

## 5. Hardware



This chapter describes the contents of the BLE Pioneer Kit hardware and its different blocks, such as the power block, USB connection, Arduino-compatible headers, module connectors, and CapSense slider.

The schematic and board layouts are available at the following location:

<Install\_Directory>\Cypress\CY8CKIT-042-BLE-A Kit\<version>\Hardware.

### 5.1 BLE Pioneer Baseboard

#### 5.1.1 PSoC 5LP

An onboard PSoC 5LP contains the KitProg, which is used to program and debug the BLE device. The PSoC 5LP connects to the USB port of the computer through a USB Mini-B connector and to the SWD interface of the BLE device. PSoC 5LP is a true system-level solution providing MCU, memory, analog, and digital peripheral functions in a single chip. The CY8C58LPxx family offers a modern method of signal acquisition, signal processing, and control with high accuracy, high bandwidth, and high flexibility. The analog capability spans the range from thermocouples (near DC voltages) to ultrasonic signals.

For more information, visit the [PSoC 5LP web page](#).

See [Serial Interconnection between KitProg and Module on page 105](#) for more details.

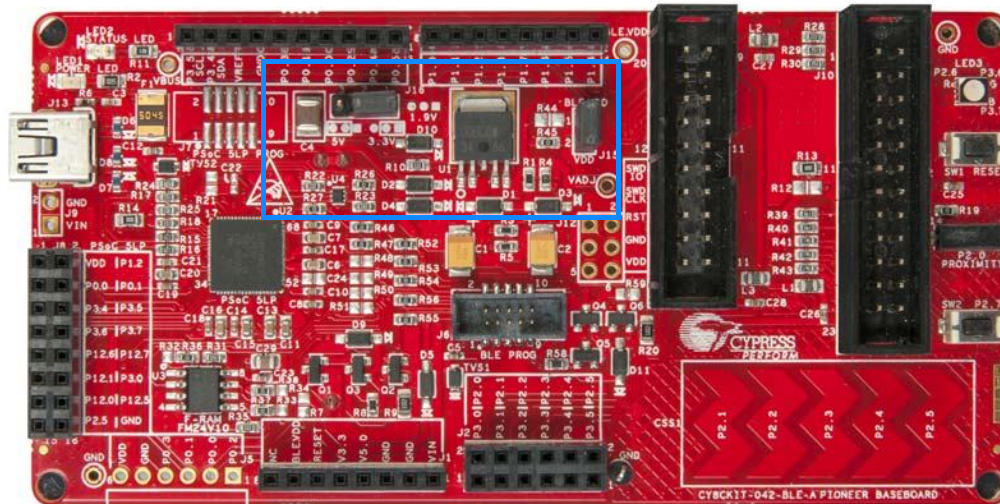
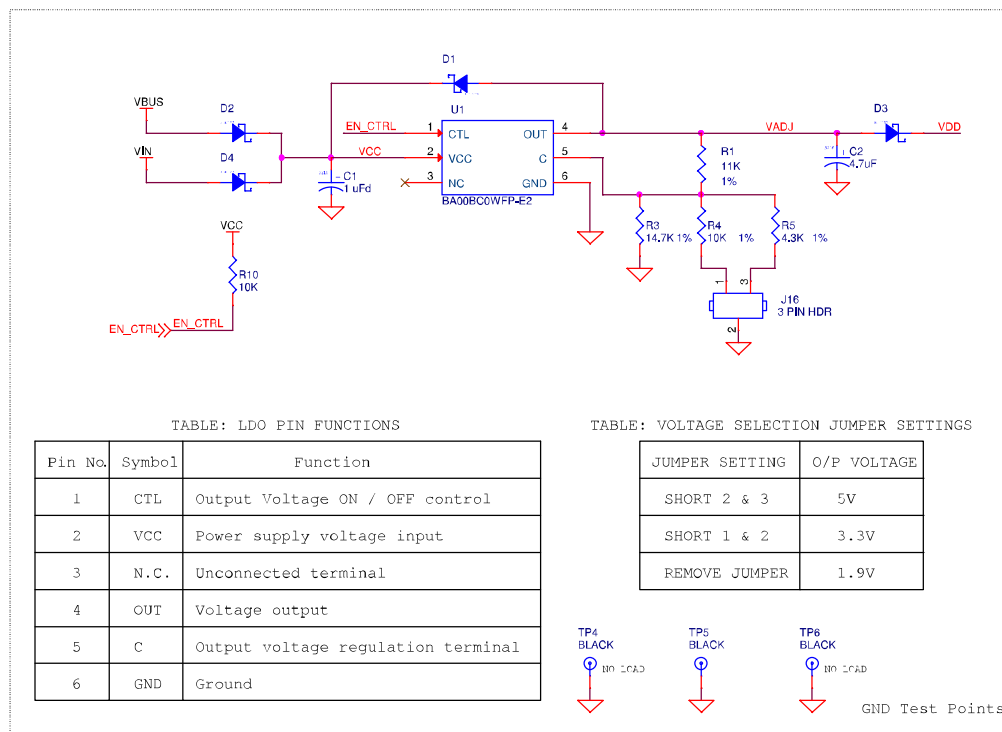
#### 5.1.2 Power System

The power supply system on the BLE Pioneer Baseboard is versatile, allowing the input supply to come from the following sources:

- 5-V power from the onboard USB connector
- 5-V to 12-V VIN power from the Arduino power header (J1)
- 3-V from the CR2032 coin cell

An adjustable LDO is used to output three different voltage levels (1.9 V, 3.3 V, and 5 V) to power the module. These voltages are selected with the J16 jumper, as shown in [Figure 5-1](#).

Figure 5-1. Schematics and Board Highlight of LDO and Power Selection Jumper

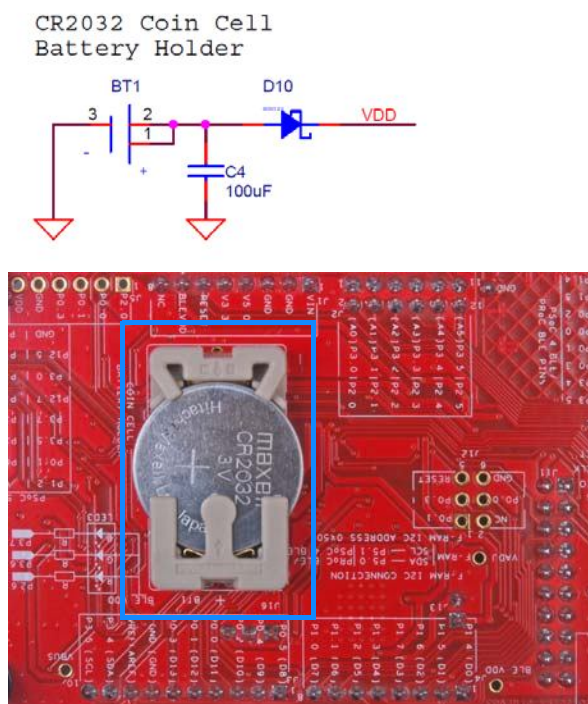


The input to the LDO can come from either the USB, the VIN pin in the Arduino header J1, or header J9.

**Note:** The typical dropout voltage of the selected LDO is 0.3 V at 500-mA output current. This gives a minimum output of 4.6 V from the input voltage of 5 V from the VBUS. This drop also considers the voltage drop across the Schottky diode connected at the output of the LDO to protect against voltage applied at the output terminal of the regulator. An input voltage supply over 12 V can damage the board.

The BLE Pioneer Baseboard also contains a CR2032 coin cell holder to power it using a coin cell, as shown in [Figure 5-2](#).

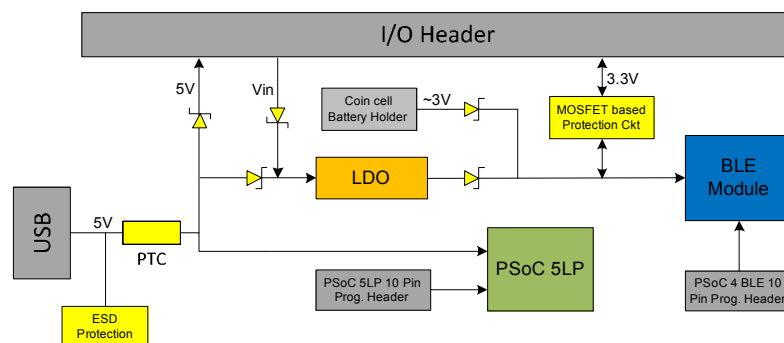
Figure 5-2. Schematics and Board Highlight of Coin Cell Holder



### 5.1.2.1 Protection Circuits

The power supply rail has reverse-voltage, overvoltage, short circuits, and excess current protection features, as shown in [Figure 5-3](#).

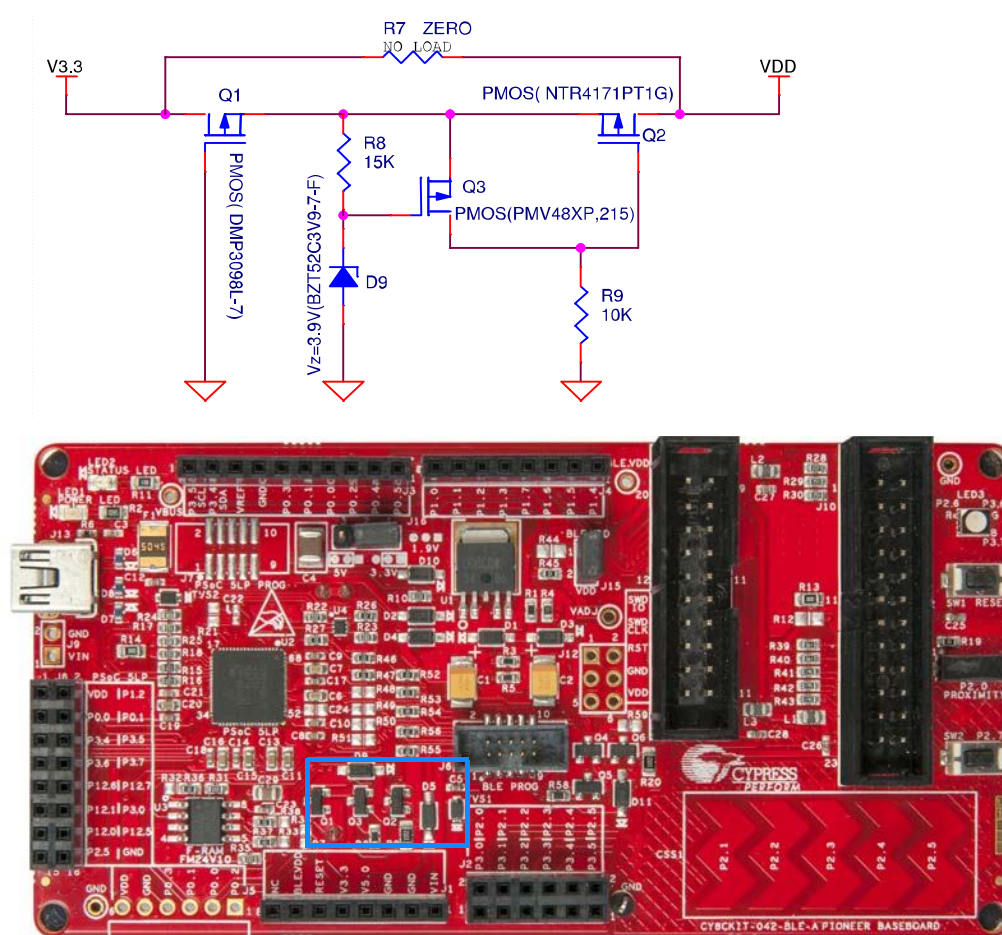
Figure 5-3. Power Supply Block Diagram With Protection Circuits



- A PTC resettable fuse is connected to protect the computer's USB ports from shorts and overcurrent.
- ORing diodes prevent damage to components when the BLE Pioneer Baseboard is powered from different voltage sources at the same time.
- ESD protection is provided for the USB Mini-B connector.

- A MOSFET-based protection circuit is provided for overvoltage and reverse-voltage protection for the 3.3-V rail from J1.5, as shown in Figure 5-4.

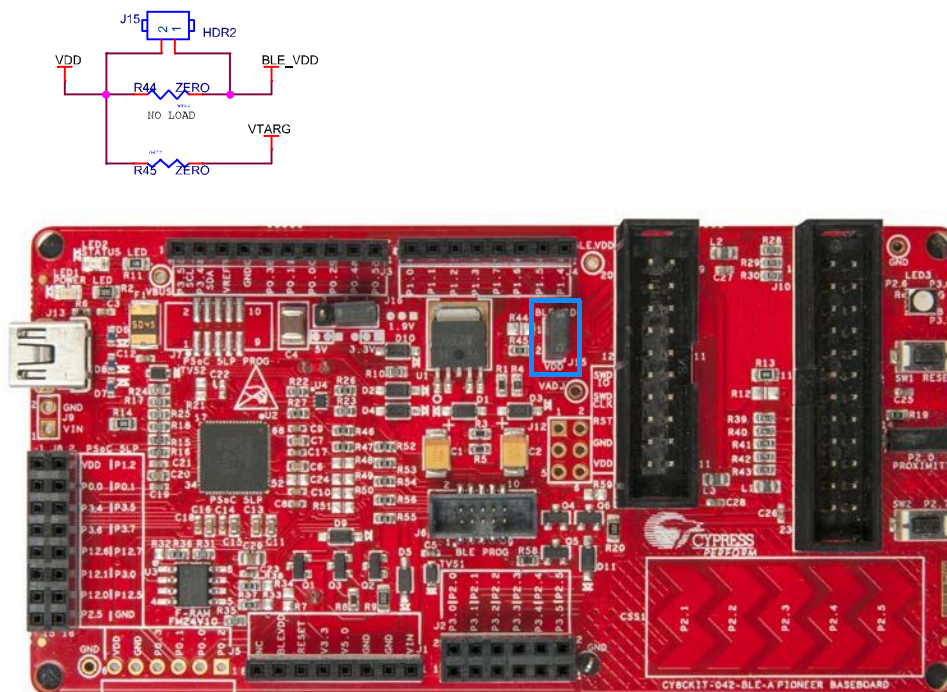
Figure 5-4. Schematics and Board Highlight of MOSFET Protection Circuit for 3.3-V Rail from J1.5



### 5.1.2.2 Current Measurement Jumper

To demonstrate the low power consumption of PSoC 4 BLE/PROC BLE Module, a two-pin header (J15) is populated in series with the power supply to the module. This can be used to measure current using an ammeter without the need to desolder any component from the BLE Pioneer Baseboard, as shown in Figure 5-5.

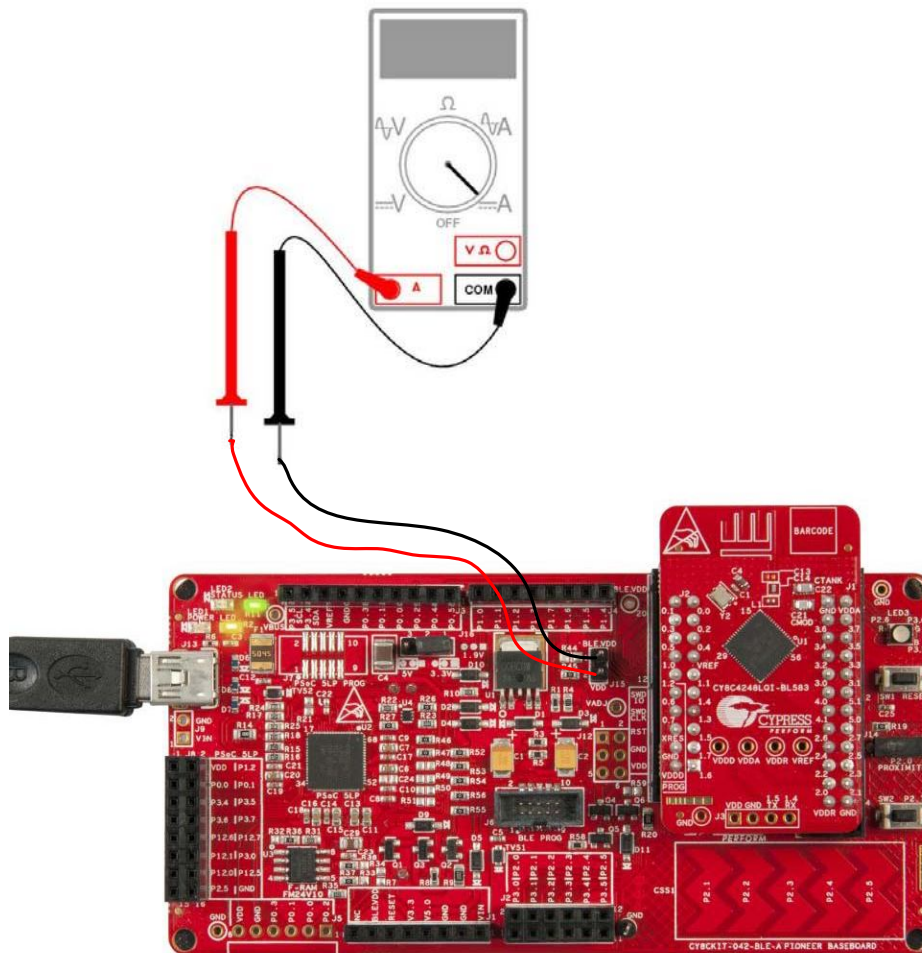
Figure 5-5. Schematics and Board Highlight of Current Measurement Jumper



The following methods are supported for measuring the current consumption of the module.

