

## Chapter 1: Introduction

After completing this chapter, you will understand what this class is, what topics are covered, and the overall class objectives.

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### Document conventions

Convention	Usage	Example
Courier New	Displays code and text commands	CY_ISR_PROTO(MyISR) ; make build
<i>Italics</i>	Displays file names and paths	<i>sourcefile.hex</i>
[bracketed, bold]	Displays keyboard commands in procedures	[Enter] or [Ctrl] [C]
Menu > Selection	Represents menu paths	File > New Project > Clone
<b>Bold</b>	Displays GUI commands, menu paths and selections, and icon names in procedures	Click the <b>Debugger</b> icon, and then click <b>Next</b> .

## 1.1 What is this Class

This class teaches you how to use Bluetooth® in ModusToolbox™ applications. The descriptions and exercises use a CYW20835 chip, which is supported by the AIROC™ Bluetooth® SDK (BTSDK).

After completing this class, you should be able to create and debug full Bluetooth® applications using ModusToolbox™ tools including peripherals, centrals, and beacons.

## 1.2 Prerequisites

This class assumes that you know the basics of using the ModusToolbox™ ecosystem, how to interact with AIROC™ Bluetooth® SDK MCUs including using peripherals, and how to program the device. If you are unfamiliar with these topics, review the following classes first:

- ModusToolbox™ Software Training Level 1 – Getting Started
- ModusToolbox™ Software Training Level 2 – AIROC™ Bluetooth® SDK (BTSDK) MCUs

## 1.3 Required Software

The following software is required for completing the exercises in this class. Installation instructions will be provided in the exercises.

### 1.3.1 ModusToolbox™ tools

You should already have ModusToolbox™ tools installed on your system from previous classes. If not, you will install it in the exercises.

### 1.3.2 AIROC™ Bluetooth® Connect App

We will make extensive use of a smart phone app called AIROC™ Bluetooth® Connect (also known as AIROC™ Connect) to act as a Bluetooth® LE central to connect to and test the peripherals that we will create. That tool is available for Android and iOS.

### 1.3.3 LightBlue

Another popular Bluetooth® development tool is called LightBlue. It is available on both Android and iOS and can perform similar functions as AIROC™ Connect. It will be used in the scan response exercise and can be used in other exercises instead of AIROC™ Connect.

### 1.3.4 Beacon Scanner app

For the chapter on Bluetooth® beacons, a beacon scanner app for Android or iOS used to test the exercises. Many free beacon scanner apps are available.

## 1.4 Bluetooth® Families and Development Kits

Infineon supports Bluetooth® on multiple families of devices. A high-level summary of the different solutions is:

- AIROC™ Wi-Fi and Bluetooth® Devices (CYW4343x, CYW43012, CYW4373x) with Host MCU
  - The CYW43xxx device runs the lower levels of the stack in hosted mode while a host processor such as a PSoC™ 6 MCU runs the upper levels of the stack and the application.
  - This solution supports Bluetooth® LE and Wi-Fi
- AIROC™ Bluetooth® SoC (CYW20xxx)
  - The 20xxx device runs the entire Bluetooth® stack and the application.
  - This solution supports Bluetooth® BR, EDR, and LE.
  - The firmware architecture for this solution is almost identical to the 43xxx case.
- AIROC™ Bluetooth® Microcontroller (PSoC™ 63 MCU)
  - The PSoC™ 63 device runs the entire Bluetooth® stack and the application.
  - This solution supports Bluetooth® LE.
  - The stack for this solution is different from the prior two cases so the firmware architecture is considerably different.

*Note: This class covers the AIROC™ Bluetooth® SoC family of devices.*

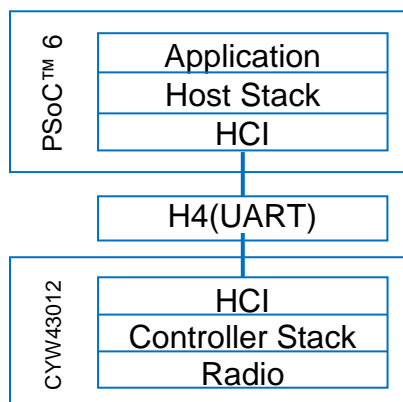
*Note: All examples and exercises in this class use the CYW20835 device. The kit used is the CYW920835M2EVB-01.*

Development kits are available for each of the three families described above. See the list of kits in the ModusToolbox™ Project Creator tool and the Infineon website the most up-to date list.

