PSoC™ 6 Wi-Fi Bluetooth® Pioneer Kit guide

CY8CKIT-062-WIFI-BT

About this document

Scope and purpose

This document explains about the CY8CKIT-062-WIFI-BT PSoC™ Wi-Fi Bluetooth® Pioneer Kit: kit operation, out-of the box example and its operation, and the hardware details of the board.

Intended audience

This evaluation board is intended for all technical specialists who are familiar with microcontrollers and connectivity and is intended to be used under laboratory conditions.

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Safety precautions

Note: Please note the following warnings regarding the hazards associated with development system

Table 1 Safety precautions

	**Caution:** *The evaluation or reference board contains parts and assemblies sensitive to electrostatic discharge (ESD). Electrostatic control precautions are required when installing, testing, servicing or repairing the assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with electrostatic control procedures, refer to the applicable ESD protection handbooks and guidelines.*
	**Caution:** *The evaluation or reference board is shipped with packing materials that need to be removed prior to installation. Failure to remove all packing materials that are unnecessary for system installation may result in overheating or abnormal operating conditions.*

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1 Introduction

Thank you for your interest in the CY8CKIT-062-WIFI-BT PSoC™ 6 Wi-Fi Bluetooth® Pioneer Kit. This kit enables you to evaluate and develop your applications using the **PSoC™ 6 MCU**.

The PSoC™ 6 MCU is an ultra-low-power PSoC™ device specifically designed for wearables and IoT products. It is a programmable embedded system-on-chip, integrating a 150-MHz Arm® Cortex®-M4 as the primary application processor, a 100-MHz CM0+ that supports low-power operations, 1024 KB flash 288 KB SRAM, CAPSENSE™ touch sensing, and programmable analog and digital peripherals that allow higher flexibility, in-field tuning of the design, and faster time-to-market.

The PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board offers compatibility with shields compatible with Arduino. The board features a PSoC™ 6 MCU, a 512-Mb NOR flash, an onboard programmer/debugger (KitProg3), a 2.4-GHz WLAN and Bluetooth® functionality module (CYW4343W), a USB Type-C Power Delivery system (EZ-PD™ CCG3), a five-segment CAPSENSE™ slider, two CAPSENSE™ buttons, one CAPSENSE™ proximity sensing header, an RGB LED, two user LEDs, USB host and device features, and one push button. The board supports operating voltages from 1.8 V to 3.3 V for the PSoC™ 6 MCU.

The kit package includes a CY8CKIT-028-TFT display shield that contains a 2.4-inch TFT display, a motion sensor, ambient light sensor, a 32-bit audio codec, and a PDM microphone.

You can use ModusToolbox™ software to develop and debug your PSoC™ 6 MCU projects. ModusToolbox™ software is a set of tools that enable you to integrate Infineon devices into your existing development methodology.

If you are new to PSoC™ 6 MCU and Eclipse IDE for ModusToolbox™ software, see the application note **AN228571 - Getting started with PSoC™ 6 MCU on ModusToolbox™ software** to help you familiarize with the PSoC™ 6 MCU and help you create your own design using the ModusToolbox™ software.

1.1 Kit contents

The kit package has the following contents, as shown in **Figure 1**.

- PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board
- CY8CKIT-028-TFT display shield
- USB Type-A to Type-C cable
- Four jumper wires (4 inches each)
- Two proximity sensor wires (5 inches each)
- Quick start guide