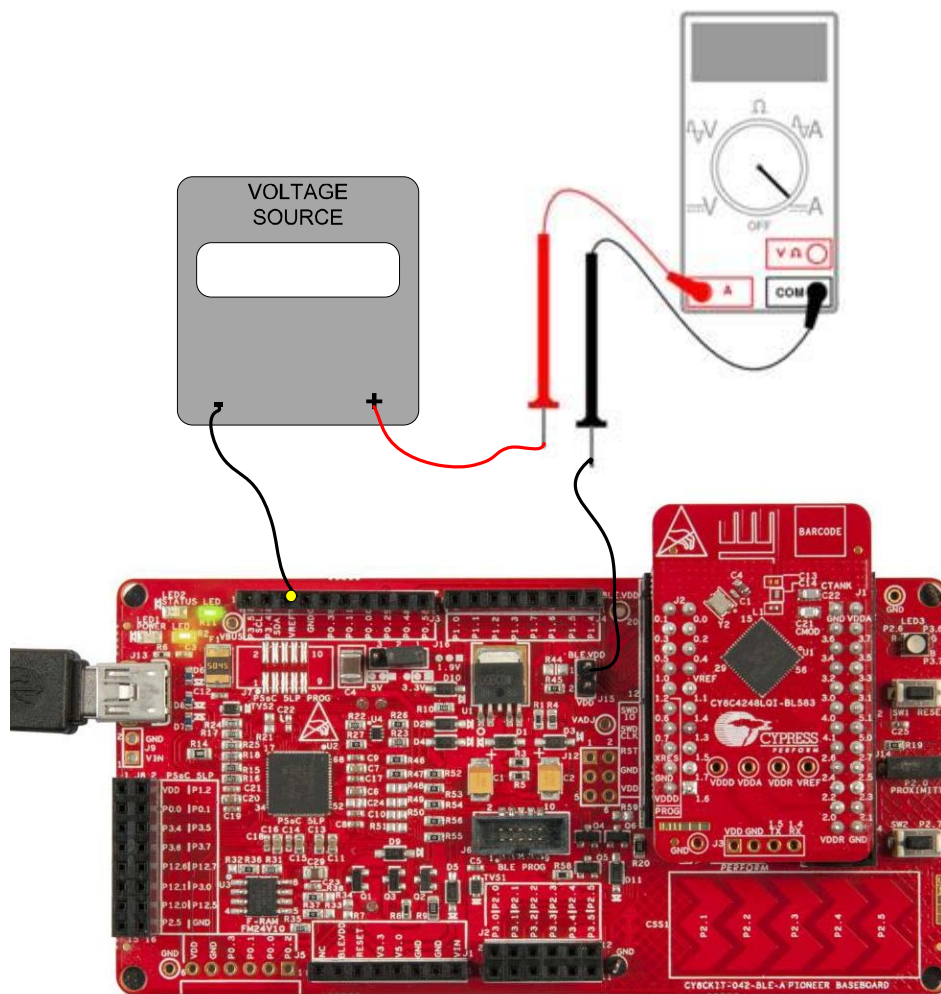
- When the BLE Pioneer Baseboard is powered through the USB port (J13), remove jumper J15 and connect an ammeter, as shown in [Figure 5-6](#).

Figure 5-6. Current Measurement when Powered from USB Port



- When the BLE Pioneer Baseboard is powered from an external voltage supply, remove the USB cable from J13. Connect the positive terminal of the external voltage supply to the positive terminal of the ammeter and the negative terminal of the ammeter to the upper pin of J15. Connect the negative terminal of the external voltage supply to an onboard GND pin. [Figure 5-7](#) shows the required connections.

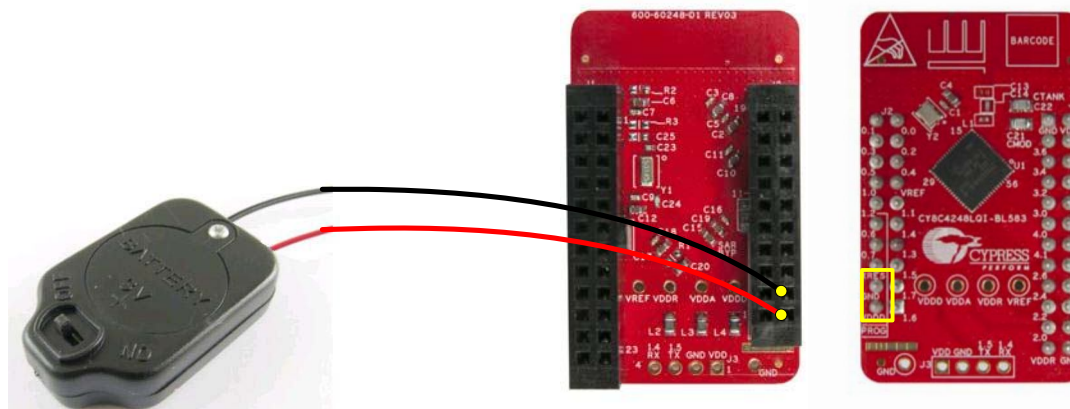
Figure 5-7. Current Measurement when Powered Separately



To measure the power consumption of only the module with coin cell, connect the coin cell directly to the modules, as shown in [Figure 5-8](#). The BLE Pioneer Baseboard is designed with additional circuits to protect the BLE device and the F-RAM in an Arduino environment. Note that power consumption measurements on the BLE Pioneer Baseboard will also include the power consumed by these additional circuits.

Connect the positive terminal of the coin cell to pin J2.2 and negative terminal to pin J2.4 using wires.

Figure 5-8. Powering the Module using a Coin Cell



### 5.1.3 Programming Interface

The BLE Pioneer Kit allows you to program and debug the PSoC 4 BLE/PROC BLE in two ways:

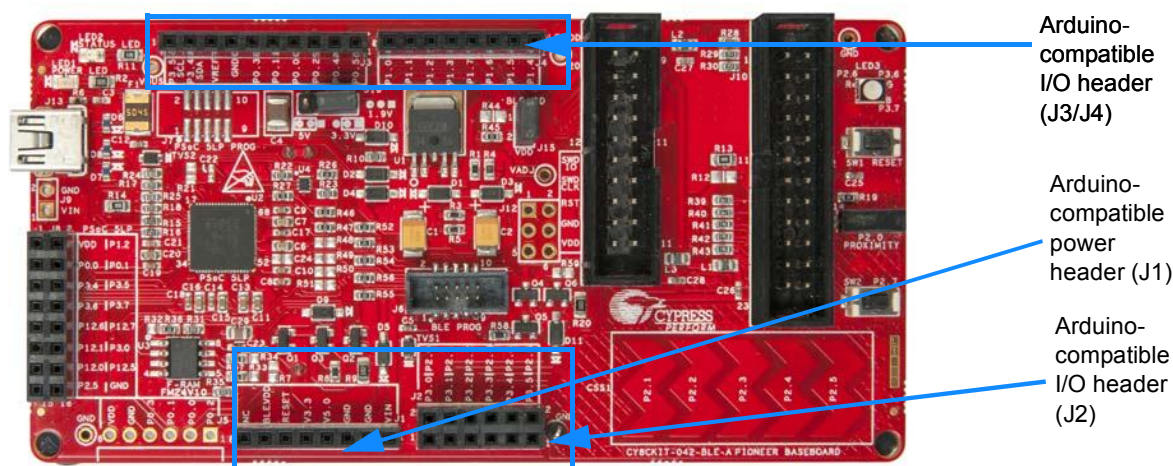
- Using the onboard KitProg
- Using a CY8CKIT-002 MiniProg3 programmer and debugger

### 5.1.4 Expansion Connectors

#### 5.1.4.1 Arduino-Compatible Headers (J1, J2, J3, J4, and J12-unpopulated)

The BLE Pioneer Kit has five Arduino-compatible headers: J1, J2, J3, J4, and J12, as shown in [Figure 5-9](#). You can develop applications based on the Arduino shield's hardware.

Figure 5-9. Arduino Headers



The J1 header contains I/O pins for reset, I/O reference voltage (IOREF), and power supply line. The J2 header is an analog port that contains I/O pins for SAR ADC, comparator, and opamp. The J3 header is primarily a digital port that contains I/O pins for PWM, I<sup>2</sup>C, SPI, and analog reference. The J4 header is also a digital port that contains I/O pins for UART and PWM. The J12 header is an Arduino ICSP-compatible header for the SPI interface and is not populated. Refer to the “No Load Components” section of [Bill of Materials \(BOM\)](#) on [page 118](#) for the header part number.

**Note:** Take care when powering the Arduino shields via Arduino-compatible power header (J1). The V3.3 pin will output 5 V when the board is powered from USB/VIN and the system power supply jumper (J16) is set to 5 V operation.

### Additional Functionality of Header J2

The J2 header is a 6×2 header that supports Arduino shields. The Port 2 and Port 3 pins of PSoC 4BLE and PRoC BLE are brought to this header. The Port 2 pins also connect to the onboard CapSense slider through 560-ohm resistors. When the CapSense feature is not used, remove these resistors to help ensure better performance with these pins.

#### 5.1.4.2 Pmod Connector - Digilent Pmod Compatible (J5-unpopulated)

This port supports Digilent Pmod modules (see [Figure 5-10](#)). Pmods are small I/O interfaces that connect with the embedded control boards through either 6- or 12-pin connectors. The BLE Pioneer Kit supports the 6-pin Pmod Type 2 (SPI) interface. For Digilent Pmod cards, go to [www.digilentinc.com](http://www.digilentinc.com).

This header is not populated on the BLE Pioneer Baseboard. You must populate this header before connecting the Pmod daughter cards. Refer to the “No Load Components” section of [Bill of Materials \(BOM\) on page 118](#) for the header part number.

Figure 5-10. Schematics and Board Highlight of Pmod Connector

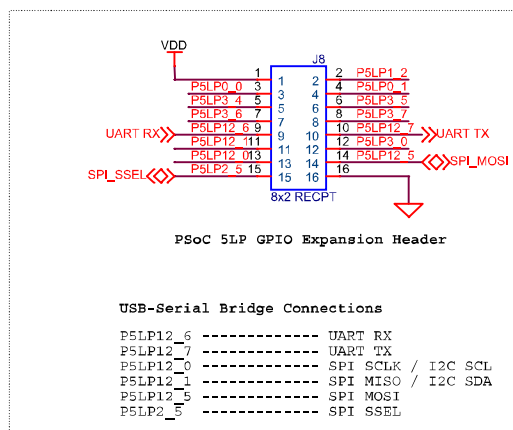


### 5.1.4.3 PSoC 5LP GPIO Header (J8)

An 8×2 header is provided on the BLE Pioneer Baseboard to pull out several pins of PSoC 5LP to support advanced features such as a low-speed oscilloscope and a low-speed digital logic analyzer (see [Figure 5-11](#)). This header also contains the USB-Serial interface pins that can be used when these pins are not accessible on the Arduino headers because a shield is connected.

**Note:** You can use PSoC 5LP for your own custom firmware.

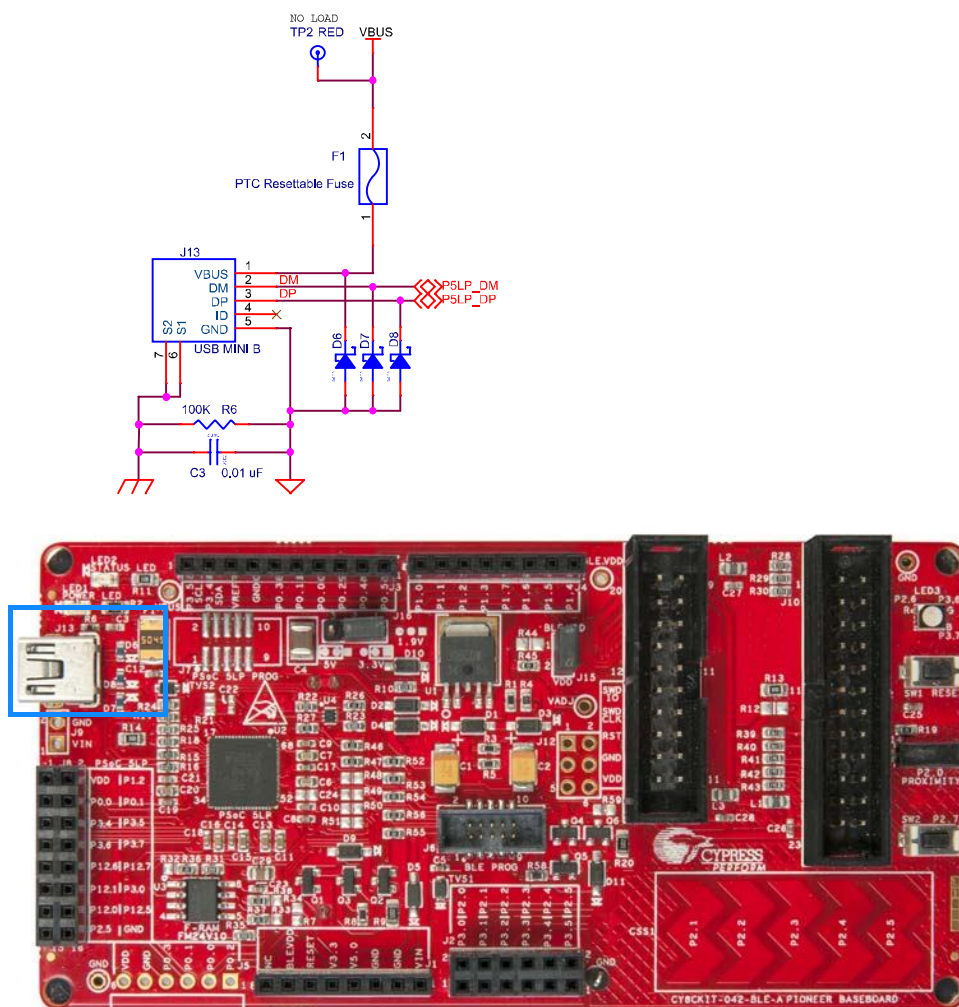
Figure 5-11. Schematics and Board Highlight of PSoC 5LP GPIO Expansion Header



## 5.1.5 USB Mini-B Connector

The PSoC 5LP connects to the USB port of a computer through a Mini-B connector (see [Figure 5-12](#)), which can also be used to power the BLE Pioneer Baseboard. A resettable polyfuse is used to protect the computer's USB ports from shorts and overcurrent. If more than 500 mA is drawn from the USB port, the fuse will automatically break the connection until the short or overload is removed.

Figure 5-12. Schematics and Board Highlight of USB Mini-B Connector

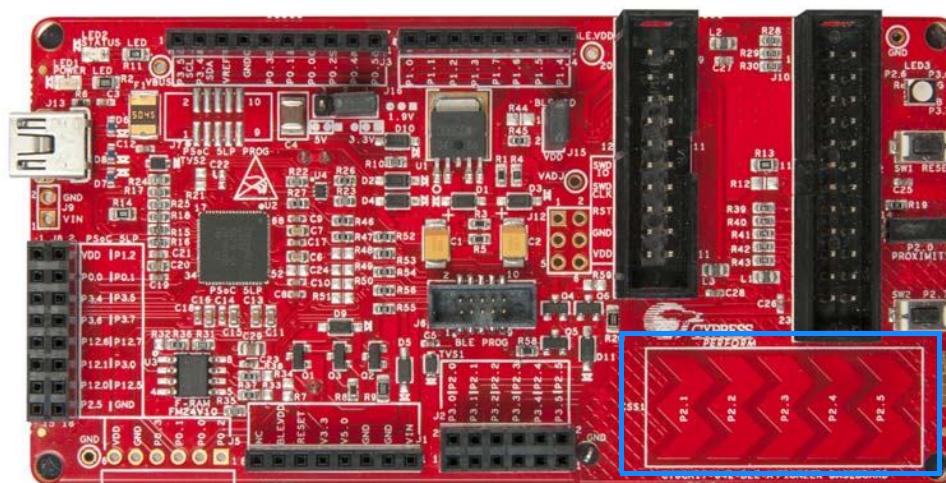


## 5.1.6 CapSense Circuit

### 5.1.6.1 CapSense Slider

The BLE Pioneer Kit has a five-segment linear capacitive touch slider, which is connected to the PSoC 4 BLE/PROc BLE Module pins (see [Figure 5-13](#)). The CMOD and CTANK capacitors are required for CapSense functionality and are provided on the modules (see [Module Board on page 107](#)). A 2.2-nF capacitor is present on the CMOD pin, P4[0], for CapSense operation. BLE Pioneer Kit also supports CapSense designs that enable waterproofing. The connection of the shield to the pin or to ground is made by resistors R12 and R13, respectively. By default, R13 is mounted on the BLE Pioneer Baseboard, which connects the shield to ground. Populate R12 and remove R13 when evaluating waterproofing designs, which will connect the shield to the designated pin, P1[6].

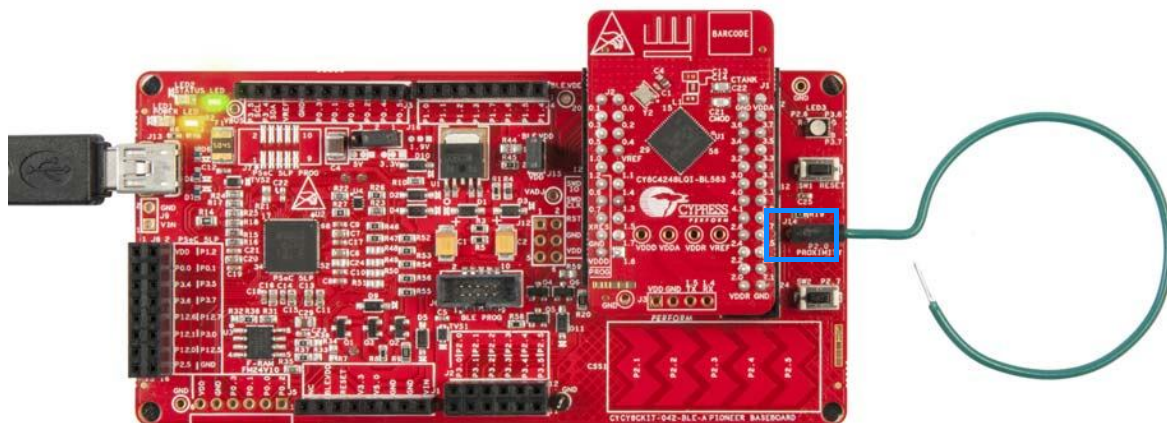
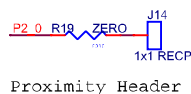
Figure 5-13. Schematics and Board Highlight of CapSense Slider and Shield Setting



### 5.1.6.2 Proximity Header

The BLE Pioneer Baseboard contains a header (J14) for CapSense proximity wire connection (see [Figure 5-14](#)).

Figure 5-14. Schematics and Board Highlight of Proximity Header



### 5.1.7 BLE Pioneer Baseboard LEDs

The BLE Pioneer Baseboard has three LEDs. A green LED (LED2) indicates the status of the programmer. An amber LED (LED1) indicates the status of power supplied to the board. The BLE Pioneer Kit also has a general-purpose tricolor LED (LED3) for user applications. These are connected to P2\_6 (red LED), P3\_6 (green LED) and P3\_7 (blue LED). [Figure 5-15](#) and [Figure 5-16](#) show the schematics of these LEDs.

