the built in debugger.

Note that the scan example used in Building and Programming a Project for CYW943907AEVAL1F in WICED Studio IDE section is also used here. Steps outlined in Building and Programming a Project for CYW943907AEVAL1F in WICED Studio IDE should be first followed with a slight change (adding -debug to the Make Target command and removing run). Instead of

snip.scan-CYW943907AEVAL1F download run

The following make command should be used:

snip.scan-CYW943907AEVAL1F-debug download

If -debug is not added then it will be built for release. The important difference between the debug and release configurations is optimization. Debug is built with no optimization and release is built with optimization. It is possible to debug without using -debug as well, but with many variables and lines optimized away, many breakpoints might not get hit.

It should be noted that Breakpoints must be placed after starting a debug session in WICED Studio 5.0 or later. If there are any breakpoints that were created prior to the start of debug session, their properties must be changed to be enabled for all Threads.

Perform these steps to debug the project:

- 1. Execute the make target described above to download the project to the device.
- 2. Click the arrow next to the **Debug** icon as shown in Figure 3-7 and select 43xxx-Wi-Fi_Debug_Windows. The Confirm Perspective Switch dialog appears; click the **Yes** button. The Debug session starts and halts in the start_GCC.s file.

Note:

- The Confirm Perspective Switch dialog is not displayed if you have previously selected the Remember my decision checkbox in the Confirm Perspective Switch dialog.
- If any MakeFile/Build error occurs, then clean (using the *Clean* make target), re-build, and download to the CYW943907AEVAL1F EVK again. The Debug session starts and halts in the start GCC.s file.
- In the Debug Perspective, the Project explorer window goes away by default. To view the source files, switch back to the "C/C++" perspective.
- To switch between perspectives use the "C/C++" or "Debug" icon at the top right corner of screen.