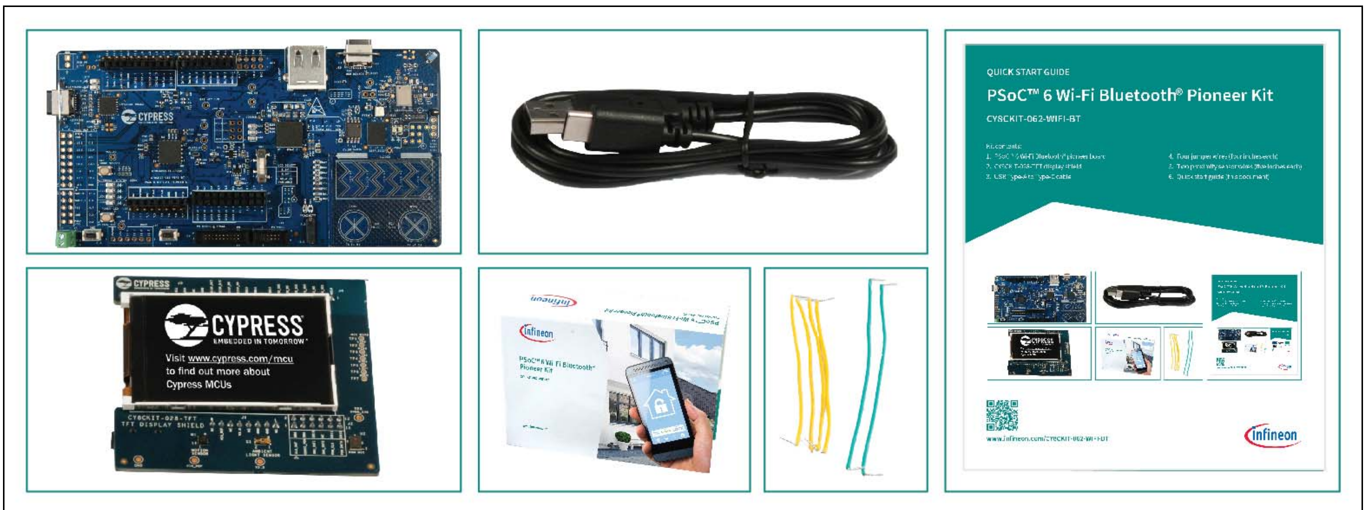


Figure 1 Kit contents

Inspect the contents of the kit; if you find any part missing, contact **Infineon support**.

1.2 Getting started

This guide will help you to get acquainted with the PSoC™ 6 Wi-Fi Bluetooth® Pioneer Kit:

- The **"Kit operation"** on page 20 describes the CY8CKIT-062-WIFI-BT baseboard and CY8CKIT-028-TFT shield hardware features and functionalities.
- The **"Hardware"** on page 35 provides a detailed hardware description, methods to use the onboard components, kit schematics, bill of materials (BOM), and FAQs.

1.3 Board details

1.3.1 CY8CKIT-062-WIFI-BT board details

Figure 2 shows the Pioneer Board, which has the following features:

- PSoC™ 6 MCU
- Expansion headers that are compatible with Arduino Uno 3.3-V shields[1] and Digilent Pmod modules
- Type 1DX ultra-small 2.4-GHz WLAN and Bluetooth® functionality module
- 512-Mbit external quad-SPI NOR flash that provides a fast, expandable memory for data and code
- EZ-PD™ CCG3 USB Type-C Power Delivery (PD) system with rechargeable lithium-ion polymer (Li-Po) battery support[2]. KitProg3 onboard programmer/debugger, USB-to-UART/I2C/SPI bridge functionality
- CAPSENSE™ touch sensing slider (five elements) and two buttons, all of which are capable of both self-capacitance (CSD) and mutual-capacitance (CSX) operation, and a CSD proximity sensor that allows you to evaluate Infineon's fourth-generation CAPSENSE™ technology
- 1.8-V to 3.3-V operation of PSoC™ 6 MCU is supported
- Two user LEDs, an RGB LED, a user button, and a reset button for PSoC™ 6 MCU
- Two button and three LEDs for KitProg3