Figure 5-15. Schematics of Status and Power LED

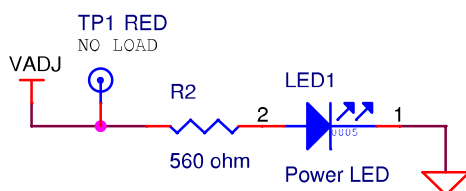
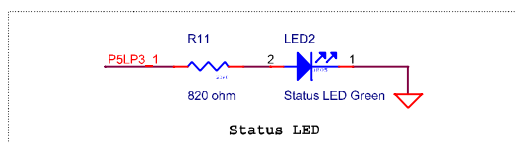
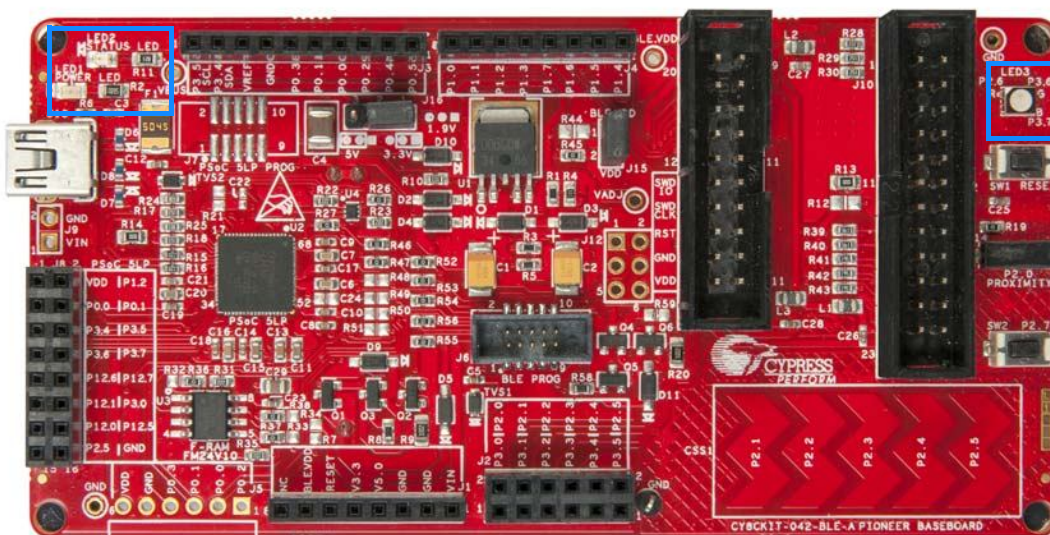
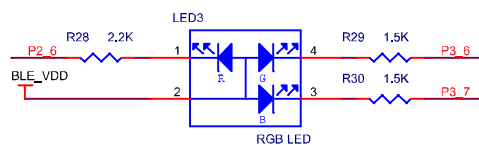


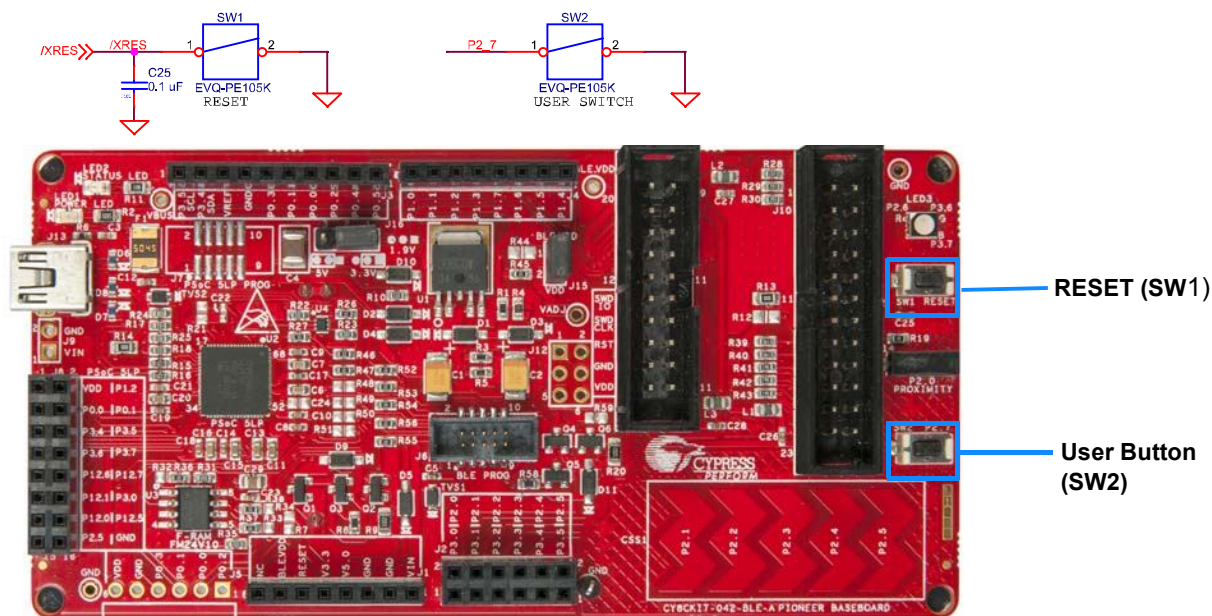
Figure 5-16. Schematics and Board Highlight of RGB LED



## 5.1.8 Push-Buttons

The BLE Pioneer Baseboard contains a reset push-button and a user push-button, as shown in Figure 5-17. The reset button is connected to the XRES pin of BLE device and is used to reset it. The user button is connected to P2[7] of the BLE device. Both the buttons connect to ground on activation (active low).

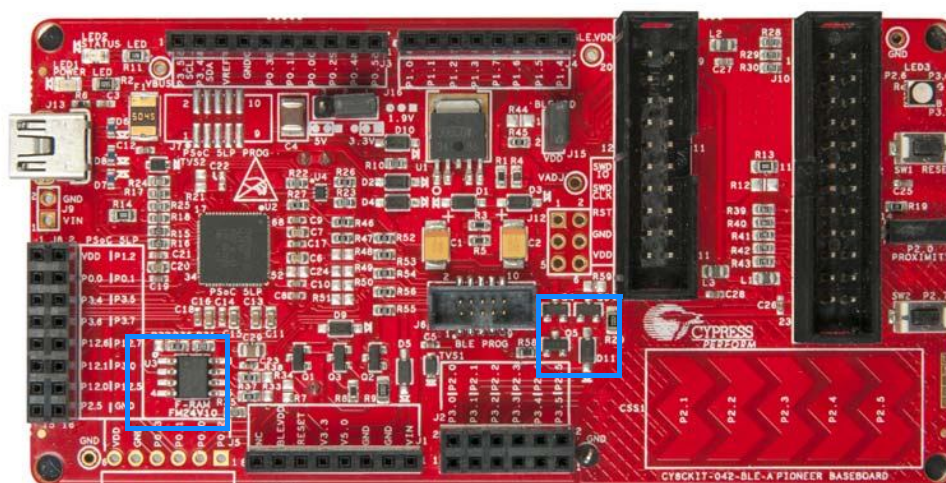
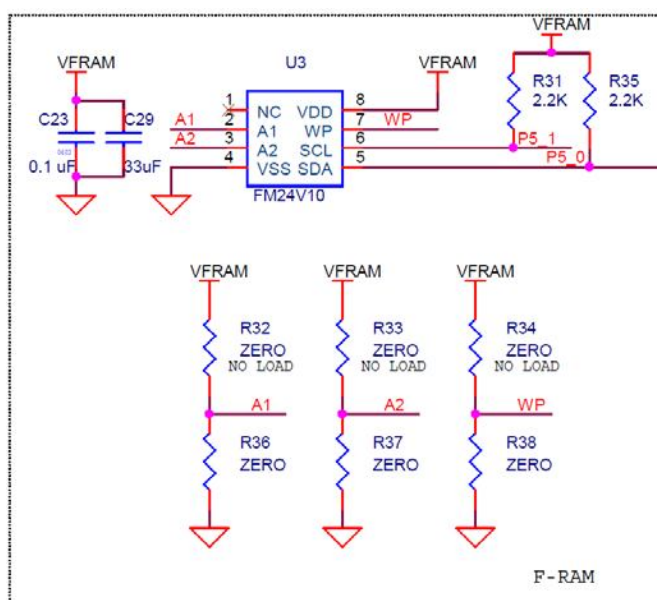
Figure 5-17. Schematics and Board Highlight of Reset Button and User Button



## 5.1.9 Cypress Ferroelectric RAM (F-RAM)

The BLE Pioneer Baseboard contains the FM24V10-G F-RAM device (see [Figure 5-18](#)), which can be accessed through I<sup>2</sup>C lines P5[0] and P5[1] of the PSoC 4 BLE/PROc BLE Module. The F-RAM is 1-Mbit (128KB) with an I<sup>2</sup>C speed up to 1 Mbps. The I<sup>2</sup>C slave address of the F-RAM device is seven bits wide, and the LSB two bits are configurable through physical pins and are hardwired to 00 on the board. By default, the address of the F-RAM device used on the BLE Pioneer Baseboard is 0x50. This address can be modified by changing the R32/R36 and R33/R37 pairs. The operating voltage range of the F-RAM is between 2 V and 3.6 V. To prevent the application of 5 V from the adjustable LDO regulator on the BLE Pioneer Baseboard, a MOSFET-based protection circuit similar to the one used for the 3.3-V rail is connected between the output of the regulator and the VDD pin of the F-RAM. The protection circuit cuts off the power to the F-RAM when the output of the regulator is greater than 3.6 V.

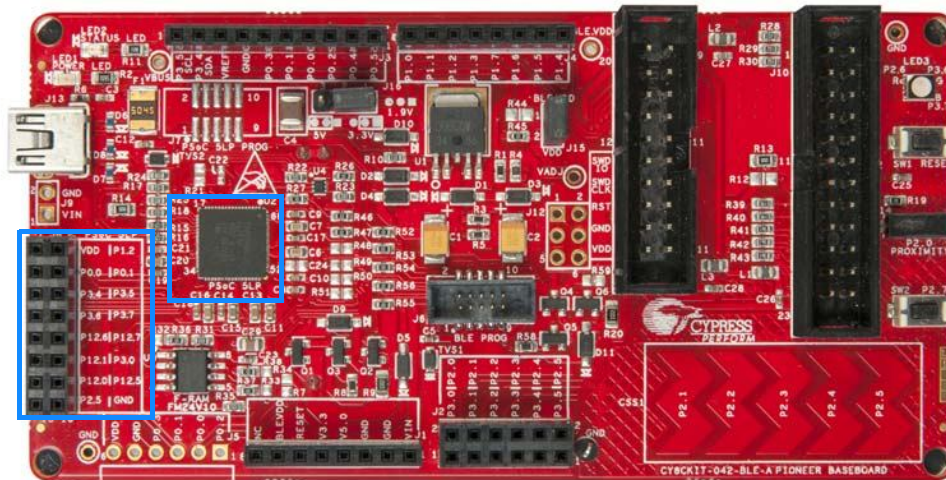
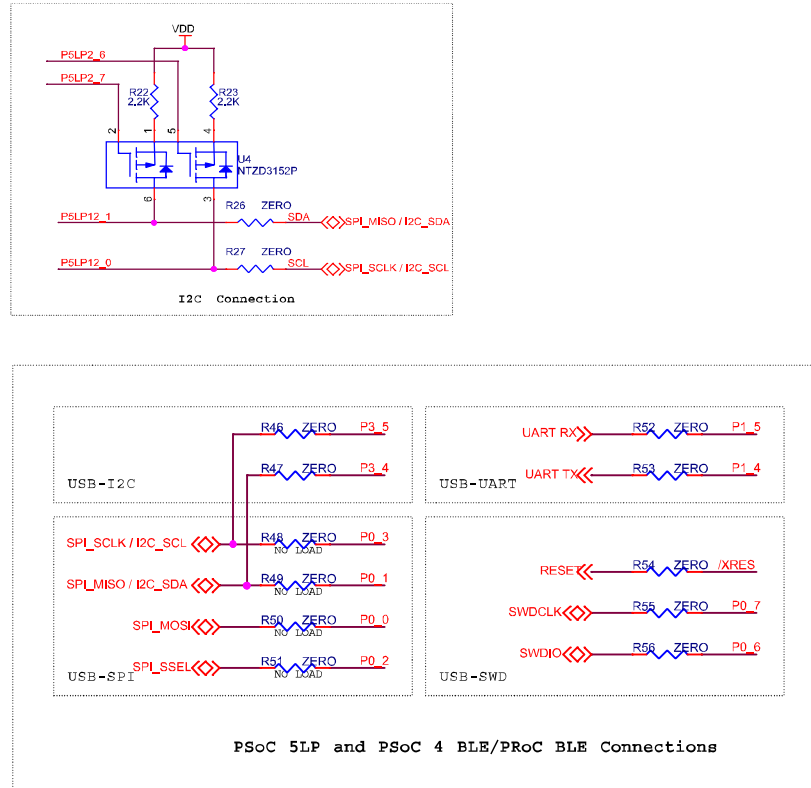
Figure 5-18. Schematics and Board Highlight of F-RAM



## 5.1.10 Serial Interconnection between KitProg and Module

The KitProg is also a USB-Serial interface. It supports USB-UART and USB-I<sup>2</sup>C bridges (see [Figure 5-19](#)). The pull-up resistors on the I<sup>2</sup>C bus are enabled when the protocol is selected from the user interface (such as Bridge Control Panel). The USB-Serial pins of the KitProg are also available on the Arduino header; therefore, it can be used to control Arduino shields with the SPI/I<sup>2</sup>C/UART interface. Refer [USB-UART Bridge on page 34](#) and [USB-I2C Bridge on page 35](#) for more information on how to use these serial interconnections.

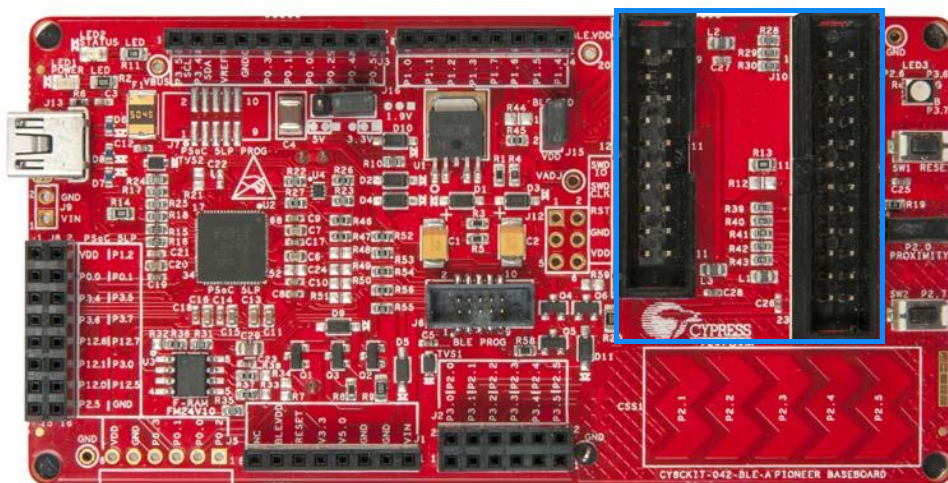
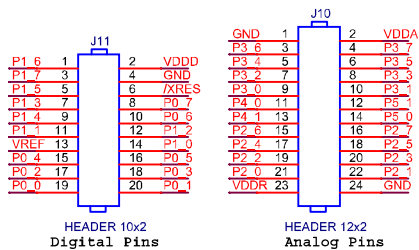
Figure 5-19. Schematics and Board Highlight of Serial Interface and I<sup>2</sup>C Pull-Up via FET



## 5.1.11 Module Headers

The PSoC 4 BLE and PSoC 4 BLE Modules are connected to the BLE Pioneer Baseboard using the two (24-pin and 20-pin) module headers, as shown in [Figure 5-20](#).

Figure 5-20. Schematics and Board Highlight of Module Headers



For information on how to add these on your own board, refer to [Adding BLE Module-Compatible Headers on Your Baseboard on page 128](#).

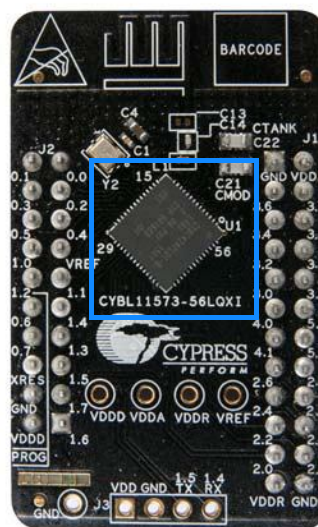
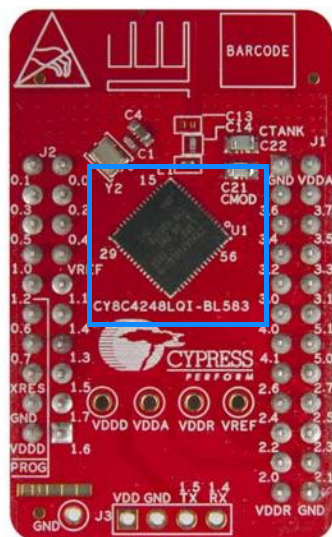
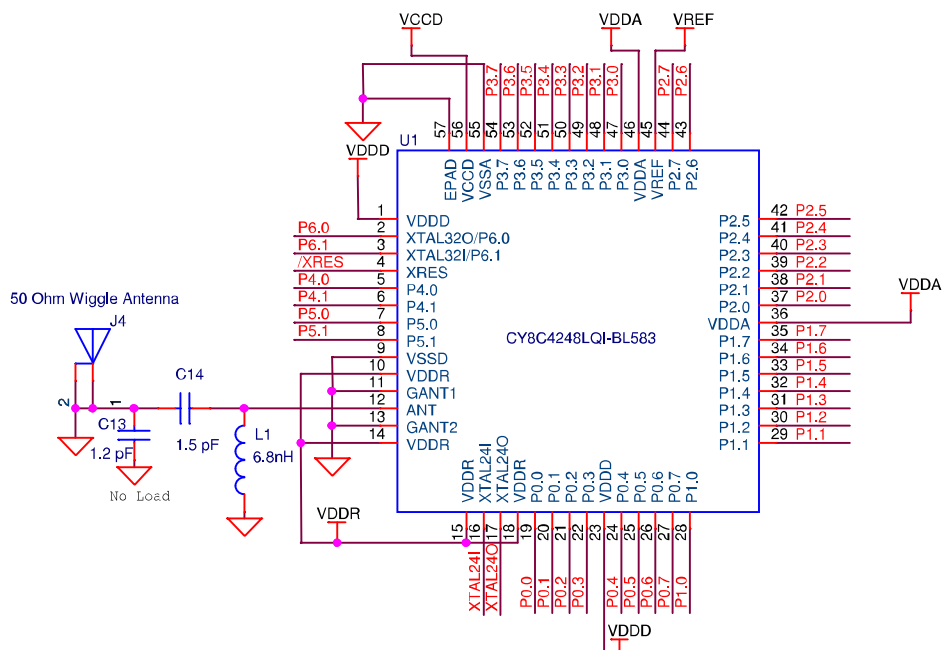
## 5.2 Module Board

### 5.2.1 PSoC 4 BLE or PSoC 4 BLE Device

The PSoC 4 BLE or PSoC 4 BLE device is the main component on the module. It provides the RF interface and analog and digital capability. The PSoC 4 BLE or PSoC 4 BLE pins are mapped to the module headers (see [Figure 5-21](#)). For more information, refer to the [BLE web page](#).

See [BLE Modules and BLE Dongles Compatible with the BLE Pioneer Kit on page 130](#) for details.

