PSoC 4 BLE – CapSense Proximity

Objective

This example demonstrates the use of the BLE Component to design a Custom Profile that sends CapSense proximity data over BLE.

Overview

This project demonstrates connectivity between the BLE Pioneer Kit (acting as a GAP Peripheral and GATT Server device) and the CySmart BLE Test and Debug Utility or a mobile device running the CySmart mobile app (acting as a GAP Central and GATT Client device). This project demonstrates the following:

- Advertisement with timeout
- Connection with any GAP Central device
- Custom BLE Service
- Data transfer over BLE Custom Service using Notifications

The Custom BLE Profile in this project consists of a single Custom Service, called CapSense. This Service consists of a Custom Characteristic, termed as CapSense Proximity. The CapSense Proximity Characteristic is used to send one byte of data, ranging from 0 to 255, as Notifications to the GATT Client device. This data is the difference count read by the CapSense Component on the one-wire proximity sensor (J14) connected on the kit. This Characteristic supports Notifications, which allows the GATT Server to send data to the connected GATT Client device whenever new data is available.

Requirements

Design Tool: PSoC Creator 3.1 CP1, CySmart 1.0

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

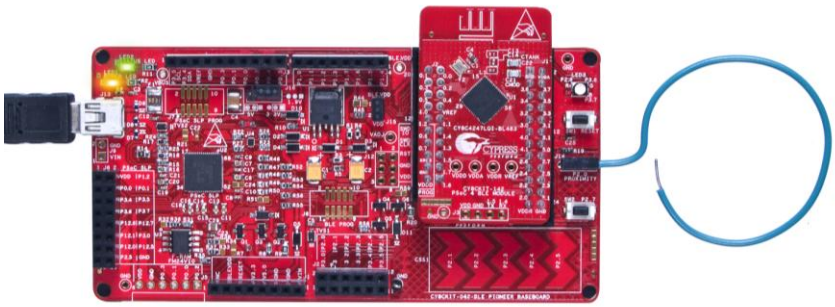
Associated Devices: All PSoC 4 BLE devices

Required Hardware: CY8CKIT-042-BLE Bluetooth® Low Energy (BLE) Pioneer Kit

Hardware Setup

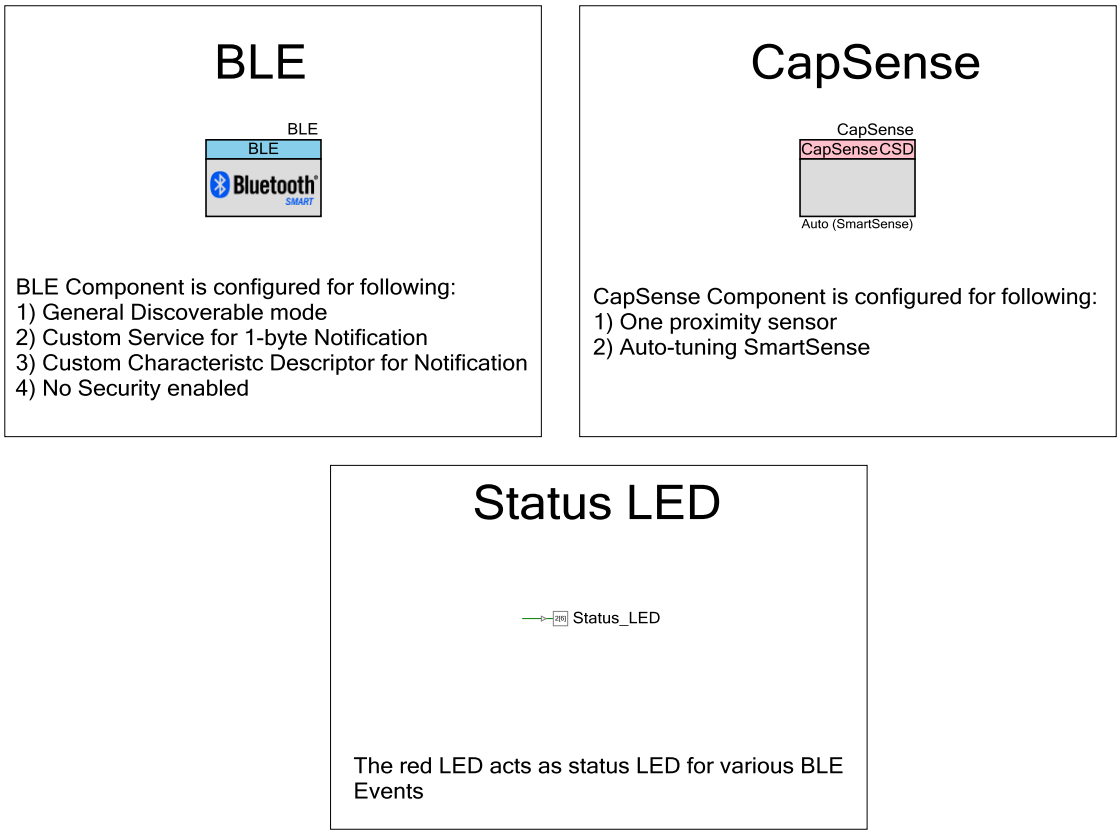
The BLE Pioneer Kit has all of the necessary hardware required for this example. Figure 1 shows the hardware setup for this example. Insert a wire into the proximity header (J14) on P2.0.

