



**Theory of Operation/Technical Description – FCC ID: WAP-CY8CKIT-062 and IC:7922A-CY8CKIT062**

The PSoC 6 BLE Pioneer Kit enables you to evaluate and develop your applications using the PSoC 6 MCU with Bluetooth Low Energy (BLE) Connectivity.

Basic operation mode

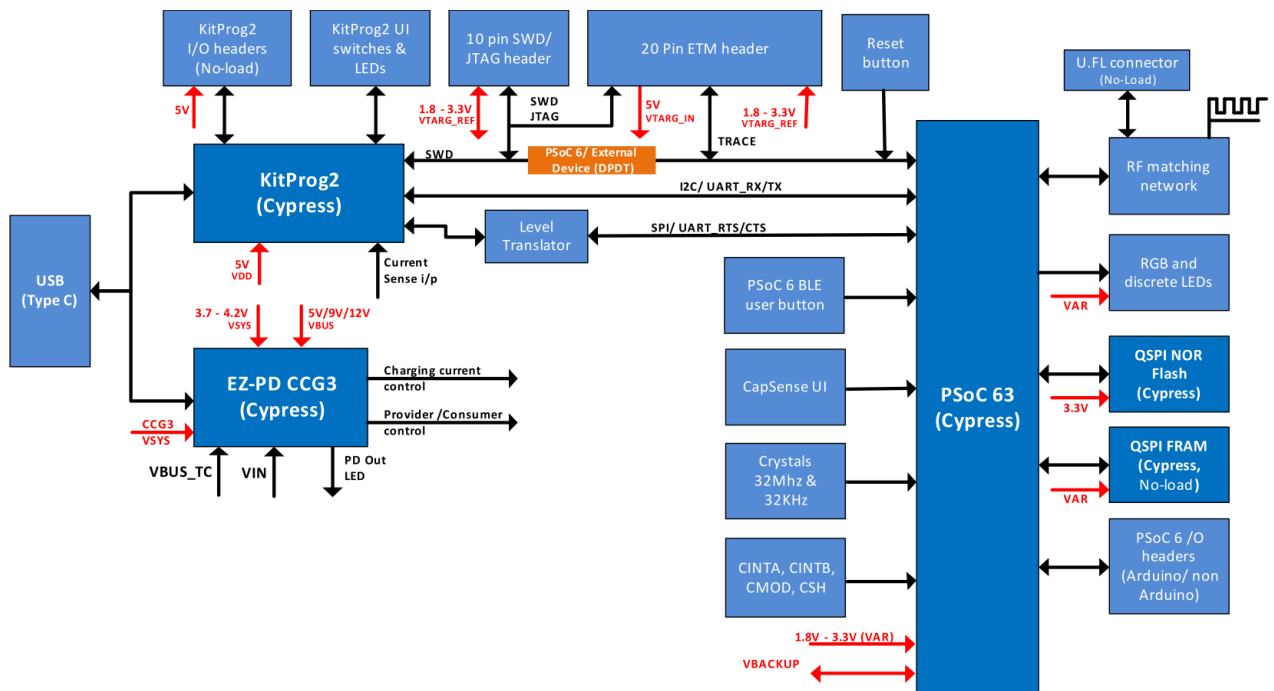
The PSoC 6 BLE Pioneer Kit is built around PSoC 6 MCU. This kit out of box demonstrates interfacing PSoC 6 MCU with user interface functions such as an E-INK display, RGB LED, and touch sensors based on self and mutual capacitance (CapSense CSD and CSX) with bi-directional BLE connectivity between the PSoC 6 MCU device and a PC running the CySmart BLE Host Emulation tool or a mobile device running the CySmart mobile application. Refer "CE220167\_BLE\_UI.pdf" for more information on operation