Figure 5-21. Schematics and Board Highlight of Module Headers for BLE Pins

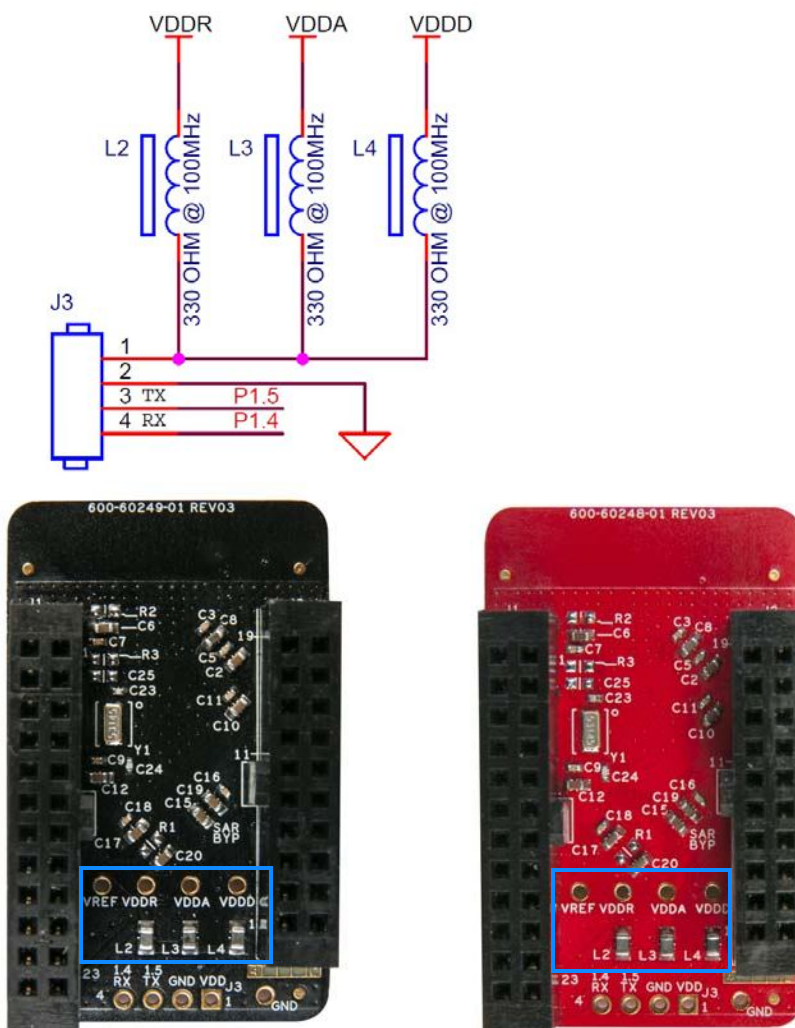


## 5.2.2 Module Power Connections

The module has three power domains: VDDD, VDDA, and VDDR. The VDDD connection supplies power for digital device operation, VDDA supplies power for analog device operation, and VDDR connection supplies power for the device radio. By default, these domains are shorted using a 330-ohm, 100-MHz ferrite bead. The domains are shorted for standalone usage scenarios of module, such as programming the module using MiniProg 3 or using the module as a standalone data acquisition unit.

It is recommended to place the ferrite bead between the supply to avoid ripple between VDDR and the other two domains. If the supply ripple is less than 100 mV, these can be changed to a zero-ohm resistor.

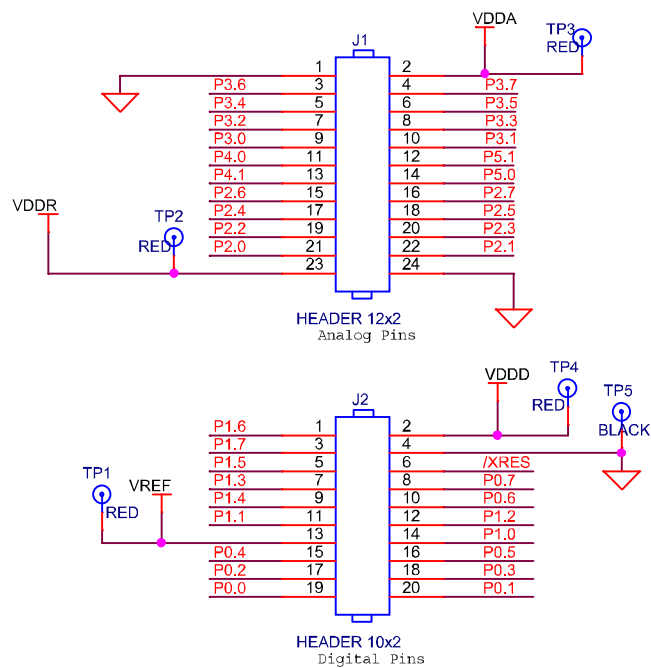
Figure 5-22. Schematics and Board Highlight of Ferrite Bead and Power Pin



## 5.2.3 Module Headers (20-Pin and 24-Pin Headers)

The PSoC 4 BLE and PSoC 4 BLE Modules connect to the BLE Pioneer Baseboard using two (20-pin and 24-pin) module headers (Figure 5-23). All GPIOs and power domains are brought out to these headers. These headers are the counterparts of the connectors in [Expansion Connectors on page 96](#).

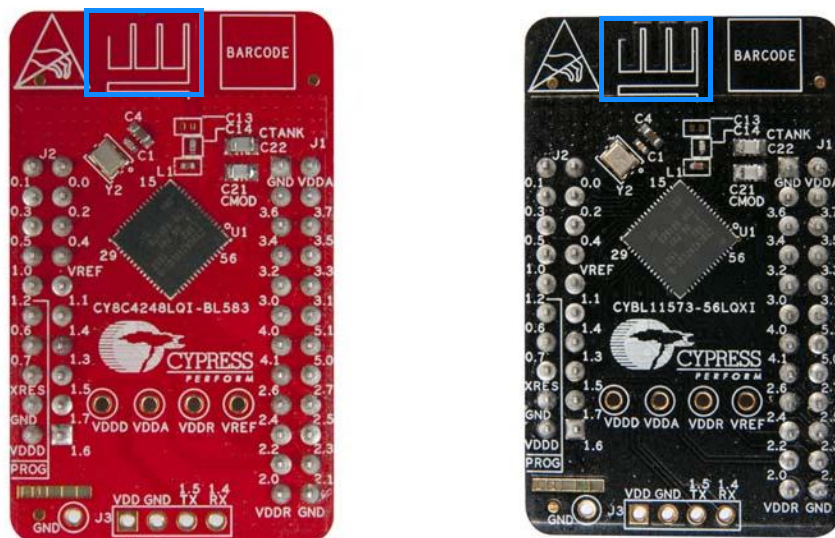
Figure 5-23. Schematics and Board Highlight of Headers



## 5.2.4 Wiggle Antenna

Both the modules use the wiggle antenna. Refer to the Antenna Design Guide ([AN91445](#)) for details.

Figure 5-24. Board Highlight of Wiggle Antenna

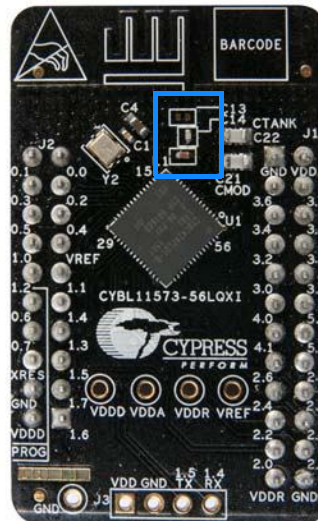
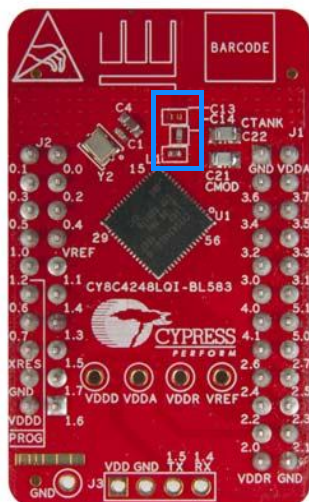
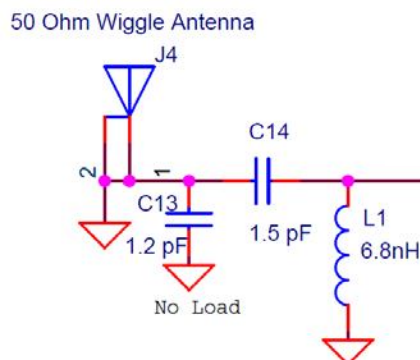


## 5.2.5 Antenna Matching Network

An Antenna Matching Network is required between the BLE device and the antenna to achieve optimum performance (Figure 5-25). The matching network has four main tasks:

- Transform the balanced output of the radio to an unbalanced connection to the antenna (balun).
- Transform the output impedance of the radio to a 50-ohm antenna.
- Suppress harmonics to a level below the regulations level in TX mode.
- Suppress the local oscillator (LO) leakage in RX mode.

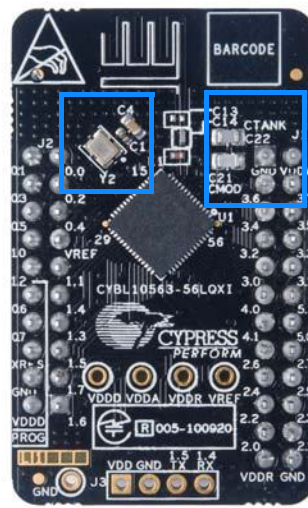
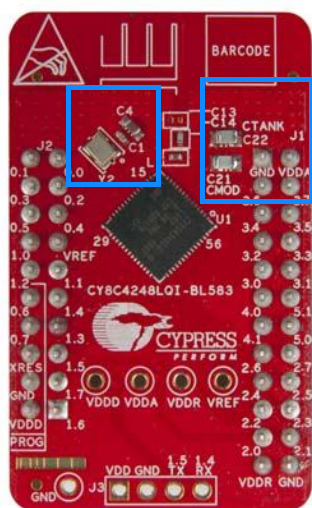
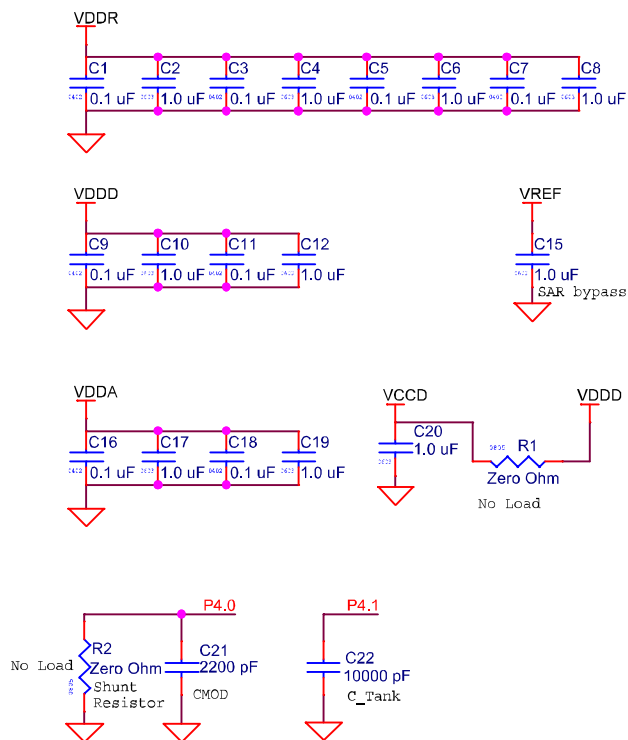
Figure 5-25. Schematics and Board Highlight of Antenna Matching Network and Antenna

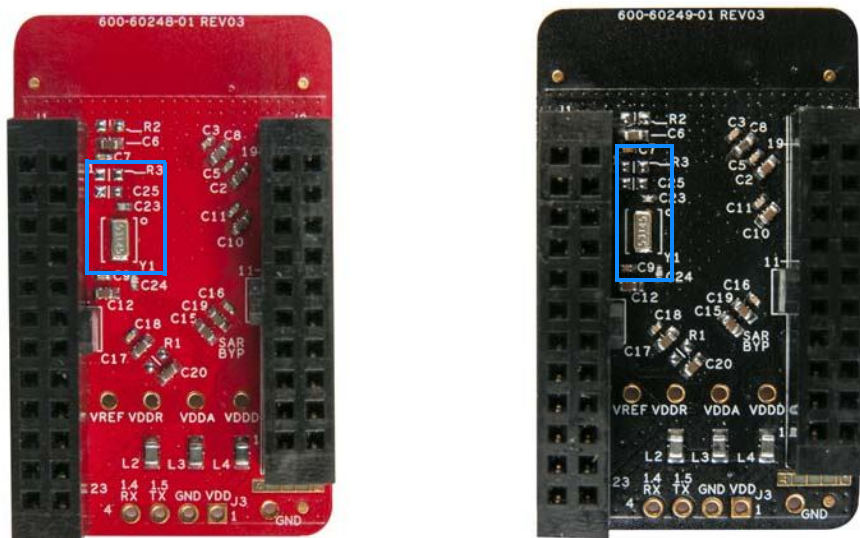


## 5.2.6 BLE Passives

Module boards include a 24-MHz crystal and a 32-kHz crystal, the CMOD and shield (CTANK) circuit for CapSense, a SAR bypass capacitor, and adequate decoupling capacitors for all the power domains, as shown in Figure 5-26.

Figure 5-26. Schematics and Board Highlight – External Crystal, CMOD, CTANK, Decaps, Jumpers





## 5.2.7 Test Points

All power domains are brought out as test points for easy probing.

## 5.3 BLE Dongle Board

See [PSoc 4 BLE or PProC BLE Device on page 107](#) for schematics of PProC BLE pins.

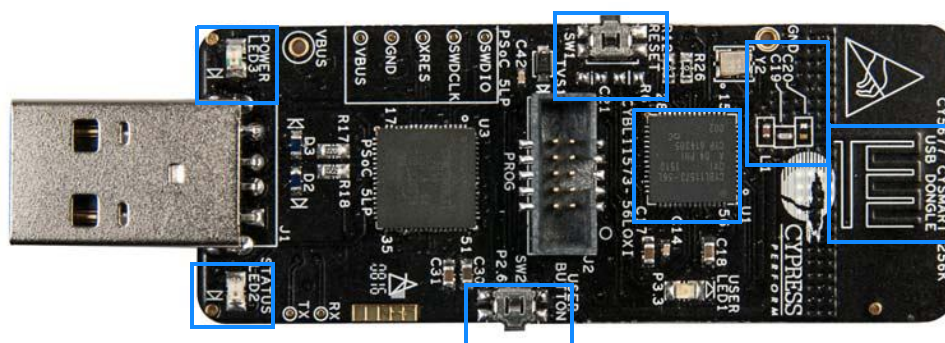
See [Wiggle Antenna on page 110](#) for schematics of wiggle antenna.

See [Antenna Matching Network on page 111](#) for schematics of antenna matching network.

See [BLE Pioneer Baseboard LEDs on page 101](#) for schematics of power and status LED.

See [Push-Buttons on page 103](#) for schematics of push-buttons.

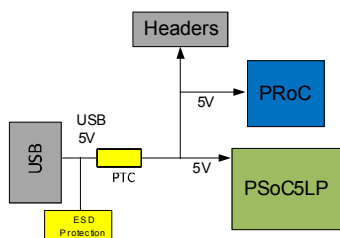
Figure 5-27. Board Highlight



### 5.3.1 Power System

The BLE Dongle is powered directly using 5 V from the USB port, as shown in [Figure 5-28](#).

Figure 5-28. Power Supply Block Diagram With Protection Circuits



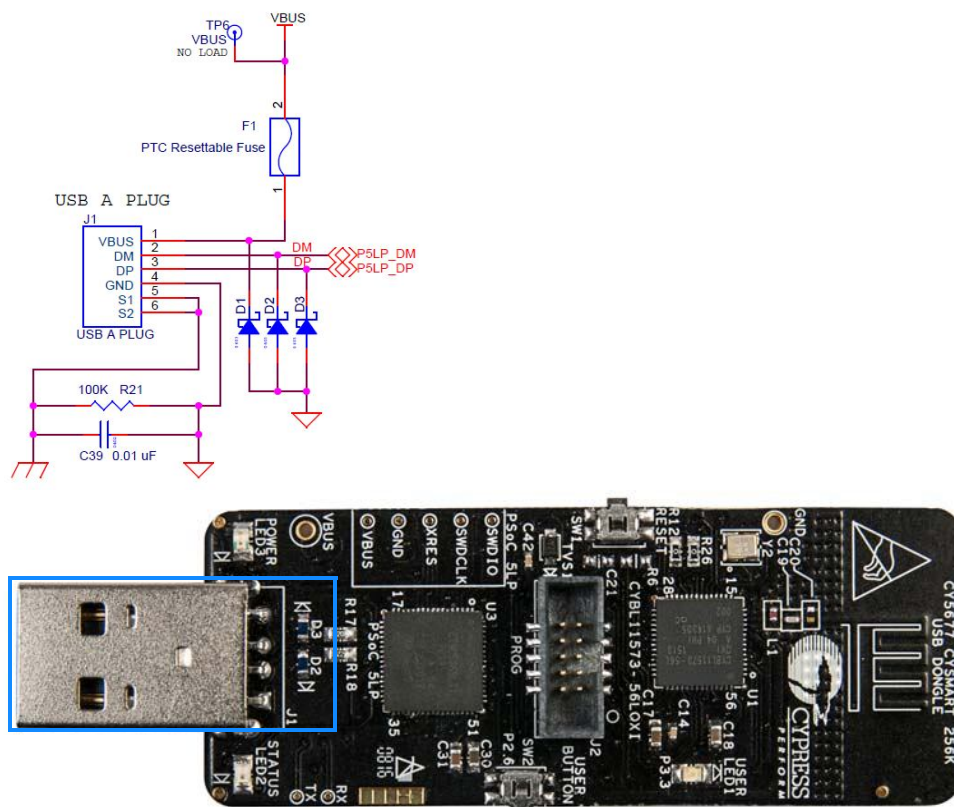
#### 5.3.1.1 Protection Circuits

The PTC resettable fuse is connected to protect the computer's USB ports from shorts and overcurrent.

### 5.3.2 USB Type-A Plug

The KitProg on the BLE Dongle connects to the USB port of a computer through a USB Type-A plug ([Figure 5-29](#)). The BLE Dongle is powered using the same plug. A resettable polyfuse is used to protect the computer's USB ports from shorts and overcurrent. If more than 500 mA is applied to the USB port, the fuse will automatically break the connection until the short or overload is removed. The VBUS, D+, and D– lines from the USB connector are also protected against ESD events using TVS diodes.

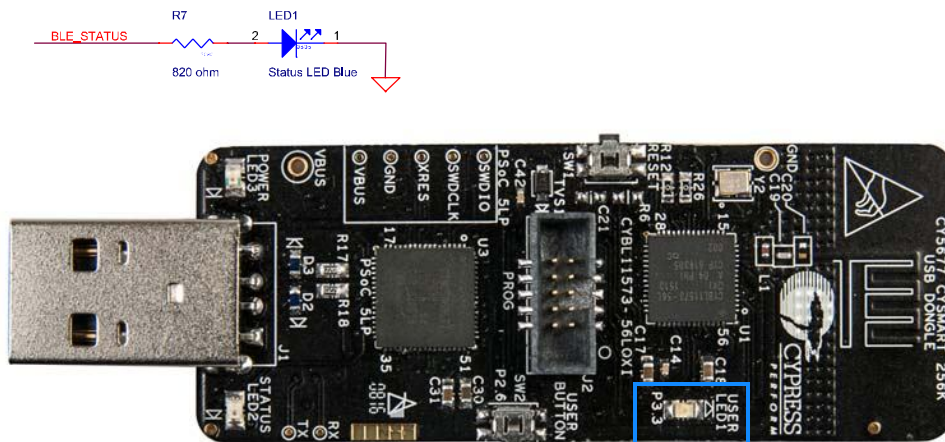
Figure 5-29. Schematics and Board Highlight of USB Type-A Plug



### 5.3.3 User LED

A user LED is provided to indicate status from the PSoC BLE device (Figure 5-30). It is also used to show the bind status.