Figure 1: Kit Setup



PSoC Creator Schematic

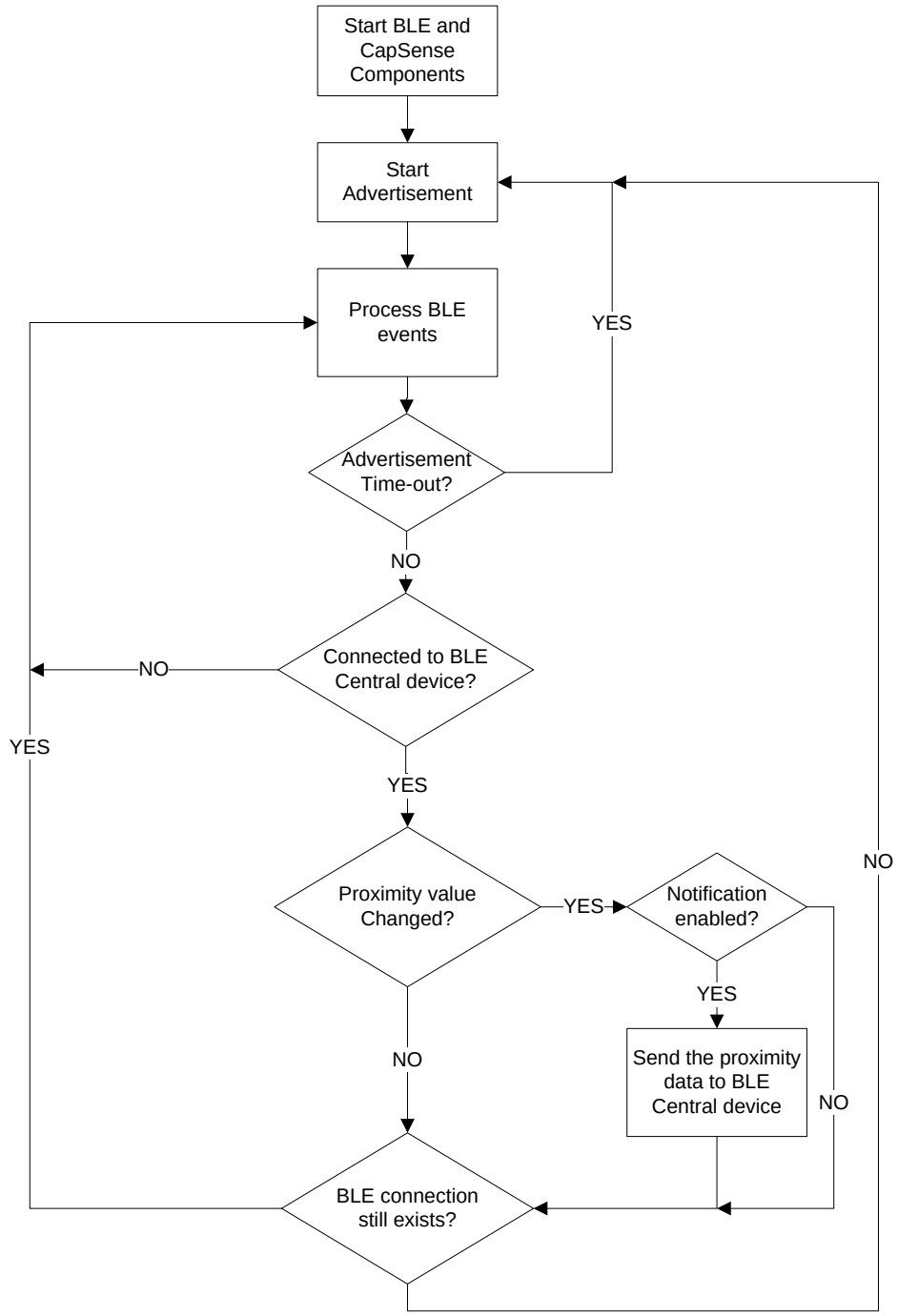
Figure 2. PSoC Creator Schematic



Operation

Figure 3 shows the operation flow of this example.

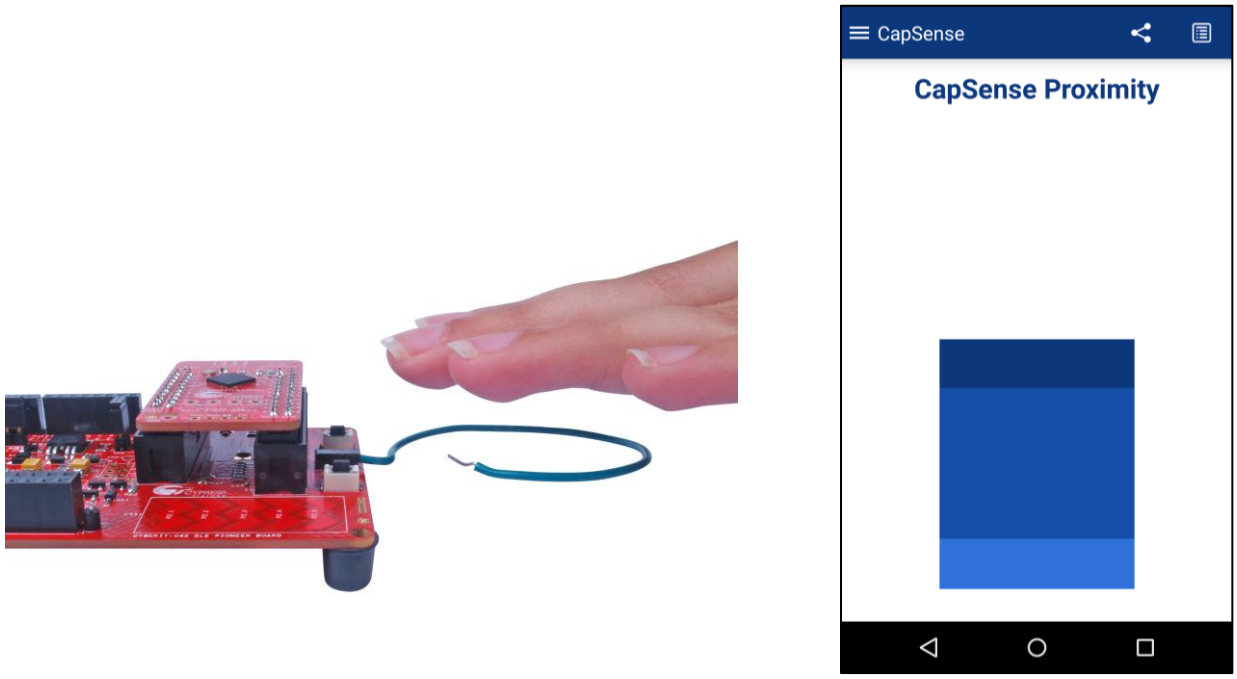
Figure 3: Operation Flow



Testing with CySmart Mobile App

1. Open the **CySmart Mobile App** on your phone. If you do not have Bluetooth switched on already, the app will ask you to do it.
2. Connect to your GATT Server device on the app. Once connected, the app shows you all the Services exposed by the GATT Server. It automatically detects the Custom Services for CapSense Proximity.
3. Select the CapSense Proximity Service. Bring your hand near the sensor wire on the BLE Pioneer Kit and see the bar graph in the app change accordingly. See Figure 4.

Figure 4: CySmart Android Mobile App – CapSense Proximity



Related Documents

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