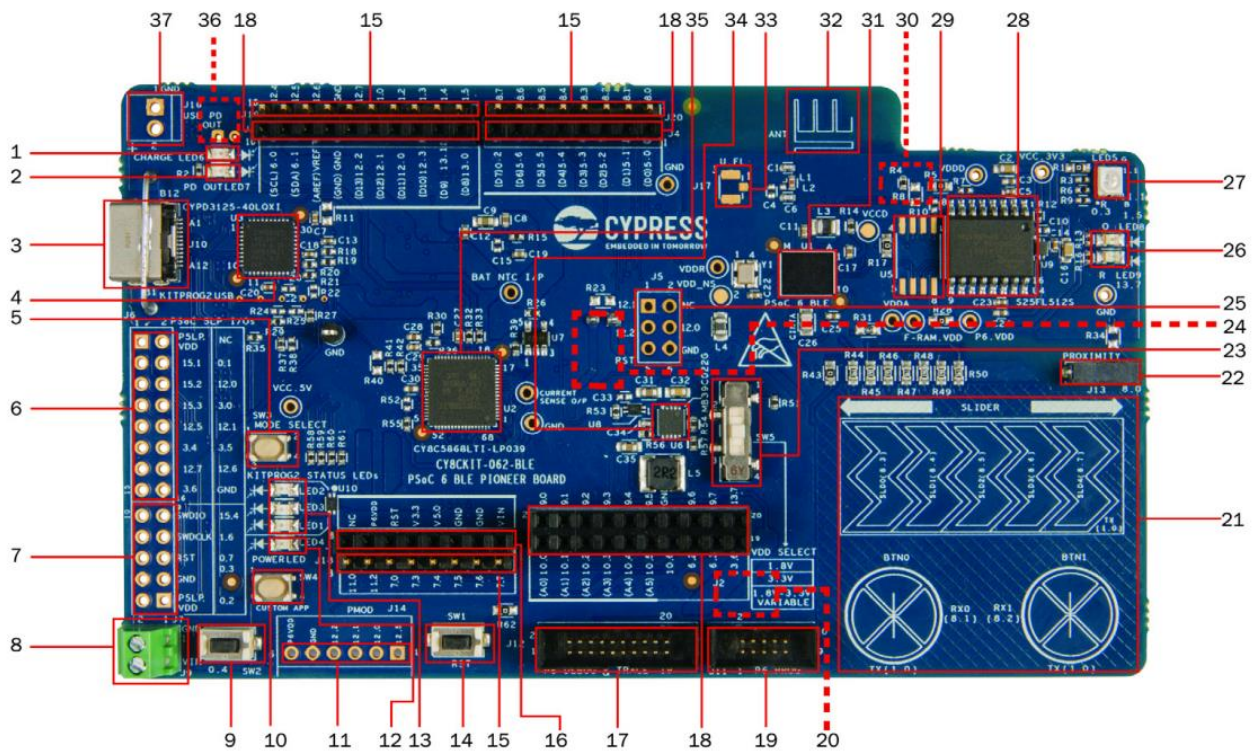
Basic circuit function

PSoC 6 MCU is Cypress' latest, ultra-low-power PSoC specifically designed for wearables and IoT products. PSoC 6 MCU is a true programmable embedded system-on-chip, integrating a 150-MHz ARM® Cortex®-M4 as the primary application processor, a 100-MHz ARM Cortex®-M0+ that supports low-power operations, up to 1 MB Flash and 288 KB SRAM, an integrated BLE 4.2 radio, CapSense touch-sensing, and custom analog and digital peripheral functions.

The PSoC 6 BLE Pioneer board offers compatibility with Arduino™ shields. The board features a PSoC 6 MCU, a 512-Mb NOR flash, onboard programmer/debugger (KitProg2), USB Type-C power delivery system (EZ-PD™ CCG3), 5-segment CapSense slider, two CapSense buttons, one CapSense proximity sensing header, an RGB LED, two user LEDs, and one push button. The board supports operating voltages from 1.8 V to 3.3 V for PSoC 6 MCU.

The CY8CKIT-062-BLE package includes a CY8CKIT-028-EPD E-INK Display Shield that contains a 2.7-inch E-INK display, a motion sensor, a thermistor, and a PDM microphone. The kit packages also contains a CY5677 CySmart BLE 4.2 USB Dongle that is factory-programmed to emulate a BLE GAP Central device, enabling you to emulate a BLE host on your computer.