Figure 5-30. Schematics and Board Highlight of User LED



## 6. Advanced Topics



This chapter describes the functionality of the FM24V10 F-RAM in the BLE Pioneer Kit.

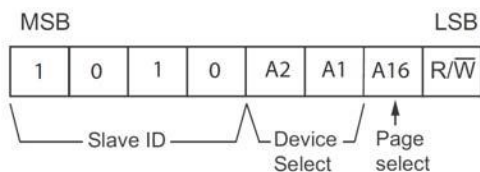
### 6.1 Using FM24V10 F-RAM

The BLE Pioneer Baseboard has an onboard ferroelectric RAM chip that can hold up to 1 Mb of data. The chip provides an I<sup>2</sup>C communication interface for data access. It is hardwired to the I<sup>2</sup>C lines (P5\_0 and P5\_1). Because the F-RAM device is an I<sup>2</sup>C slave, it can be accessed or shared among various I<sup>2</sup>C masters on the same line. For more details on the F-RAM device, refer to the [device datasheet](#).

#### 6.1.1 Address Selection

The slave address of the F-RAM device consists of three parts, as shown in [Figure 6-1](#): slave ID, device select, and page select. Slave ID is an F-RAM family-specific ID located in the datasheet of the particular F-RAM device. For the device used in the BLE Pioneer Baseboard (FM24V10), the slave ID is 1010b. Device select bits are set using the two physical pins A2 and A1 in the device. The setting of these two pins on the BLE Pioneer Baseboard is controlled by resistors R32/R36 (A1) and R33/R37 (A2). Because the memory location in F-RAM is divided into two pages of 64KB each, the page select bit is used to refer to one of the two pages in which the read or write operations will take place.

Figure 6-1. F-RAM I<sup>2</sup>C Address Byte Structure



## 6.1.2 Write/Read Operation

The device datasheet includes details on how to perform a write/read operation with the F-RAM. [Figure 6-2](#) and [Figure 6-3](#) provide a snapshot of the write/read packet structure as a quick reference.

Figure 6-2. F-RAM Single-Byte and Multiple-Byte Write Packet Structure

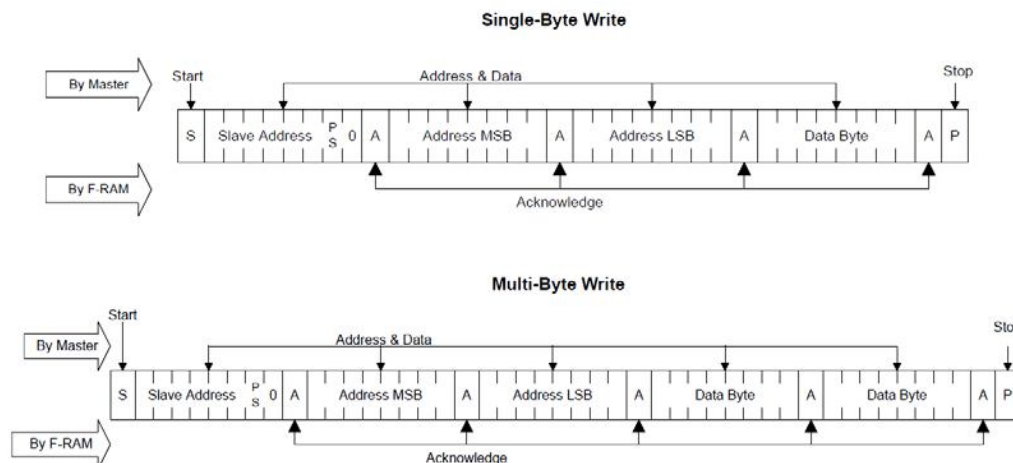
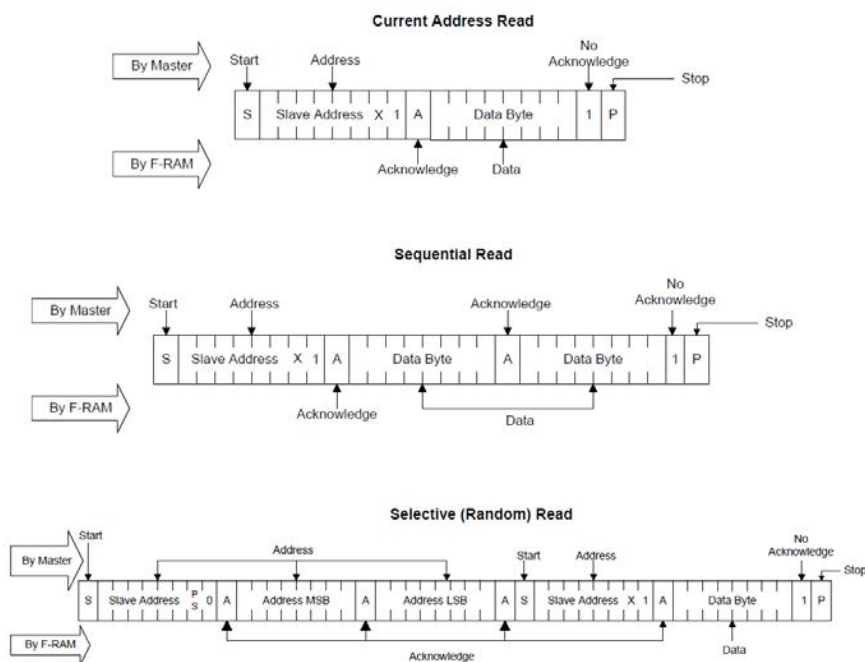


Figure 6-3. F-RAM Single-Byte and Multiple-Byte Read Packet Structure



As shown in the figures, all operations start with the slave address followed by the memory address. For write operations, the bus master sends each byte of data to the memory, and the memory generates an acknowledgement condition. For read operations, after receiving the complete slave address and memory address, the memory begins shifting data from the current address on the next clock.

# A. Appendix



## A.1 Bill of Materials (BOM)

### A.1.1 BLE Pioneer Baseboard

| Item | Qty | Reference                                                | Value                 | Description                        | Manufacturer            | Mfr Part Number      |
|------|-----|----------------------------------------------------------|-----------------------|------------------------------------|-------------------------|----------------------|
| 1    | 1   | PCB                                                      | -                     | Printed circuit board              | Cypress                 | 600-60194-01, Rev04  |
| 2    | 1   | BT1                                                      | CR2032 Battery Holder | HOLDER COIN CELL CR2032 EJECT      | MPD                     | BA2032               |
| 3    | 1   | C1                                                       | 1.0 uF                | CAP TANT 1UF 35V 10% 1210          | AVX Corporation         | TAJB105K035RNJ       |
| 4    | 1   | C2                                                       | 4.7 uF                | CAP TANT 4.7UF 20V 10% 1210        | AVX Corporation         | TAJB475K020RNJ       |
| 5    | 1   | C3                                                       | 0.01 uFd              | CAP 10000PF 16V CERAMIC 0402 SMD   | TDK Corporation         | C1005X7R1C103K050B A |
| 6    | 1   | C4                                                       | 100 uFd               | CAP CER 100UF 6.3V 20% X5R 1210    | TDK Corporation         | C3225X5R0J107M250A C |
| 7    | 15  | C5,C8,C9,C10,C12,C14,C17,C18,C19,C21,C23,C25,C26,C27,C28 | 0.1 uFd               | CAP .1UF 16V CERAMIC X5R 0402      | TDK Corporation         | C1005X5R1A104K050B A |
| 8    | 7   | C6,C7,C11,C13,C15,C16,C20                                | 1.0 uFd               | CAP CERAMIC 1.0UF 25V X5R 0603 10% | Taiyo Yuden             | TMK107BJ105KA-T      |
| 9    | 1   | C29                                                      | 33 uF                 | CAP CER 33UF 6.3V 20% X5R 0805     | TDK Corporation         | C2012X5R0J336M125A C |
| 10   | 6   | D1,D2,D3,D4,D5,D10                                       | MBR0520L              | DIODE SCHOTTKY 0.5A 20V SOD-123    | Fairchild Semiconductor | MBR0520L             |
| 11   | 3   | D6,D7,D8                                                 | ESD diode             | SUPPRESSOR ESD 5VDC 0603 SMD       | Bourns Inc.             | CG0603MLC-05LE       |
| 12   | 1   | D9                                                       | 3.9V Zener            | DIODE ZENER 3.9V 500MW SOD12       | Diodes Inc              | BZT52C3V9-7-F        |
| 13   | 1   | D11                                                      | 2.7V Zener            | DIODE ZENER 2.7V 500MW SOD123      | ON Semiconductor        | MMSZ4682T1G          |
| 14   | 1   | F1                                                       | FUSE                  | PTC RESETTABLE .50A 15V 1812       | Bourns                  | MF-MSMF050-2         |
| 15   | 2   | J1, J4                                                   | 8x1 RECP              | CONN HEADER FEMALE 8POS .1" GOLD   | Proteccion Electro-mech | P9401-08-21          |
| 16   | 1   | J2                                                       | 6x2 RECP              | CONN HEADER FMAL 12PS.1" DL GOLD   | Proteccion Electro-mech | P9403-12-21          |

| Item | Qty | Reference                                               | Value            | Description                        | Manufacturer                | Mfr Part Number          |
|------|-----|---------------------------------------------------------|------------------|------------------------------------|-----------------------------|--------------------------|
| 17   | 1   | J3                                                      | 10x1 RECP        | CONN HEADER FMALE 10POS .1" GOLD   | Protectron Electro-mech     | P9401-10-21              |
| 18   | 1   | J6                                                      | 50MIL KEYED SMD  | CONN HEADER 10 PIN 50MIL KEYED SMD | Samtec                      | FTSH-105-01-L-DV-K       |
| 19   | 1   | J8                                                      | 8X2 RECP         | CONN HEADER FMAL 16PS.1" DL GOLD   | Protectron Electro-mech     | P9403-16-21              |
| 20   | 1   | J10                                                     | 12X2 RECP        | CONN HEADER 2.54MM 24POS GOLD      | Sullins Connector Solutions | SBH11-PBPC-D12-ST-BK     |
| 21   | 1   | J11                                                     | 10X2 RECP        | CONN HEADER 2.54MM 20POS GOLD      | Sullins Connector Solutions | SBH11-PBPC-D10-ST-BK     |
| 22   | 1   | J13                                                     | USB MINI B       | MINI USB RCPT R/A DIP              | TE Connectivity             | 1734510-1                |
| 23   | 1   | J14                                                     | 1X1 RECP         | CONN RCPT 1POS .100" SNGL HORZ     | Samtec Inc                  | BCS-101-L-S-HE           |
| 24   | 1   | J15                                                     | 2p_jumper        | CONN HEADR BRKWAY .100 2POS STR    | Protectron Electro-mech     | P9101-02-12-1            |
| 25   | 1   | J16                                                     | 3p_jumper        | CONN HEADR BRKWAY .100 3POS STR    | Protectron Electro-mech     | P9101-03-12-1            |
| 26   | 1   | LED1                                                    | Power LED Amber  | LED 595NM AMB DIFF 0805 SMD        | Avago Technologies          | HSMA-C170                |
| 27   | 1   | LED2                                                    | Status LED Green | LED GREEN CLEAR 0805 SMD           | Chicago Miniature           | CMD17-21VGC/TR8          |
| 28   | 1   | LED3                                                    | RGB LED          | LED RED/GREEN/BLUE PLCC4 SMD       | Cree, Inc.                  | CLV1A-FKB-CJ1M1F1BB7R4S3 |
| 29   | 3   | L1,L2,L3                                                | 330 OHM @ 100MHz | FERRITE CHIP 330 OHM 0805          | Murata                      | BLM21PG331SN1D           |
| 30   | 3   | Q2,Q4,Q6                                                | PMOS             | MOSFET P-CH 30V 2.2A SOT23         | ON Semiconductor            | NTR4171PT1G              |
| 31   | 1   | Q1,                                                     | PMOS             | MOSFET P-CH 30V 3.8A SOT23-3       | Diodes Inc                  | DMP3098L-7               |
| 32   | 2   | Q3,Q5                                                   | PMOS             | MOSFET P-CH 20V 3.5A SOT23         | NXP Semiconductors          | PMV48XP,215              |
| 33   | 1   | R1                                                      | 11K 1%           | RES 11K OHM 1/10W 1% 0603 SMD      | Panasonic - ECG             | ERJ-3EKF1102V            |
| 34   | 1   | R2                                                      | 560 ohm          | RES 560 OHM 1/8W 5% 0805 SMD       | Panasonic - ECG             | ERJ-6GEYJ561V            |
| 35   | 1   | R3                                                      | 14.7K 1%         | RES 14.7K OHM 1/10W 1% 0603 SMD    | Panasonic - ECG             | ERJ-3EKF1472V            |
| 36   | 1   | R4                                                      | 10K 1%           | RES 10K OHM 1/10W 1% 0603 SMD      | Panasonic - ECG             | ERJ-3EKF1002V            |
| 37   | 1   | R5                                                      | 4.3K 1%          | RES 4.3K OHM 1/10W 1% 0603 SMD     | Panasonic - ECG             | ERJ-3EKF4301V            |
| 38   | 1   | R6                                                      | 100K             | RES 100K OHM 1/10W 5% 0402 SMD     | Panasonic - ECG             | ERJ-2GEJ104X             |
| 39   | 14  | R19,R26,R27,R36,R37,R38,R45,R46,R47,R52,R53,R54,R55,R56 | ZERO             | RES 0.0 OHM 1/10W 0603 SMD         | Panasonic - ECG             | ERJ-3GEY0R00V            |

| Item                                                           | Qty | Reference           | Value                              | Description                                                        | Manufacturer              | Mfr Part Number   |
|----------------------------------------------------------------|-----|---------------------|------------------------------------|--------------------------------------------------------------------|---------------------------|-------------------|
| 40                                                             | 2   | R8,R58              | 15K                                | RES 15K OHM 1/10W 1% 0603 SMD                                      | Panasonic - ECG           | ERJ-3EKF1502V     |
| 41                                                             | 2   | R9,R20              | 10K 1%                             | RES 10K OHM 1/8W 1% 0805 SMD                                       | Stackpole Electronics Inc | RMCF0805FT10K0    |
| 42                                                             | 1   | R10                 | 10K                                | RES 10K OHM 1/10W 5% 0603 SMD                                      | Panasonic - ECG           | ERJ-3GEYJ103V     |
| 43                                                             | 1   | R11                 | 820 ohm                            | RES 820 OHM 1/8W 5% 0805 SMD                                       | Panasonic - ECG           | ERJ-6GEYJ821V     |
| 44                                                             | 2   | R13,R14             | ZERO                               | RES 0.0 OHM 1/8W 0805 SMD                                          | Panasonic-ECG             | ERJ-6GEY0R00V     |
| 45                                                             | 2   | R15,R16             | 22E                                | RES 22 OHM 1/10W 1% 0603 SMD                                       | Panasonic - ECG           | ERJ-3EKF22R0V     |
| 46                                                             | 2   | R17,R18             | 15K                                | RES 15K OHM 1/10W 5% 0603 SMD                                      | Panasonic - ECG           | ERJ-3GEYJ153V     |
| 47                                                             | 5   | R22,R23,R28,R31,R35 | 2.2K                               | RES 2.2K OHM 1/10W 5% 0603 SMD                                     | Panasonic - ECG           | ERJ-3GEYJ222V     |
| 48                                                             | 2   | R24,R25             | 30K                                | RES 30K OHM 1/10W 5% 0603 SMD                                      | Panasonic - ECG           | ERJ-3GEYJ303V     |
| 49                                                             | 2   | R29,R30             | 1.5K                               | RES 1.5K OHM 1/10W 5% 0603 SMD                                     | Panasonic - ECG           | ERJ-3GEYJ152V     |
| 50                                                             | 5   | R39,R40,R41,R42,R43 | 560 ohm                            | RES 560 OHM 1/10W 5% 0603 SMD                                      | Panasonic - ECG           | ERJ-3GEYJ561V     |
| 51                                                             | 2   | SW1,SW2             | SW PUSH-BUTTON                     | SWITCH TACTILE SPST-NO 0.05A 12V                                   | Panasonic - ECG           | EVQ-PE105K        |
| 52                                                             | 1   | TP5                 | BLACK                              | TEST POINT PC MINI .040"D Black                                    | Keystone Electronics      | 5001              |
| 53                                                             | 2   | TVS1,TVS2           | 5V 350W                            | TVS UNIDIR 350W 5V SOD-323                                         | Dioded Inc.               | SD05-7            |
| 54                                                             | 1   | U1                  | LDO                                | IC REG LDO ADJ 1A TO252-5                                          | Rohm Semiconductor        | BA00BC0WFP-E2     |
| 55                                                             | 1   | U2                  | PSoC 5LP                           | 68QFN PSoC 5LP chip for USB debug channel and USB-Serial interface | Cypress Semiconductor     | CY8C5868LTI-LP039 |
| 56                                                             | 1   | U3                  | F-RAM                              | F-RAM 1-Mbit (128K X 8) I2C interface                              | Cypress Semiconductor     | FM24V10-G         |
| 57                                                             | 1   | U4                  | DUAL PMOS                          | MOSFET 2P-CH 20V 430MA SOT-563                                     | ON Semiconductor          | NTZD3152PT1G      |
| Install on Bottom of PCB As per the Silk Screen in the Corners |     |                     |                                    |                                                                    |                           |                   |
| 58                                                             | 4   | N/A                 | N/A                                | BUMPER CYLIN 0.375" DIA BLK                                        | 3M                        | SJ61A4            |
| <b>Special Jumper Installation Instructions</b>                |     |                     |                                    |                                                                    |                           |                   |
| 59                                                             | 2   | J15,J16             | Install jumper across pins 1 and 2 | Rectangular Connectors MINI JUMPER GF 6.0MM CLOSE TYPE BLACK       | Kobiconn                  | 151-8010-E        |

| Item                      | Qty | Reference                          | Value           | Description                                                                            | Manufacturer                | Mfr Part Number      |
|---------------------------|-----|------------------------------------|-----------------|----------------------------------------------------------------------------------------|-----------------------------|----------------------|
| <b>Label</b>              |     |                                    |                 |                                                                                        |                             |                      |
| 60                        | 1   | N/A                                | N/A             | LBL, PCA Label, Vendor Code, Datecode, Serial Number 121-60329-01 Rev 04 (YYWWVVXXXXX) | Cypress Semiconductor       |                      |
| 61                        | 1   | N/A                                | N/A             | LBL, QR code, 12mm X 12mm                                                              | Cypress Semiconductor       |                      |
| <b>No load components</b> |     |                                    |                 |                                                                                        |                             |                      |
| 62                        | 1   | C22                                | 0.1 uFd         | CAP .1UF 16V CERAMIC Y5V 0402                                                          | TDK Corporation             | C1005X5R1A104K050B A |
| 63                        | 1   | C24                                | 1.0 uFd         | CAP CERAMIC 1.0UF 25V X5R 0603 10%                                                     | Taiyo Yuden                 | TMK107BJ105KA-T      |
| 64                        | 9   | R7,R59,R32,R33,R34,R48,R49,R50,R51 | Zero Ohm        | RES 0.0 OHM 1/10W JUMP 0603                                                            | TE Connectivity             | 1623094-1            |
| 65                        | 1   | R21                                | 4.7K            | RES 4.7K OHM 1/10W 5% 0603 SMD                                                         | Panasonic - ECG             | ERJ-3GEYJ472V        |
| 66                        | 1   | J7                                 | 50MIL KEYED SMD | CONN HEADER 10 PIN 50MIL KEYED SMD                                                     | Samtec                      | FTSH-105-01-L-DV-K   |
| 67                        | 1   | J9                                 | 2 PIN HDR       | CONN HEADER FEMALE 2POS .1" GOLD                                                       | Sullins Connector Solutions | PPPC021LFBN-RC       |
| 68                        | 2   | TP4,TP5                            | BLACK           | TEST POINT 43 HOLE 65 PLATED BLACK                                                     | Keystone Electronics        | 5001                 |
| 69                        | 3   | TP1,TP2,TP3                        | RED             | TEST POINT 43 HOLE 65 PLATED RED                                                       | Keystone Electronics        | 5000                 |
| 70                        | 2   | R44,R12                            | ZERO            | RES 0.0 OHM 1/8W 0805 SMD                                                              | Panasonic-ECG               | ERJ-6GEY0R00V        |
| 71                        | 1   | J12                                | 3x2 RECPT       | CONN HEADER FMAL 6PS .1" DL GOLD                                                       | Sullins Connector Solutions | PPPC032LFBN-RC       |
| 72                        | 1   | J5                                 | 6X1 RECP RA     | CONN FEMALE 6POS .100" R/A GOLD                                                        | Sullins Connector Solutions | PPPC061LGBN-RC       |

