

Objective

This example demonstrates the BLE component functionality configured as Cycling Sensor.

Overview

In this example the BLE Component is configured to operate as a Cycling Sensor. To implement this functionality, the BLE component is configured as Cycling Power Profile (CPP) operating in the CP Sensor and Broadcaster role. To implement the full sensor functionality required for the cycling sensor, the standard Cycling Speed and Cadence Service is also added to the CPP.

Requirements

Design Tool: [PSoC Creator 3.1 SP2](#), [CySmart 1.0](#)

Programming Language: C (GCC 4.8.4 – included with PSoC Creator)

Associated Devices: All PSoC 4 BLE devices

Required Hardware: [CY8CKIT-042-BLE Bluetooth® Low Energy \(BLE\) Pioneer Kit](#)

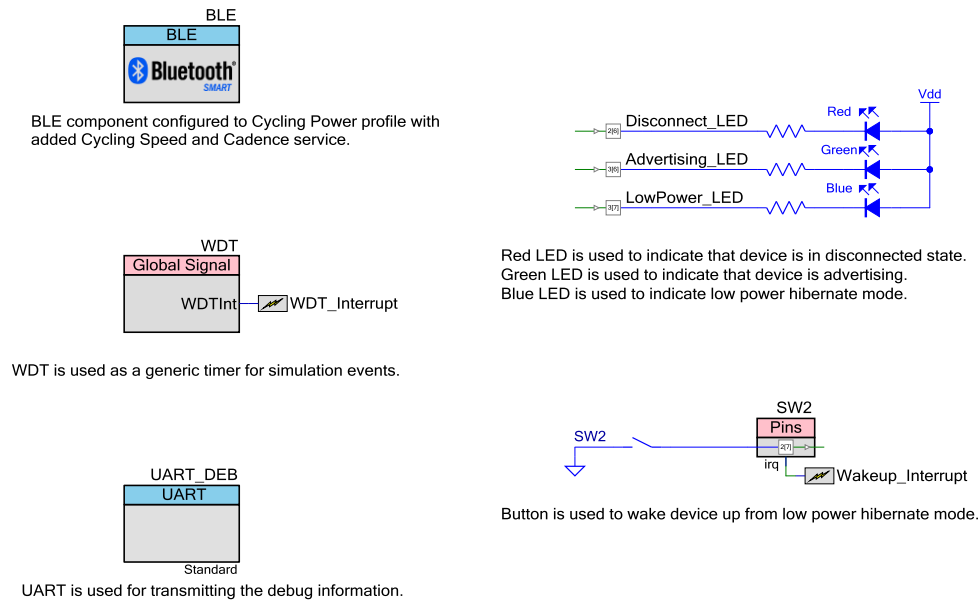
Hardware Setup

The BLE Pioneer Kit has all of the necessary hardware required for this lab. In this setup, following connections are done in the BLE Pioneer Kit.

- The UART RX pin is connected to port 1 pin 4.
- The UART TX pin is connected to port 1 pin 5.
- The red LED (port 2 pin 6) is used to indicate the BLE disconnection state.
- The green LED (port 3 pin 6) is used to indicate the advertising state.
- The blue LED (port 3 pin 7) is used to indicate the hibernate mode.
- A mechanical button (port 2 pin 7) is used to wake up the device and start re-scanning.

PSoC Creator Schematic

Figure 1. PSoC Creator Schematic
BLE Cycling Sensor Example project



Project Description

The project demonstrates BLE component functionality configured as a Cycling sensor.

On power up device starts advertising, indicated by the blinking green LED. Upon connection with the client, green LED is turned off indicating that the connection is established. To read the instantaneous power, accumulated torque, wheel revolution and accumulated energy, client enables the notification of the Cyclic Power Measurement characteristic.

At every measurement interval, configured as 1 second, device sends the above mentioned simulated data to the client as notifications.

Expected Results

The project simulates Cycling Power Measurements characteristic with instantaneous power, accumulated torque, cumulative wheel revolution and accumulated energy values. Following table contains example of simulated data and expected calculation results.

	Instantaneous Power [W]	Accumulated Torque	Expected Accumulated Torque	Cumulative Wheel Revolution	Last Wheel Event Time [1/2048s]	Expected Instantaneous Speed [km/h]	Accumulated Energy Value [kJ]	Expected Accumulated Energy [kJ]
1	200	64960	2030.0	1000	63000	N/A	65532	65532
2	201	65280	2040.0	1008	65048	60.48	65534	65534
3	202	64	2050.0	1016	1560	60.48	0	65536
4	203	384	2060.0	1024	3608	60.48	2	65538
5	204	704	2070.0	1032	5656	60.48	4	65540

Related Documents

Table 1 lists all relevant application notes, code examples, knowledge base articles, device datasheets, and Component / user module datasheets.

Table 1. Related Documents

Document	Title	Comment
AN91267	Getting Started with PSoC 4 BLE	Provides an introduction to PSoC 4 BLE device that integrates a Bluetooth Low Energy radio system along with programmable analog and digital resources.
AN91445	Antenna Design Guide	Provides guidelines on how to design an antenna for BLE applications.