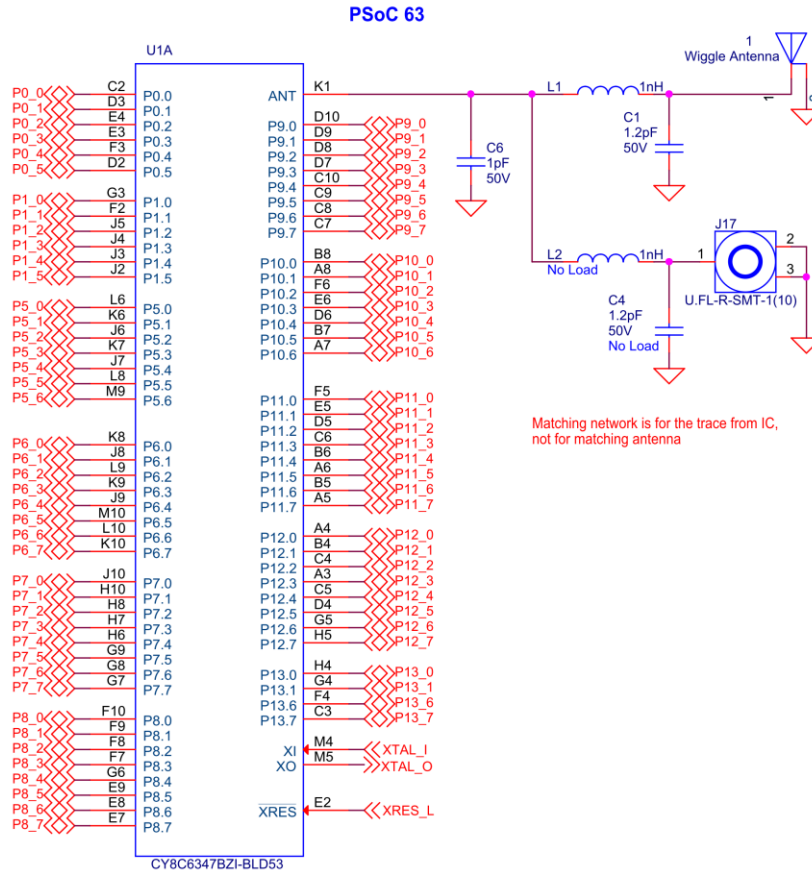


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| <ol style="list-style-type: none"> <li>1. Battery charging indicator (LED6)</li> <li>2. USB PD output voltage availability indicator (LED7)</li> <li>3. KitProg2 USB connector (J10)</li> <li>4. Cypress EZ-PD™ CCG3 Type-C Port Controller with PD (CYPD3125-40LQXI, U3)</li> <li>5. KitProg2 programming mode selection button (SW3)</li> <li>6. KitProg2 I/O header (J6)<sup>1</sup></li> <li>7. KitProg2 programming/custom application header (J7)<sup>1</sup></li> <li>8. External power supply connector (J9)</li> <li>9. PSoC 6 BLE user button (SW2)</li> <li>10. KitProg2 application selection button (SW4)</li> <li>11. Digilent® Pmod™ compatible I/O header (J14)<sup>1</sup></li> <li>12. Power LED (LED4)</li> <li>13. KitProg2 status LEDs (LED1, LED2, and LED3)</li> <li>14. PSoC 6 BLE reset button (SW1)</li> <li>15. PSoC 6 BLE I/O header (J18, J19 and J20)</li> <li>16. Arduino™ Uno R3 compatible power header (J1)</li> <li>17. PSoC 6 BLE debug and trace header (J12)</li> <li>18. Arduino™ Uno R3 compatible PSoC 6 BLE I/O header (J2, J3 and J4)</li> <li>19. PSoC 6 BLE program and debug header (J11)</li> </ol> | <ol style="list-style-type: none"> <li>20. KitProg2 programming target selection switch (SW6)<sup>2</sup></li> <li>21. CapSense slider and buttons</li> <li>22. CapSense proximity header (J13)</li> <li>23. PSoC 6 BLE VDD selection switch (SW5)</li> <li>24. PSoC 6 BLE power monitoring jumper (J8)<sup>2</sup></li> <li>25. Arduino™ Uno R3 compatible ICSP header (J5)<sup>1</sup></li> <li>26. PSoC 6 BLE user LEDs (LED8 and LED9)</li> <li>27. RGB LED (LED5)</li> <li>28. Cypress 512-Mbit serial NOR flash memory (S25FL512S, U4)</li> <li>29. Cypress serial Ferroelectric RAM (U5)<sup>1</sup></li> <li>30. Vbackup and PMIC control selection switch (SW7)</li> <li>31. Cypress PSoC 6 BLE (CY8C6347BZI-BLD53, U1)</li> <li>32. BLE antenna</li> <li>33. U.FL connector for external antenna (J17)<sup>1</sup></li> <li>34. Cypress main voltage regulator (MB39C022G, U6)</li> <li>35. KitProg2 (PSoC 5LP) programmer and debugger (CY8C5868LTI-LP039, U2)</li> <li>36. Battery connector (J15)<sup>1,2</sup></li> <li>37. USB PD output voltage (9V/12V) connector (J16)<sup>1</sup></li> </ol> |
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<sup>1</sup>Footprints only, not populated on the board