## A.1.2 Module

### A.1.2.1 CY5676A PRoC BLE 256KB Module

| Item                      | Qty | Reference                           | Value            | Description                                                                             | Mfr_Name                               | Mfr_Part_Number      |
|---------------------------|-----|-------------------------------------|------------------|-----------------------------------------------------------------------------------------|----------------------------------------|----------------------|
| 1                         | 1   | PCB                                 | -                | PRoC BLE 256KB Module printed circuit board                                             | Cypress qualified vendor               | 600-60249-01 Rev 03  |
| 2                         | 8   | C1,C3,C5,C7,C9,C11,C16,C18          | 0.1 uF           | CAP .1UF 16V CERAMIC Y5V 0402                                                           | Samsung Electro-Mechanics America, Inc | CL05F104ZO5NNNC      |
| 3                         | 10  | C2,C4,C6,C8,C10,C12,C15,C17,C19,C20 | 1.0 uF           | CAP CERAMIC 1.0UF 25V X5R 0603 10%                                                      | TDK Corporation                        | C1608X5R1E105K080AC  |
| 4                         | 1   | C21                                 | 2200 pF          | CAP CER 2200PF 50V 5% NP0 0805                                                          | Murata Electronics                     | GRM2165C1H222JA01D   |
| 5                         | 1   | C22                                 | 10000 pF         | CAP CER 10000PF 50V 5% NP0 0805                                                         | Murata Electronics                     | GRM2195C1H103JA01D   |
| 6                         | 1   | C23                                 | 36 pF            | CAP CER 36PF 50V 5% NP0 0402                                                            | Murata Electronics                     | GRM1555C1H360JA01D   |
| 7                         | 1   | C24                                 | 18 pF            | CAP CER 18PF 50V 1% NP0 0402                                                            | Murata Electronics                     | GRM1555C1H180FA01D   |
| 8                         | 1   | C14                                 | 1.5 pF           | CAP CER 1.5PF 50V NP0 0402                                                              | Johanson Technology Inc                | 500R07S1R5BV4T       |
| 9                         | 1   | J1                                  | HEADER 24        | CONN HEADR FEMALE 24POS .1" DL AU                                                       | Sullins Connector                      | SFH11-PBPC-D12-ST-BK |
| 10                        | 1   | J2                                  | HEADER 20        | CONN HEADR FEMALE 20POS .1" DL AU                                                       | Sullins Connector                      | SFH11-PBPC-D10-ST-BK |
| 11                        | 1   | L1                                  | 6.8nH            | CER INDUCTOR 6.8NH 0402                                                                 | Johanson Technology Inc                | L-07C6N8JV6T         |
| 12                        | 3   | L2,L3,L4                            | 330 Ohm @100 MHz | FERRITE CHIP 330 OHM 0805                                                               | Murata Electronics                     | BLM21PG331SN1D       |
| 13                        | 1   | U1                                  | PRoC BLE         | 56 QFN PRoC BLE - 256KB                                                                 | Cypress Semiconductor                  | CYBL11573-56LQXI     |
| 14                        | 1   | Y1                                  | 32.768KH Z       | CRYSTAL 32.768KHZ 12.5PF SMD                                                            | ECS Inc                                | ECS-.327-12.5-34B    |
| 15                        | 1   | Y2                                  | 24MHz            | CRYSTAL 24.000 MHZ 8PF SMD                                                              | ECS Inc                                | ECS-240-8-36CKM      |
| 16                        | 1   | LBL                                 | -                | LBL, PCA Label, Vendor Code, Datecode, Serial Number 121-60216-01 Rev 01 (YYWWV-VXXXXX) | Cypress qualified vendor               | -                    |
| <b>No Load components</b> |     |                                     |                  |                                                                                         |                                        |                      |
| 17                        | 1   | C13                                 | 1.2 pF           | CAP CER 1.2PF 50V NP0 0402                                                              | Johanson Technology Inc                | 500R07S1R2BV4T       |
| 18                        | 1   | C25                                 | 100pF            | CAP CER 100PF 50V 10% X7R 0603                                                          | Kemet                                  | C0603C101K5RACTU     |
| 19                        | 1   | R1                                  | Zero Ohm         | RES 0.0 OHM 1/8W 0605 SMD                                                               | TE Connectivity                        | 1623094-1            |

| Item | Qty | Reference       | Value    | Description                        | Mfr_Name             | Mfr_Part_Number |
|------|-----|-----------------|----------|------------------------------------|----------------------|-----------------|
| 20   | 1   | R2              | Rbleed   | No Load                            | -                    | -               |
| 21   | 1   | R3              | 4.7K     | RES 4.7K OHM 1/10W 5% 0603 SMD     | Panasonic - ECG      | ERJ-3GEYJ472V   |
| 22   | 1   | J3              | 4 HEADER | CONN HEADER 4POS .100 R/A 15AU     | FCI                  | 68016-204HLF    |
| 23   | 4   | TP1,TP2,TP3,TP4 | RED      | TEST POINT 43 HOLE 65 PLATED RED   | Keystone Electronics | 5000            |
| 24   | 1   | TP5             | BLACK    | TEST POINT 43 HOLE 65 PLATED BLACK | Keystone Electronics | 5001            |

#### A.1.2.2 CY8CKIT-143A PSoC 4 BLE 256KB Module

| Item | Qty | Reference                           | Value            | Description                                   | Mfr_Name                               | Mfr_Part_Number      |
|------|-----|-------------------------------------|------------------|-----------------------------------------------|----------------------------------------|----------------------|
| 1    | 1   | PCB                                 | -                | PSoC 4 BLE 256KB Module printed circuit board | Cypress qualified vendor               | 600-60248-01 Rev 03  |
| 2    | 8   | C1,C3,C5,C7,C9,C11,C16,C18          | 0.1 uF           | CAP .1UF 16V CERAMIC Y5V 0402                 | Samsung Electro-Mechanics America, Inc | CL05F104ZO5NNNC      |
| 3    | 10  | C2,C4,C6,C8,C10,C12,C15,C17,C19,C20 | 1.0 uF           | CAP CERAMIC 1.0UF 25V X5R 0603 10%            | TDK Corporation                        | C1608X5R1E105K080A C |
| 4    | 1   | C21                                 | 2200 pF          | CAP CER 2200PF 50V 5% NP0 0805                | Murata Electronics                     | GRM2165C1H222JA01D   |
| 5    | 1   | C22                                 | 10000 pF         | CAP CER 10000PF 50V 5% NP0 0805               | Murata Electronics                     | GRM2195C1H103JA01D   |
| 6    | 1   | C23                                 | 36 pF            | CAP CER 36PF 50V 5% NP0 0402                  | Murata Electronics                     | GRM1555C1H360JA01D   |
| 7    | 1   | C24                                 | 18 pF            | CAP CER 18PF 50V 1% NP0 0402                  | Murata Electronics                     | GRM1555C1H180FA01D   |
| 8    | 1   | C14                                 | 1.5 pF           | CAP CER 1.5PF 50V NP0 0402                    | Johanson Technology Inc                | 500R07S1R5BV4T       |
| 9    | 1   | J1                                  | HEADER 24        | CONN HEADR FEMALE 24POS .1" DL AU             | Sullins Connector                      | SFH11-PBPC-D12-ST-BK |
| 10   | 1   | J2                                  | HEADER 20        | CONN HEADR FEMALE 20POS .1" DL AU             | Sullins Connector                      | SFH11-PBPC-D10-ST-BK |
| 11   | 1   | L1                                  | 6.8nH            | CER INDUCTOR 6.8NH 0402                       | Johanson Technology Inc                | L-07C6N8JV6T         |
| 12   | 3   | L2,L3,L4                            | 330 Ohm @100 MHz | FERRITE CHIP 330 OHM 0805                     | Murata Electronics                     | BLM21PG331SN1D       |
| 13   | 1   | U1                                  | PSoC 4BLE        | 56 QFN PSoC 4 BLE - 256KB                     | Cypress Semiconductor                  | CY8C4248LQI-BL583    |
| 14   | 1   | Y1                                  | 32.768KHz        | CRYSTAL 32.768KHZ 12.5PF SMD                  | ECS Inc                                | ECS-.327-12.5-34B    |
| 15   | 1   | Y2                                  | 24MHz            | CRYSTAL 24.000 MHZ 8PF SMD                    | ECS Inc                                | ECS-240-8-36CKM      |

| Item                      | Qty | Reference       | Value    | Description                                                                            | Mfr_Name                 | Mfr_Part_Number  |
|---------------------------|-----|-----------------|----------|----------------------------------------------------------------------------------------|--------------------------|------------------|
| 16                        | 1   | LBL             | -        | LBL, PCA Label, Vendor Code, Datecode, Serial Number 121-60215-01 Rev 01 (YYWWVVXXXXX) | Cypress qualified vendor | -                |
| <b>No Load components</b> |     |                 |          |                                                                                        |                          |                  |
| 17                        | 1   | C13             | 1.2 pF   | CAP CER 1.2PF 50V NP0 0402                                                             | Johanson Technology Inc  | 500R07S1R2BV4T   |
| 18                        | 1   | C25             | 100pF    | CAP CER 100PF 50V 10% X7R 0603                                                         | Kemet                    | C0603C101K5RACTU |
| 19                        | 1   | R1              | Zero Ohm | RES 0.0 OHM 1/10W JUMP 0603                                                            | TE Connectivity          | 1623094-1        |
| 20                        | 1   | R2              | Rbleed   | No Load                                                                                | -                        | -                |
| 21                        | 1   | R3              | 4.7K     | RES 4.7K OHM 1/10W 5% 0603 SMD                                                         | Panasonic - ECG          | ERJ-3GEYJ472V    |
| 22                        | 1   | J3              | 4 HEADER | CONN HEADER 4POS .100 R/A 15AU                                                         | FCI                      | 68016-204HLF     |
| 23                        | 4   | TP1,TP2,TP3,TP4 | RED      | TEST POINT 43 HOLE 65 PLATED RED                                                       | Keystone Electronics     | 5000             |
| 24                        | 1   | TP5             | BLACK    | TEST POINT 43 HOLE 65 PLATED BLACK                                                     | Keystone Electronics     | 5001             |

### A.1.3 CY5677 CySmart BLE 4.2 USB Dongle

| Item | Qty | Reference                                                       | Value            | Description                        | Manufacturer             | Mfr Part Number     |
|------|-----|-----------------------------------------------------------------|------------------|------------------------------------|--------------------------|---------------------|
| 1    | 1   | -                                                               | -                | BLE Dongle Printed circuit board   | Cypress qualified vendor | 600-60326-01 Rev01  |
| 2    | 17  | C1,C4,C6,C7,C9,C11,C14,C16,C25,C28,C29,C32,C35,C36,C38,C41,C42  | 0.1 uFd          | CAP .1UF 16V CERAMIC Y5V 0402      | TDK Corporation          | C1005X5R1A104K050BA |
| 3    | 17  | C2,C3,C5,C8,C10,C12,C13,C15,C17,C18,C24,C26,C30,C31,C33,C34,C40 | 1.0 uFd          | CAP CERAMIC 1.0UF 25V X5R 0603 10% | Taiyo Yuden              | TMK107BJ105KA-T     |
| 4    | 1   | C19                                                             | 1.2 pFd          | CAP CER 1.2PF 50V NP0 0402         | Johanson Technology Inc  | 500R07S1R2BV4T      |
| 5    | 1   | C22                                                             | 36 pF            | CAP CER 36PF 50V 5% NP0 0402       | Murata Electronics       | GRM1555C1H360JA01D  |
| 6    | 1   | C23                                                             | 18 pF            | CAP CER 18PF 50V 1% NP0 0402       | Murata Electronics       | GRM1555C1H180FA01D  |
| 7    | 1   | C39                                                             | 0.01 uFd         | CAP 10000PF 16V CERAMIC 0402 SMD   | TDK Corporation          | C1005X7R1C103K050BA |
| 8    | 3   | D1,D2,D3                                                        | ESD diode        | SUPPRESSOR ESD 5VDC 0603 SMD       | Bourns Inc.              | CG0603MLC-05LE      |
| 9    | 1   | F1                                                              | FUSE             | PTC RESETTABLE .50A 15V 1812       | Bourns                   | MF-MSMF050-2        |
| 10   | 1   | J1                                                              | USB A PLUG       | CONN PLUG USB 4POS RT ANG PCB      | Molex Inc                | 480370001           |
| 11   | 1   | J2                                                              | 50MIL KEYED SMD  | CONN HEADER 10POS DUAL SHRD SMD    | FCI                      | 20021521-00010T1LF  |
| 12   | 1   | LED1                                                            | Status LED Blue  | LED BLUE CLEAR THIN 0805 SMD       | LiteOn Inc               | LTST-C171TBKT       |
| 13   | 1   | LED2                                                            | Status LED Green | LED GREEN CLEAR 0805 SMD           | Chicago Miniature        | CMD17-21VGC/TR8     |
| 14   | 1   | LED3                                                            | Power LED Red    | LED SUPER RED CLEAR 0805 SMD       | LiteOn Inc               | LTST-C170KRKT       |
| 15   | 1   | L1                                                              | 5.1 nH           | CER INDUCTOR 5.1NH 0402            | Johanson Technology Inc  | L-07C5N1SV6T        |
| 16   | 2   | R8,R11                                                          | Zero Ohm         | RES 0.0 OHM 1/8W 0805 SMD          | Panasonic-ECG            | ERJ-6GEY0R00V       |
| 17   | 1   | R7                                                              | 820 ohm          | RES 820 OHM 1/10W 5% 0603 SMD      | Panasonic - ECG          | ERJ-3GEYJ821V       |
| 18   | 2   | R22,R25                                                         | 820 ohm          | RES 820 OHM 1/8W 5% 0805 SMD       | Panasonic - ECG          | ERJ-6GEYJ821V       |
| 19   | 2   | R9,R10                                                          | 2.2K             | RES 2.2K OHM 1/10W 5% 0603 SMD     | Panasonic - ECG          | ERJ-3GEYJ222V       |

| Item                      | Qty | Reference                                                         | Value      | Description                                                                                           | Manufacturer             | Mfr Part Number     |
|---------------------------|-----|-------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------|--------------------------|---------------------|
| 20                        | 9   | R1,R2,R3,R4,R12,R13,R14,R15,R26                                   | ZERO       | RES 0.0 OHM 1/10W 0603 SMD                                                                            | Panasonic - ECG          | ERJ-3GEY0R00V       |
| 21                        | 2   | R17,R18                                                           | 22E        | RES 22 OHM 1/10W 1% 0603 SMD                                                                          | Panasonic - ECG          | ERJ-3EKF22R0V       |
| 22                        | 1   | R21                                                               | 100K       | RES 100K OHM 1/10W 5% 0402 SMD                                                                        | Panasonic - ECG          | ERJ-2GEJ104X        |
| 23                        | 2   | R19,R20                                                           | 15K        | RES 15K OHM 1/10W 5% 0603 SMD                                                                         | Panasonic - ECG          | ERJ-3GEYJ153V       |
| 24                        | 2   | R23,R24                                                           | 30K        | RES 30K OHM 1/10W 5% 0603 SMD                                                                         | Panasonic - ECG          | ERJ-3GEYJ303V       |
| 25                        | 2   | SW1,SW2                                                           | SW RA PUSH | SWITCH TACTILE SPST-NO 0.05A 12V                                                                      | Panasonic - ECG          | EVQ-P3401P          |
| 26                        | 1   | TVS1                                                              | 5V 350W    | TVS UNIDIR 350W 5V SOD-323                                                                            | Diodes Inc.              | SD05-7              |
| 27                        | 1   | U1                                                                | PRoC BLE   | PRoC BLE, 56QFN 256KB                                                                                 | Cypress Semiconductor    | CYBL11573-56LQXI    |
| 28                        | 1   | U2                                                                | DUAL PMOS  | MOSFET 2P-CH 20V 430MA SOT-563                                                                        | ON Semiconductor         | NTZD3152PT1G        |
| 29                        | 1   | U3                                                                | PSoC 5LP   | PSoC 5LP Programmable System on Chip, 68QFN                                                           | Cypress Semiconductor    | CY8C5868LTI-LP039   |
| 30                        | 1   | Y1                                                                | 32.768KHz  | CRYSTAL 32.768KHZ 12.5PF SMD                                                                          | ECS Inc                  | ECS-.327-12.5-34B   |
| 31                        | 1   | Y2                                                                | 24MHz      | CRYSTAL 24.000 MHZ 8PF SMD                                                                            | ECS Inc                  | ECS-240-8-36CKM     |
| 32                        | 1   | N/A                                                               | N/A        | LBL, PCA Label, Vendor Code, Datecode, Serial Number 121-60161-01 Rev 03 (YYWWV-VXXXXX); Only barcode | Cypress qualified vendor | -                   |
| <b>No load components</b> |     |                                                                   |            |                                                                                                       |                          |                     |
| 33                        | 1   | C20                                                               | 1.2 pF     | CAP CER 1.2PF 50V NP0 0402                                                                            | Johanson Technology Inc  | 500R07S1R2BV4T      |
| 34                        | 1   | C21                                                               | 100pF      | CAP CER 100PF 50V 10% X7R 0603                                                                        | Kemet                    | C0603C101K5RACTU    |
| 35                        | 1   | C37                                                               | 0.1 uFd    | CAP .1UF 16V CERAMIC Y5V 0402                                                                         | TDK Corporation          | C1005X5R1A104K050BA |
| 36                        | 1   | C27                                                               | 1.0 uFd    | CAP CERAMIC 1.0UF 25V X5R 0603 10%                                                                    | Taiyo Yuden              | TMK107BJ105KA-T     |
| 37                        | 1   | R5                                                                | Zero Ohm   | RES 0.0 OHM 1/10W JUMP 0603                                                                           | TE Connectivity          | 1623094-1           |
| 38                        | 2   | R6,R16                                                            | 4.7K       | RES 4.7K OHM 1/10W 5% 0603 SMD                                                                        | Panasonic - ECG          | ERJ-3GEYJ472V       |
| 39                        | 15  | TP1,TP2,TP3,TP4,TP5,TP6,TP7,TP8,TP9,TP10,TP11,TP12,TP13,TP14,TP15 | No load    | No load                                                                                               | -                        | -                   |

