Chapter 4: Bluetooth Low Energy (BLE)

Time 3 Hours

At the end of this chapter you will understand …

**Most importantly, you will be able to use WICED to connect your IoT device to a Wi-Fi Network.**

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# BLE Introduction

Bluetooth Classic vs. BLE (LE is not lower power radio, but rather a radio that is off most of the time)

PHY, channels, speeds, data rates, MTU, etc.

Advertising vs. connecting

Bluetooth 4.0, 4.1 (better throughput and power), 4.2 (data length extension – 27 bytes vs 251 bytes - and enhanced security/privacy 1.2 – FIPS compliant ECDH key exchange), 5.0 (2 Mbps), etc.

Bluetooth Smart, Smart Ready terminology

Stack

# GAP

GAP roles

# GATT

GATT database and GATT roles

# Profiles, Services, and Characteristics

Profiles (incl. standard profiles from BT SIG)

Profile: Collection of Services

Service: Collection of Characteristics

Characteristic: Collection of Attributes

# Security

Security and secure modes – including enhanced security and privacy from BT 4.2

# CySmart

CySmart Android and iOS apps, CySmart PC app intro

# Advanced Topics

DTM – Direct Test Mode

HCI - Host Control Interface

OTA updates

Multi-role devices

Mesh

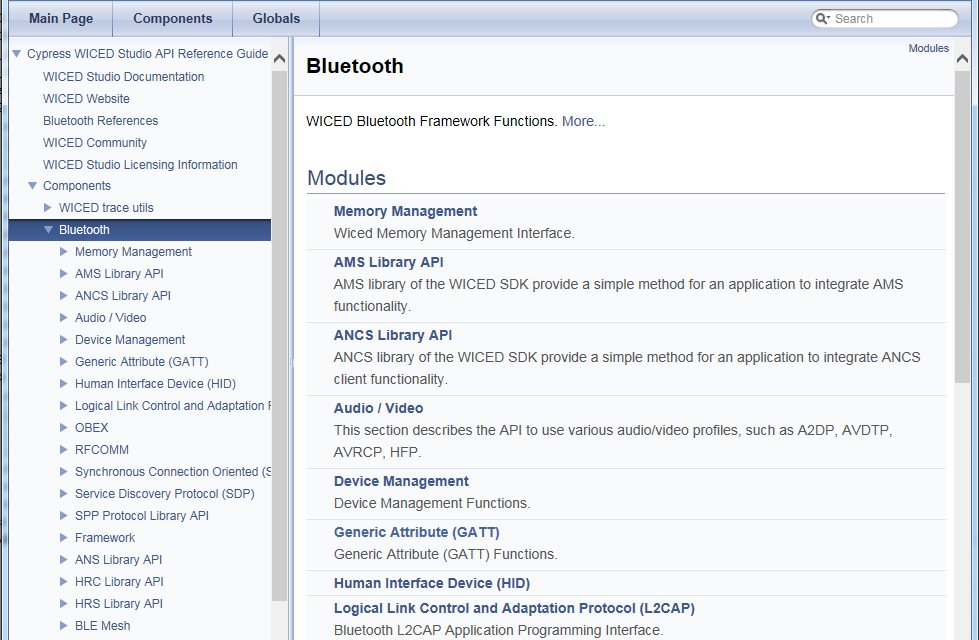
# Using BLE in WICED Studio

wiced\_bt\_cfg.c, GATT database definitions, callback functions, read/write functions

WICED Bluetooth Designer Wizard

# Documentation

The relevant documentation for Bluetooth functions are in the WICED SDK documentation under Components🡪Bluetooth.



# Exercise(s)

* 1. Create a BLE Advertiser
  2. Connect using BLE
  3. Save BLE Bonding Information
  4. Add a Pairing Key
  5. (Advanced) Join a BLE Mesh Network ???

# Related Example “Apps”

|  |  |
| --- | --- |
| **App Name** | **Function** |
| snip.ble.eddystone |  |
| snip.ble.ibeacon |  |
| snip.ble.mybeacon |  |
| snip.ble.multi\_beakon |  |
| snip.ble.hrs |  |
| snip.ble.env\_sensing\_temp |  |
| semo.hello\_sensor |  |
|  |  |

# Recommended Reading