<sup>2</sup>Components at the bottom side of the board

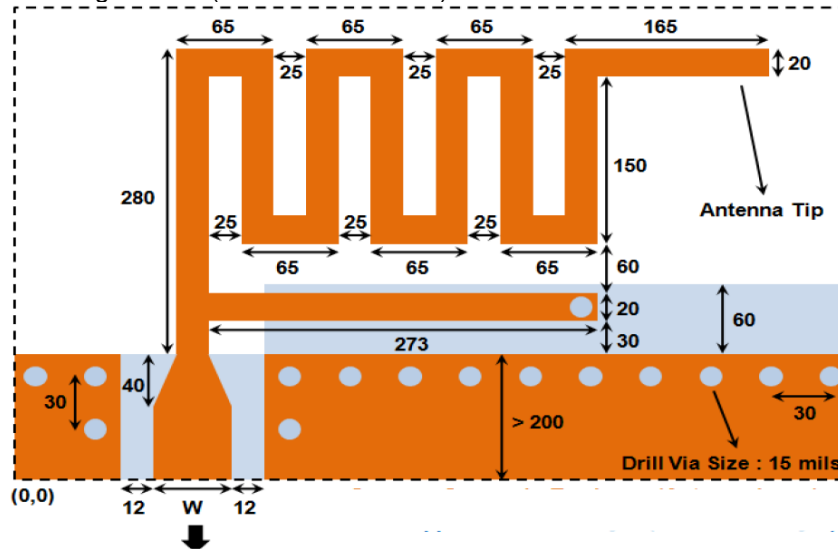
RF circuit function and RF signal flow:



The primary RF component consists of the IC U1 (PSoC 6 MCU) and the onboard wiggle antenna for BLE. L1, C1 and C6 is used to match the trace from IC. U.FL connector can be used for conductive measurements. This is not loaded by default.

Description of Antenna system (Baluns, Multiplexers)

The board uses the wiggle antenna (PCB antenna; Meandered Inverted-F Antenna). Antenna gain is 1.6dBi. Refer to the Antenna Design Guide (AN91445 attached) for details on antenna.



Transmission line 50 ohm to matching network

Orange: Top Layer  
Light Blue: Bottom Layer  
All dimensions are in mils



Show compliance with 15.203 antenna requirements:

Class: 2.4GHz Low Power Data Communication – Bluetooth low energy

Operating Frequency 2402~2480MHz; 40channels @ 2MHz separation

Modulation method: GFSK

Data Rate: 1Mbps / 2Mbps

Transmitted Power: Max 4 dBm (F1D 0.00229W)

Operation power/voltage: DC Max 5V