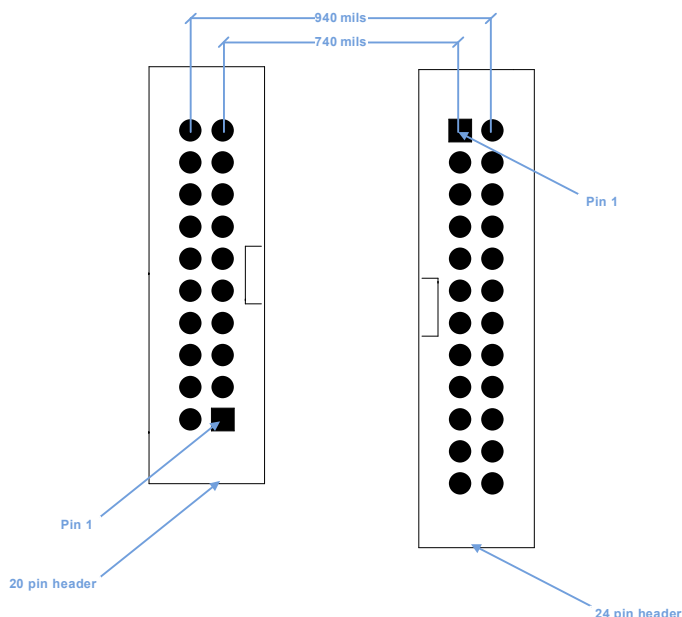
## A.2 KitProg Status LED States

| User Indication                              | Scenario                                                                                                               | Action Required by user                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LED blinks fast:<br>Frequency = 4.00 Hz      | LED starts blinking at power up, if bootloadable file is corrupt.                                                      | Bootload the <i>KitProg.cyacd</i> file: In PSoC Programmer, connect to the kit, open the <b>Utilities</b> tab, and press the <b>Upgrade Firmware</b> button.                                                                                                                                                                                |
| LED blinks slow:<br>Frequency = 0.67 Hz      | Entered Bootloader mode by holding the Reset button of the BLE Pioneer Kit/BLE Dongle during kit power up.             | Release the Reset button and replug power if you entered this mode by mistake. If the mode entry was intentional, bootload the new <i>.cyacd</i> file using the Bootloader Host tool shipped with PSoC Creator.                                                                                                                             |
| LED blinks very fast:<br>Frequency = 15.0 Hz | SWD operation is in progress.<br>Any I <sup>2</sup> C traffic.<br>Kit's COM port connect/disconnect event (one blink). | In PSoC Programmer, watch the log window for status messages for SWD operations. In the Bridge Control Panel, the LED blinks on I <sup>2</sup> C command requests. In Bridge Control Panel or any other serial port terminal program, distinguish the kit's COM port number by the blinking LED when the port is connected or disconnected. |
| LED is ON.                                   | USB enumeration successful.<br>Kit is in the idle state waiting for commands.                                          | The kit functions can be used by PSoC Creator, PSoC Programmer, Bridge Control Panel, and any serial port terminal program.                                                                                                                                                                                                                 |
| LED is OFF.                                  | Power LED is ON.                                                                                                       | This means that the USB enumeration was unsuccessful. This can happen if the kit is not powered from the USB host or the kit is not connected to the USB host through the USB cable. Verify the USB cable and check if PSoC Programmer is installed on the PC.                                                                              |

## A.3 Adding BLE Module-Compatible Headers on Your Baseboard

The baseboard should have a 20-pin header and a 24-pin header. Dimension of these connectors are given here.

Figure A-1. Connectors on BLE Pioneer Kit Baseboard



These headers are available for purchase from Digikey.

| Description                   | Manufacturer                | Manufacturer Part Number | Digikey Part Number                     |
|-------------------------------|-----------------------------|--------------------------|-----------------------------------------|
| CONN HEADER 2.54MM 24POS GOLD | Sullins Connector Solutions | SBH11-PBPC-D12-ST-BK     | <a href="#">SBH11-PBPC-D12-ST-BK-ND</a> |
| CONN HEADER 2.54MM 20POS GOLD | Sullins Connector Solutions | SBH11-PBPC-D10-ST-BK     | <a href="#">S9172-ND</a>                |

## A.4 Programming BLE Modules via MiniProg3

If the BLE Modules are to be used without the BLE Pioneer Baseboard, they can be programmed using MiniProg3. The J2 header has five adjacent pins – VDDD, GND, XRES, P0[7], and P0[6]. These pins can be used to program the BLE Module using MiniProg3.

Figure A-2. Programming a BLE Module via MiniProg3



Follow these steps to program the module:

1. Connect the MiniProg3 to the J2 connector, with the VDD of the MiniProg3 aligned to the VDDD on the module.
2. Click **Start > All Programs > Cypress > PSoC Programmer <version> > PSoC Programmer <version>**.
3. Open the desired *.hex* file in PSoC Programmer.
4. On the **Programmer** tab, set the **Programming Mode** to **Reset**.
5. Set **AutoDetection** to **On**.
6. Set **Programmer Characteristics > Protocol** to **SWD**.
7. Set **Programmer Characteristics > Voltage** to the desired value.
8. Click the **Toggle Power** icon below the menu bar to power the module.
9. Click the **Program** icon below the menu bar to program the module.

## A.5 BLE Modules and BLE Dongles Compatible with the BLE Pioneer Kit

Different BLE modules and BLE dongles can work with the BLE Pioneer Kit, as listed in the following tables.

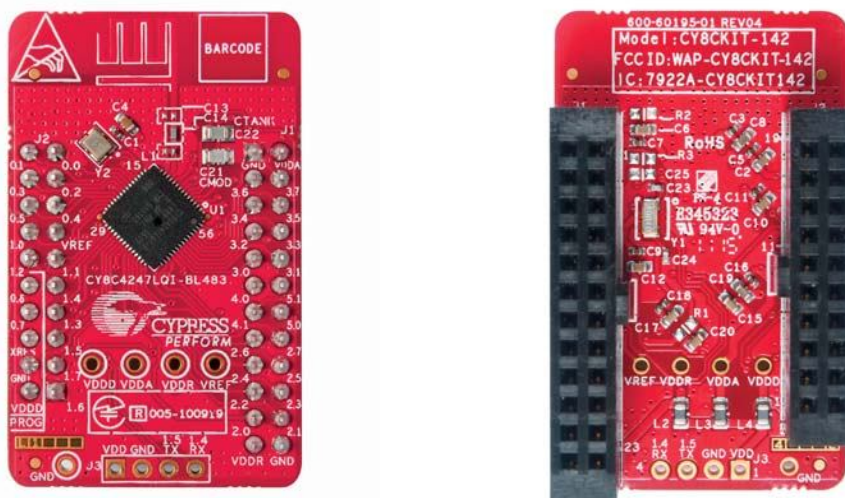
| BLE Module                                           | Availability         | Flash Size | Bluetooth Version |
|------------------------------------------------------|----------------------|------------|-------------------|
| <a href="#">CY8CKIT-142 PSoC 4 BLE Module</a>        | Available separately | 128KB      | Bluetooth 4.1     |
| <a href="#">CY8CKIT-141 PSoC 4 BLE SMA Module</a>    | Available separately | 128KB      | Bluetooth 4.1     |
| <a href="#">CY8CKIT-143 PSoC 4 BLE 256KB Module</a>  | Available separately | 256KB      | Bluetooth 4.1     |
| <a href="#">CY8CKIT-143A PSoC 4 BLE 256KB Module</a> | As part of the kit   | 256KB      | Bluetooth 4.2     |
| <a href="#">CY5671 PSoC BLE Module</a>               | Available separately | 128KB      | Bluetooth 4.1     |
| <a href="#">CY5674 PSoC BLE SMA Module</a>           | Available separately | 128KB      | Bluetooth 4.1     |
| <a href="#">CY5676 PSoC BLE 256KB Module</a>         | Available separately | 256KB      | Bluetooth 4.1     |
| <a href="#">CY5676A PSoC BLE 256KB Module</a>        | As part of the kit   | 256KB      | Bluetooth 4.2     |

| BLE Dongle                                                     | Availability         | Flash Size | Bluetooth Version |
|----------------------------------------------------------------|----------------------|------------|-------------------|
| <a href="#">CY5670 CySmart USB Dongle (BLE Dongle)</a>         | Available separately | 128KB      | Bluetooth 4.1     |
| <a href="#">CY5677 CySmart BLE 4.2 USB Dongle (BLE Dongle)</a> | As part of the kit   | 256KB      | Bluetooth 4.2     |

### A.5.1 CY8CKIT-142 PSoC 4 BLE Module

This is the lower flash version of the PSoC 4 BLE Module. It can be ordered separately. This module has the CY8C4247LQI-BL483 silicon, with 128KB flash and 16KB RAM. It supports Bluetooth 4.1.

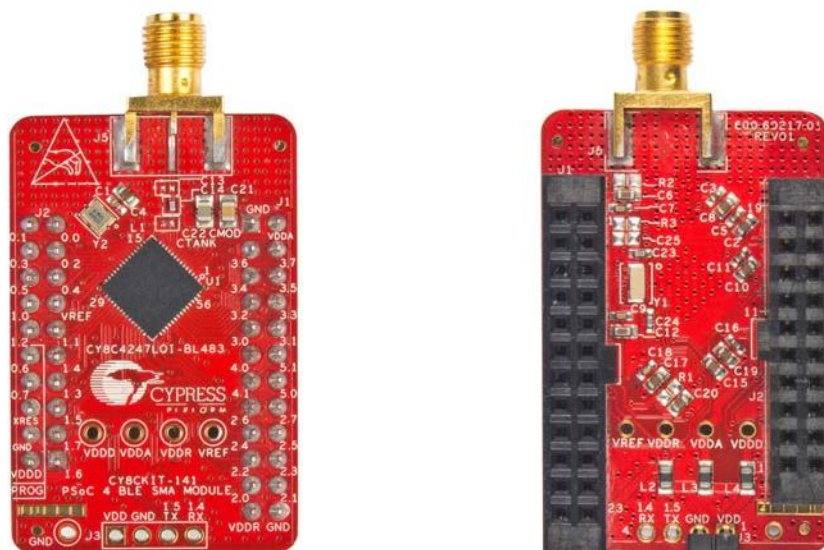
Figure A-3. CY8CKIT-142 PSoC 4 BLE Module



### A.5.2 CY8CKIT-141 PSoC 4 BLE SMA Module

This module is identical to the CY8CKIT-142 PSoC 4 BLE Module, except that it has an SMA connector instead of a wiggle antenna; this connector can be used to connect to an external antenna. This module can be ordered separately.

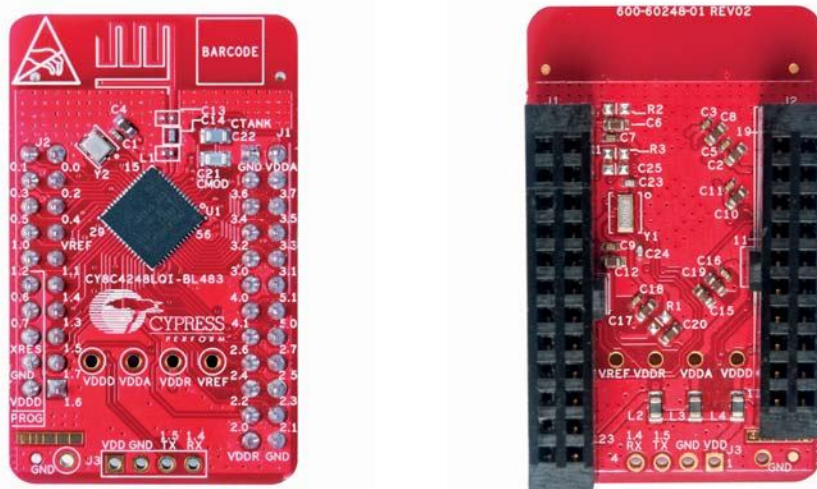
Figure A-4. CY8CKIT-141 PSoC 4 BLE SMA Module



### A.5.3 CY8CKIT-143 PSoC 4 BLE 256KB Module

This is the Bluetooth 4.1 equivalent of the CY8CKIT-143A PSoC 4 BLE 256KB Module. It has the CY8C4248LQI-BL483 silicon, with 256KB flash and 32KB RAM. It can be ordered separately.

Figure A-5. CY8CKIT-143 PSoC 4 BLE 256KB Module



#### A.5.4 CY8CKIT-143A PSoC 4 BLE 256KB Module

This is the default PSoC 4 BLE Module shipped as part of the BLE Pioneer Kit. It supports Bluetooth 4.2 features and DMA. It has the CY8C4248LQI-BL583 silicon, with 256KB flash and 32KB RAM.

Figure A-6. CY8CKIT-143A PSoC 4 BLE 256KB Module



#### A.5.5 CY5671 PProC BLE Module

This is the lower flash version of the PProC BLE Module. It can be ordered separately. This module has the CYBL10563-56LQXI silicon, with 128KB flash and 16KB RAM. It supports Bluetooth 4.1.

Figure A-7. CY5671 PProC BLE Module



### A.5.6 CY5674 PProC BLE SMA Module

This module is identical to the CY5671 PProC BLE Module, except that it has an SMA connector instead of a wiggle antenna; this connector can be used to connect to an external antenna. This module can be ordered separately.

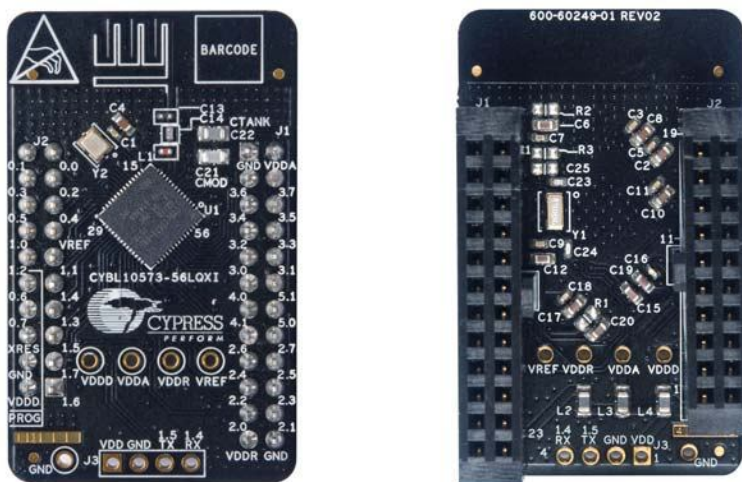
Figure A-8. CY5674 PProC BLE SMA Module



### A.5.7 CY5676 PProC BLE 256KB Module

This is the Bluetooth 4.1 equivalent of the CY5676A PProC BLE 256KB Module. It has the CYBL10573-56LQX1 silicon, with 256KB flash and 32KB RAM. It can be ordered separately.

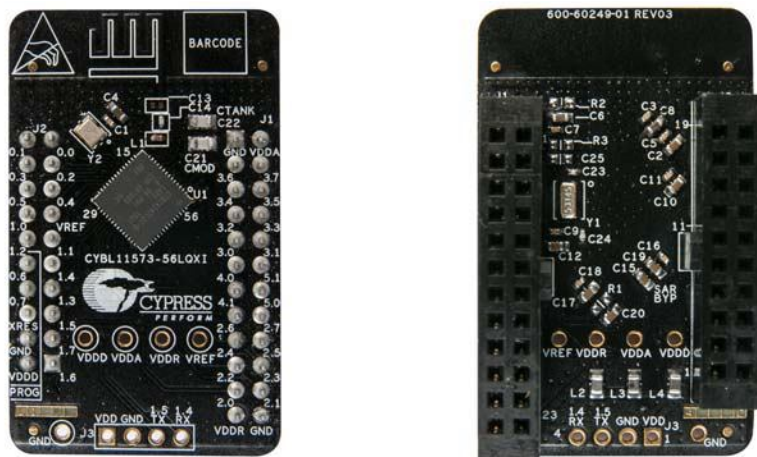
Figure A-9. CY5676 PProC BLE 256KB Module



### A.5.8 CY5676A PProC BLE 256KB Module

This is the default PProC BLE Module shipped as part of the BLE Pioneer Kit. It supports Bluetooth 4.2 features and DMA. It has the CYBL11573-56LQXI silicon, with 256KB flash and 32KB RAM.

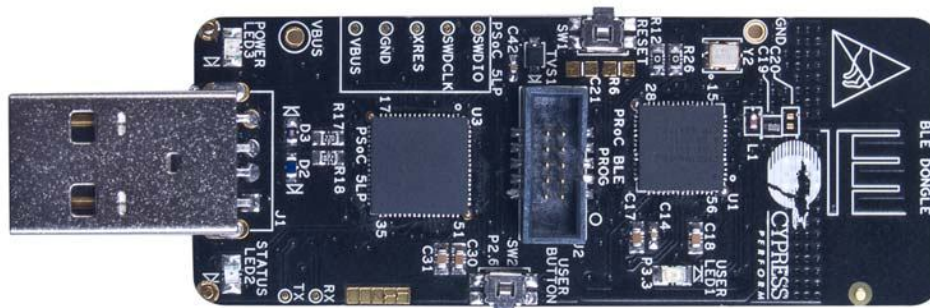
Figure A-10. CY5676A PProC BLE 256KB Module



### A.5.9 CY5670 CySmart USB Dongle (BLE Dongle)

This is the lower flash equivalent of the CY5677 CySmart BLE 4.2 USB. It can be ordered separately. This dongle has the CYBL10162-56LQXI silicon, with 128KB flash and 16KB RAM. It supports Bluetooth 4.1.