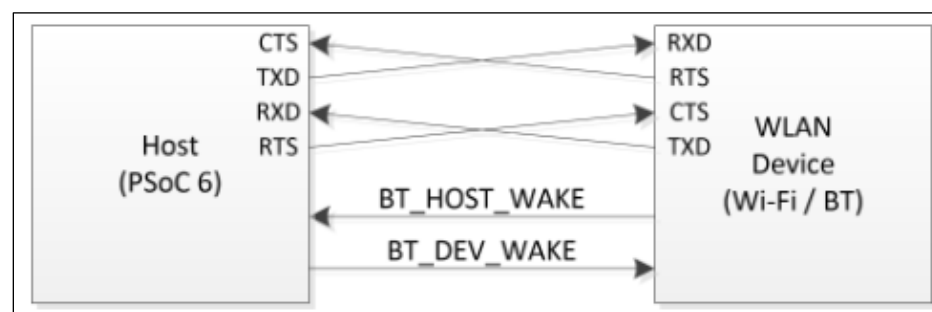
### 1.4.1 AIROC™ Wi-Fi and Bluetooth® Devices with Host MCU

In the solution with separate radio controller and host MCU, the interface between the host (e.g. PSoC™ 6) and the radio device (e.g. CYW43012) uses the Host Controller Interface (HCI). The lower level of the Bluetooth® stack (the Controller Stack) will run on the CYW43012 while the higher level of the Bluetooth stack (the Host Stack) will run on the PSoC™ 6 along with the user application.

Here is a picture that illustrates the connection:



The HCI interface physically runs using a 4-pin UART interface. The PSoC™ 6 that we are using has multiple UARTs on it so don't worry – you will still have a UART interface to print debug messages. There are also two wake pins that are used for low power which we will cover later.



*Note: The CYW43012 also supports Wi-Fi which uses a completely independent SDIO interface (not shown) for communication between the PSoC™ 6 host and the CYW43012.*

The controller (e.g. CYW43012) runs the radio physical layer (PHY) and link layer (LL). Everything above that runs on the PSoC™ 6.

### 1.4.2 AIROC™ Bluetooth® SOC

In the Bluetooth™ SOC solution, the stack and user application run on a single device. Many of the devices in this family are combo devices that support Bluetooth® BR/EDR and LE.

### 1.4.3 AIROC™ Bluetooth® Microcontroller

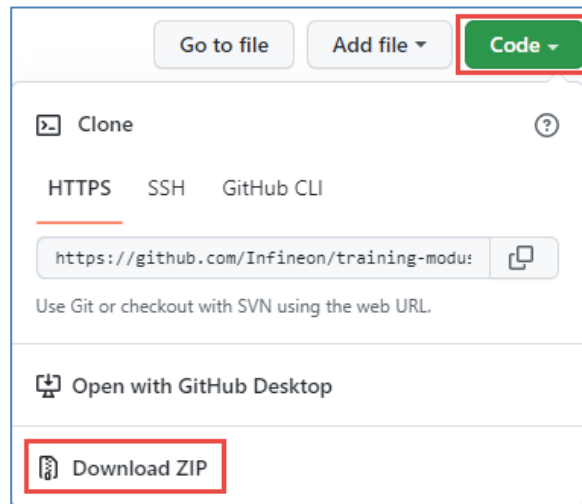
PSoC™ 63 offer the benefit of a powerful PSoC™ MCU including CAPSENSE™ along with Bluetooth® LE in a single device.

## 1.5 Exercises

### Exercise 1: Download Class Material

In this exercise, you will download the class material from GitHub. This will give you local access to the manuals and projects.

- ☐ 1. Use a Web browser to go to the class GitHub site at: <https://github.com/Infineon/training-modustoolbox-level3-bluetooth>
- ☐ 2. Click the Code button.



- ☐ 3. Click the Download ZIP button to download the repo to your local disk to a convenient location and then unzip it.

*Note: If you are familiar with Git operations, you can clone the repository to your local disk using the URL instead of downloading a ZIP file if you prefer.*

## Exercise 2: Install Software

In this exercise, we will make sure you have all of the software needed for the class.

### ModusToolbox™ tools



4. You should already have ModusToolbox™ tools installed on your system. If not, refer to the ModusToolbox™ Software Training Level 1 Getting Started class or visit <https://www.infineon.com/cms/en/design-support/tools/sdk/modustoolbox-software> for instructions.

*Note: You must use ModusToolbox 2.3.1 or later. If you have ModusToolbox 2.3, you must install the 2.3.1 patch for the exercises in this class to work.*

### AIROC™ Bluetooth® Connect



1. Install AIROC™ Bluetooth® Connect onto your smartphone from the Android or iOS app store.

### LightBlue



1. Install LightBlue onto your smartphone from the Android or iOS app store.

### Beacon Scanner App



1. Install the beacon app of your choice onto your smartphone from the Android or iOS app store.

For Android, "Beacon Scanner" is a good choice.

For iOS, "BLE Scanner" is a good choice.

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