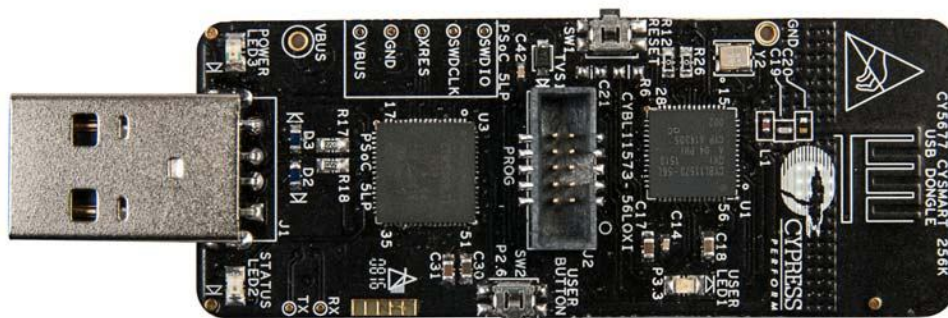
Figure A-11. CY5670 CySmart USB Dongle (BLE Dongle)



#### A.5.10 CY5677 CySmart BLE 4.2 USB Dongle (BLE Dongle)

This is the default BLE Dongle shipped as part of the BLE Pioneer Kit. It has the CYBL11573-56LQXI silicon, with 256KB flash and 32KB RAM. It supports Bluetooth 4.2 and DMA.

Figure A-12. CY5677 CySmart BLE 4.2 USB Dongle (BLE Dongle)

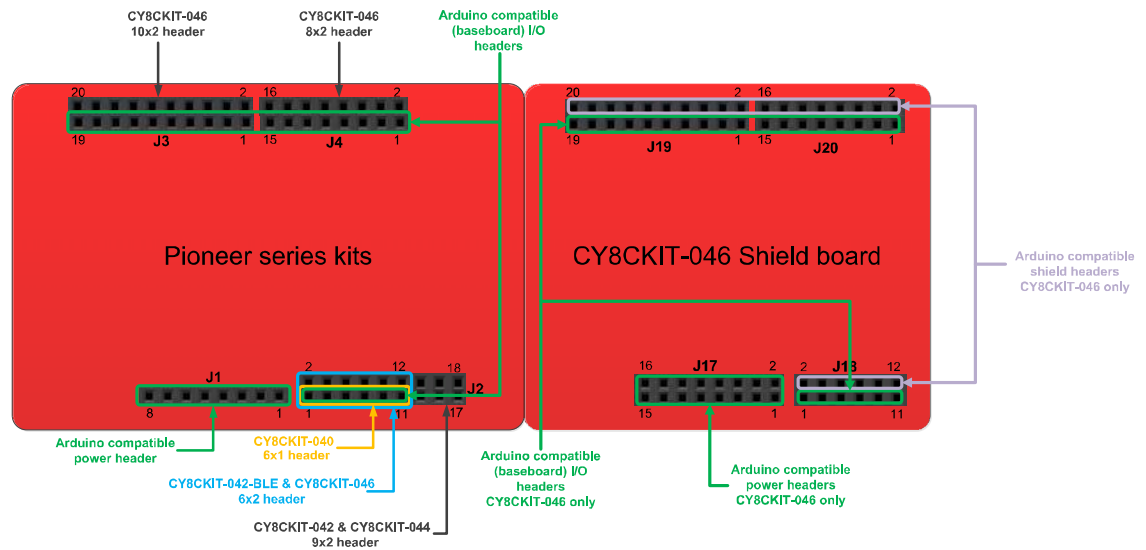


## A.6 Migrating Projects Across Different Pioneer Series Kits

All Cypress Pioneer series kits are Arduino Uno-compatible and have some common onboard peripherals such as RGB LED, CapSense, and a user switch. However, the pin mapping in each of the boards is different due to differences in pin functions of the PSoC device used. This guide lists the pin maps of the Pioneer series kits to allow easy migration of projects across different kits.

In some cases, the pins available on the Pioneer kit headers are a super set of the standard Arduino Uno pins. For example, J2 contains only one row of pins on the Arduino Uno pinout while it contains two rows of pins on many of the Pioneer series kits.

Figure A-13. Pioneer Series Kits Pin Map



## A.6.1 Arduino Uno-Compatible Headers

| J1 Arduino-Compatible Header Pin Map |             |                     |             |                 |             |             |
|--------------------------------------|-------------|---------------------|-------------|-----------------|-------------|-------------|
| Pin #                                | Arduino Pin | Pioneer Series Kits |             |                 |             |             |
|                                      |             | CY8CKIT-042         | CY8CKIT-040 | CY8CKIT-042-BLE | CY8CKIT-044 | CY8CKIT-046 |
| 1                                    | VIN         | VIN                 | VIN         | VIN             | VIN         | VIN         |
| 2                                    | GND         | GND                 | GND         | GND             | GND         | GND         |
| 3                                    | GND         | GND                 | GND         | GND             | GND         | GND         |
| 4                                    | 5V          | V5.0                | V5.0        | V5.0            | V5.0        | V5.0        |
| 5                                    | 3.3V        | V3.3                | V3.3        | V3.3            | V3.3        | V3.3        |
| 6                                    | RESET       | RESET               | RESET       | RESET           | RESET       | RESET       |
| 7                                    | IOREF       | P4.VDD              | P4.VDD      | BLE.VDD         | P4.VDD      | P4L.VDD     |
| 8                                    | NC          | NC                  | NC          | NC              | NC          | NC          |

| J2 Arduino-Compatible Header Pin Map |             |                     |                    |                    |                    |                    |
|--------------------------------------|-------------|---------------------|--------------------|--------------------|--------------------|--------------------|
| Pin #                                | Arduino Pin | Pioneer Series Kits |                    |                    |                    |                    |
|                                      |             | CY8CKIT-042         | CY8CKIT-040        | CY8CKIT-042-BLE    | CY8CKIT-044        | CY8CKIT-046        |
| 1                                    | A0          | P2[0]               | P0[0]              | P3[0]              | P2[0]              | P2[0]              |
| 2                                    | –           | P0[2] <sup>a</sup>  | –                  | P2[0]              | P2[6] <sup>a</sup> | P3[6] <sup>a</sup> |
| 3                                    | A1          | P2[1]               | P0[1]              | P3[1]              | P2[1]              | P2[1]              |
| 4                                    | –           | P0[3] <sup>a</sup>  | –                  | P2[1] <sup>a</sup> | P6[5] <sup>a</sup> | P3[7] <sup>a</sup> |
| 5                                    | A2          | P2[2]               | P0[2] <sup>a</sup> | P3[2]              | P2[2]              | P2[2]              |
| 6                                    | –           | P4_VDD              | –                  | P2[2] <sup>a</sup> | P0[6] <sup>a</sup> | P9[0]              |
| 7                                    | A3          | P2[3]               | P0[4] <sup>a</sup> | P3[3]              | P2[3]              | P2[3]              |
| 8                                    | –           | P1[5] <sup>a</sup>  | –                  | P2[3] <sup>a</sup> | P4[4] <sup>a</sup> | P9[1]              |
| 9                                    | A4          | P2[4]               | P1[3]              | P3[4]              | P2[4]              | P2[4]              |
| 10                                   | –           | P1[4] <sup>a</sup>  | –                  | P2[4] <sup>a</sup> | P4[5] <sup>a</sup> | P9[2]              |
| 11                                   | A5          | P2[5]               | P1[2]              | P3[5]              | P2[5]              | P2[5]              |
| 12                                   | –           | P1[3] <sup>a</sup>  | –                  | P2[5] <sup>a</sup> | P4[6] <sup>a</sup> | P9[3]              |
| 13                                   | –           | P0[0]               | –                  | –                  | P0[0]              | –                  |
| 14                                   | –           | GND                 | –                  | –                  | GND                | –                  |
| 15                                   | –           | P0[1]               | –                  | –                  | P0[1]              | –                  |
| 16                                   | –           | P1[2] <sup>a</sup>  | –                  | –                  | P3[4] <sup>a</sup> | –                  |
| 17                                   | –           | P1[0]               | –                  | –                  | P0[7] <sup>a</sup> | –                  |
| 18                                   | –           | P1[1] <sup>a</sup>  | –                  | –                  | P3[5] <sup>a</sup> | –                  |

a. These pins are also used for onboard peripherals. See the tables in “Onboard Peripherals” on page 140 for connection details.

| J3 Arduino-Compatible Header Pin Map |             |                     |                    |                 |             |             |
|--------------------------------------|-------------|---------------------|--------------------|-----------------|-------------|-------------|
| #                                    | Arduino Pin | Pioneer Series Kits |                    |                 |             |             |
|                                      |             | CY8CKIT-042         | CY8CKIT-040        | CY8CKIT-042-BLE | CY8CKIT-044 | CY8CKIT-046 |
| 1                                    | D8          | P2[6]               | P1[4]              | P0[5]           | P0[2]       | P0[2]       |
| 2                                    | -           | -                   | -                  | -               | -           | P3[4]       |
| 3                                    | D9          | P3[6]               | P1[5]              | P0[4]           | P0[3]       | P0[3]       |
| 4                                    | -           | -                   | -                  | -               | -           | P6[5]       |
| 5                                    | D10         | P3[4]               | P1[6]              | P0[2]           | P2[7]       | P6[3]       |
| 6                                    | -           | -                   | -                  | -               | -           | P6[3]       |
| 7                                    | D11         | P3[0]               | P1[1] <sup>a</sup> | P0[0]           | P6[0]       | P6[0]       |
| 8                                    | -           | -                   | -                  | -               | -           | P6[0]       |
| 9                                    | D12         | P3[1]               | P3[1]              | P0[1]           | P6[1]       | P6[1]       |
| 10                                   | -           | -                   | -                  | -               | -           | P6[1]       |
| 11                                   | D13         | P0[6]               | P1[7]              | P0[3]           | P6[2]       | P6[2]       |
| 12                                   | -           | -                   | -                  | -               | -           | P6[2]       |
| 13                                   | GND         | GND                 | GND                | GND             | GND         | GND         |
| 14                                   | -           | -                   | -                  | -               | -           | GND         |
| 15                                   | AREF        | P1[7]               | NC                 | VREF            | P1[7]       | VREF        |
| 16                                   | -           | -                   | -                  | -               | -           | VREF        |
| 17                                   | SDA         | P4[1]               | P1[3]              | P3[4]           | P4[1]       | P4[1]       |
| 18                                   | -           | -                   | -                  | -               | -           | P4[1]       |
| 19                                   | SCL         | P4[0]               | P1[2]              | P3[5]           | P4[0]       | P4[0]       |
| 20                                   | -           | -                   | -                  | -               | -           | P4[0]       |

a. These pins are also used for onboard peripheral connections. Refer to the [A.6.2 Onboard Peripherals](#) section for connection details.

| J4 Arduino-Compatible Header Pin Map |             |                     |                    |                 |             |             |
|--------------------------------------|-------------|---------------------|--------------------|-----------------|-------------|-------------|
| #                                    | Arduino Pin | Pioneer Series Kits |                    |                 |             |             |
|                                      |             | CY8CKIT-042         | CY8CKIT-040        | CY8CKIT-042-BLE | CY8CKIT-044 | CY8CKIT-046 |
| 1                                    | D0          | P0[4]               | P0[5]              | P1[4]           | P3[0]       | P3[0]       |
| 2                                    | -           | -                   | -                  | -               | -           | P8[0]       |
| 3                                    | D1          | P0[5]               | P0[6]              | P1[5]           | P3[1]       | P3[1]       |
| 4                                    | -           | -                   | -                  | -               | -           | P8[1]       |
| 5                                    | D2          | P0[7] <sup>a</sup>  | P0[7]              | P1[6]           | P1[0]       | P1[0]       |
| 6                                    | -           | -                   | -                  | -               | -           | P8[2]       |
| 7                                    | D3          | P3[7]               | P3[2] <sup>a</sup> | P1[7]           | P1[1]       | P1[1]       |
| 8                                    | -           | -                   | -                  | -               | -           | P8[3]       |
| 9                                    | D4          | P0[0]               | P0[3]              | P1[3]           | P1[2]       | P1[2]       |
| 10                                   | -           | -                   | -                  | -               | -           | P8[4]       |
| 11                                   | D5          | P3[5]               | P3[0]              | P1[2]           | P1[3]       | P1[3]       |
| 12                                   | -           | -                   | -                  | -               | -           | P8[5]       |
| 13                                   | D6          | P1[0]               | P1[0]              | P1[1]           | P5[3]       | P5[6]       |
| 14                                   | -           | -                   | -                  | -               | -           | P8[6]       |
| 15                                   | D7          | P2[7]               | P2[0] <sup>a</sup> | P1[0]           | P5[5]       | P5[5]       |
| 16                                   | -           | -                   | -                  | -               | -           | P8[7]       |

a. These pins are also used for onboard peripheral connections. Refer to the [A.6.2 Onboard Peripherals](#) section for connection details.

## A.6.2 Onboard Peripherals

| #  | CapSense Pin       | Pioneer Series Kits         |             |                                 |                           |                                                           |
|----|--------------------|-----------------------------|-------------|---------------------------------|---------------------------|-----------------------------------------------------------|
|    |                    | CY8CKIT-042 (Linear Slider) | CY8CKIT-040 | CY8CKIT-042-BLE (Linear Slider) | CY8CKIT-044 (Gesture Pad) | CY8CKIT-046 (Gesture Pad with Radial Slider) <sup>a</sup> |
| 1  | CapSense Sensor 1  | P1[1]/CS_LS_E0              | –           | P2[1]/CS_LS_E0                  | P4[4]/CS_GES_CR           | P0[6]/CS_GES_CR                                           |
| 2  | CapSense Sensor 2  | P1[2]/CS_LS_E1              | –           | P2[2]/CS_LS_E1                  | P4[5]/CS_GES_UP           | P4[5]/CS_GES_LT                                           |
| 3  | CapSense Sensor 3  | P1[3]/CS_LS_E2              | –           | P2[3]/CS_LS_E2                  | P4[6]/CS_GES_LT           | P4[4]/CS_GES_UP                                           |
| 4  | CapSense Sensor 4  | P1[4]/CS_LS_E3              | –           | P2[4]/CS_LS_E3                  | P3[4]/CS_GES_DN           | P4[7]/CS_GES_RT                                           |
| 5  | CapSense Sensor 5  | P1[5]/CS_LS_E4              | –           | P2[5]/CS_LS_E4                  | P3[5]/CS_GES_RT           | P4[6]/CS_GES_DN                                           |
| 6  | CapSense Sensor 10 | –                           | –           | –                               | –                         | P7[4]/CS_RS_E0                                            |
| 7  | CapSense Sensor 11 | –                           | –           | –                               | –                         | P7[5]/CS_RS_E1                                            |
| 8  | CapSense Sensor 12 | –                           | –           | –                               | –                         | P7[6]/CS_RS_E2                                            |
| 9  | CapSense Sensor 13 | –                           | –           | –                               | –                         | P7[7]/CS_RS_E3                                            |
| 10 | CapSense Sensor 6  | –                           | –           | –                               | –                         | P0[0]/CS_RS_E4                                            |
| 11 | CapSense Sensor 7  | –                           | –           | –                               | –                         | P0[1]/CS_RS_E5                                            |
| 12 | CapSense Sensor 8  | –                           | –           | –                               | –                         | P7[2]/CS_RS_E6                                            |
| 13 | CapSense Sensor 9  | –                           | –           | –                               | –                         | P7[3]/CS_RS_E7                                            |
| 14 | CMOD <sup>b</sup>  | P4[2]                       | P0[4]       | P4[0]                           | P4[2]                     | P4[2]                                                     |
| 15 | CTANK <sup>b</sup> | P4[3]                       | P0[2]       | P4[1]                           | P4[3]                     | P4[3]                                                     |
| 16 | CMOD <sup>b</sup>  | –                           | –           | –                               | –                         | P5[0]                                                     |
| 17 | CTANK <sup>b</sup> | –                           | –           | –                               | –                         | P5[1]                                                     |
| 18 | CapSense Shield    | P0[1]                       | –           | P1[6]                           | P0[1]                     | P0[2]                                                     |

a. The CapSense elements are present on the CY8CKIT-046 shield board. The radial slider (CapSense sensors 6 to 13) is symmetric and the sensor order can be shifted to fit your requirement, that is, the desired zero position on the slider.

b. CMOD0, CTANK0, CMOD1, and CTANK1 are only present in the CY8CKIT-046 PSoC 4 L-Series Pioneer Kit.

| Proximity Header Pin Map |             |                     |             |                 |             |             |
|--------------------------|-------------|---------------------|-------------|-----------------|-------------|-------------|
| Pin #                    | Description | Pioneer Series Kits |             |                 |             |             |
|                          |             | CY8CKIT-042         | CY8CKIT-040 | CY8CKIT-042-BLE | CY8CKIT-044 | CY8CKIT-046 |
| 1                        | PROXIMITY   | –                   | P2[0]       | P2[0]           | P3[7]       | P9[4]       |
| 2                        |             | –                   | –           | –               | P3[6]       | P9[5]       |

| RGB LED Pin Map |       |                     |             |                 |             |             |
|-----------------|-------|---------------------|-------------|-----------------|-------------|-------------|
| Pin #           | Color | Pioneer Series Kits |             |                 |             |             |
|                 |       | CY8CKIT-042         | CY8CKIT-040 | CY8CKIT-042-BLE | CY8CKIT-044 | CY8CKIT-046 |
| 1               | Red   | P1[6]               | P3[2]       | P2[6]           | P0[6]       | P5[2]       |
| 2               | Green | P0[2]               | P1[1]       | P3[6]           | P2[6]       | P5[3]       |
| 3               | Blue  | P0[3]               | P0[2]       | P3[7]           | P6[5]       | P5[4]       |

| User Switch Pin Map |             |                     |             |                 |             |             |
|---------------------|-------------|---------------------|-------------|-----------------|-------------|-------------|
| Pin #               | Description | Pioneer Series Kits |             |                 |             |             |
|                     |             | CY8CKIT-042         | CY8CKIT-040 | CY8CKIT-042-BLE | CY8CKIT-044 | CY8CKIT-046 |
| 1                   | SW2         | P0[7]               | –           | P2[7]           | P0[7]       | P0[7]       |

# Revision History



## CY8CKIT-042-BLE-A Bluetooth® Low Energy (BLE) Pioneer Kit Guide Revision History

| Document Title: CY8CKIT-042-BLE-A Bluetooth® Low Energy (BLE) Pioneer Kit Guide |            |            |                  |                                                                                                                                                                     |
|---------------------------------------------------------------------------------|------------|------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Document Number: 002-11468                                                      |            |            |                  |                                                                                                                                                                     |
| Revision                                                                        | ECN Number | Issue Date | Origin of Change | Description of Change                                                                                                                                               |
| **                                                                              | 5162292    | 03/04/2016 | UDYG             | New kit guide.                                                                                                                                                      |
| *A                                                                              |            | 05/25/2016 | AARA             | Updated <a href="#">Safety Information</a> chapter on page 6:<br>Added " <a href="#">Regulatory Compliance Information</a> " on page 8.<br>Updated to new template. |