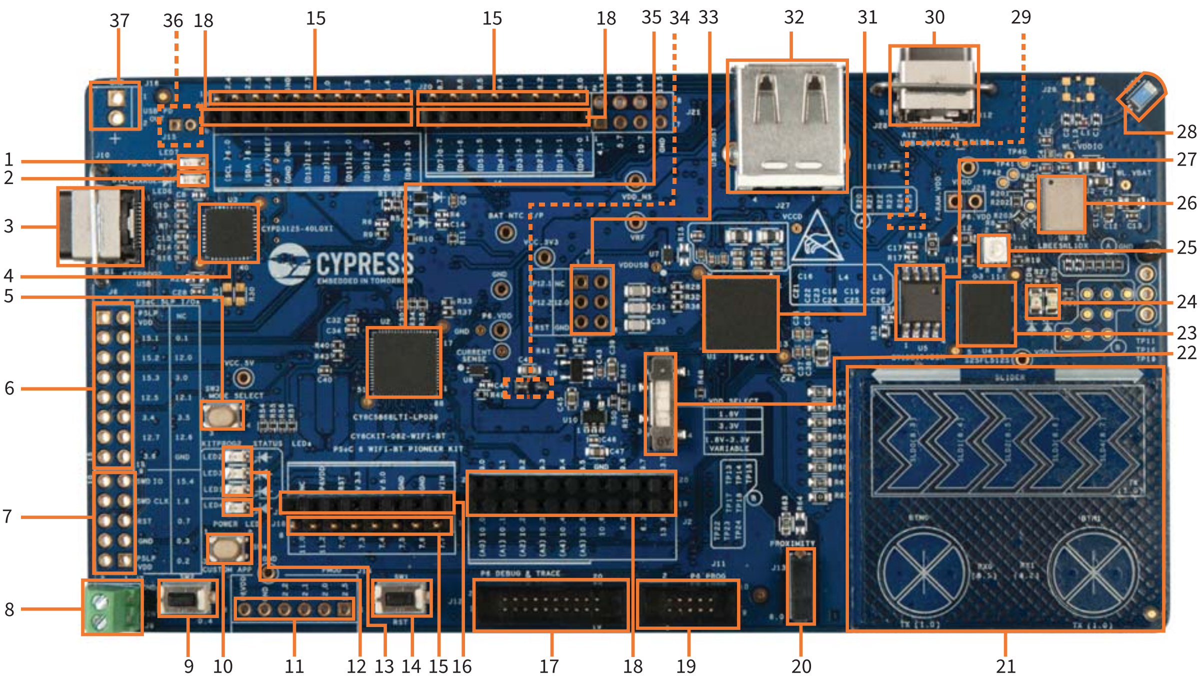
Note:

1. *Starting with Rev. *F of the kit, the super capacitor is removed. Therefore, you must keep SW7 at VDDD/KITPROG3 position. If not, the kit will not be powered and the TFT display flickers.*
2. *In the Rev *F version of the kit, the silkscreen on the board shows KitProg2. However, the KitProg3 is loaded on the kit.*

1) 5-V shields are not supported.

2) Battery and power-delivery capable USB Type-C to Type-C cable are not included in the kit package and should be purchased separately.

PSoC™ 6 Wi-Fi Bluetooth® pioneer board details



1. USB PD output voltage availability indicator (LED7)
2. Battery charging indicator (LED6)
3. KitProg2 USB Type-C connector (J10)
4. EZ-PD™ CCG3 Type-C Port Controller with PD (CYPD3125-40LQXI, U3)
5. KitProg2 programming mode selection button (SW3)
6. KitProg2 I/O header (J6)*
7. KitProg2 programming/custom application header (J7)*
8. External power supply connector (J9)
9. PSoC™ 6 user button (SW2)
10. KitProg2 application selection button (SW4)
11. I/O header compatible with Digilent Pmod (J14)*
12. Power LED (LED4)
13. KitProg2 status LEDs (LED1, LED2, and LED3)
14. PSoC™ 6 reset button (SW1)
15. PSoC™ 6 I/O header (J18, J19 and J20)
16. Power header compatible with Arduino Uno R3 (J1)
17. PSoC™ 6 debug and trace header (J12)
18. I/O headers compatible with Arduino Uno R3 (J2, J3, J4)
19. PSoC™ 6 program and debug header (J11)
20. CAPSENSE™ proximity header (J13)
21. CAPSENSE™ slider and buttons (BTN0, BTN1, SLIDER)
22. PSoC™ 6 VDD selection switch (SW5)
23. Infineon 512-Mbit serial NOR flash memory (S25FL512S, U4)
24. PSoC™ 6 user LEDs (LED8, LED9)
25. RGB LED (LED5)
26. Wi-Fi/Bluetooth® module (LBEE5KL 1DX, U6)
27. Infineon EXCELON™ Ultra Quad-SPI F-RAM (CY15B104QSN, U5)
28. Wi-Fi-Bluetooth® antenna (ANT1)
29. VBACKUP and PMIC control selection switch (SW7)**
30. PSoC™ 6 USB device Type-C connector (J28)
31. PSoC™ 6 MCU (CY8C6247BZI-D54, U1)
32. PSoC™ 6 USB host Type-A connector (J27)
33. ICSP header compatible with Arduino Uno R3 (J5)*
34. PSoC™ 6 power monitoring jumper (J8)**
35. KitProg3 programmer and debugger based on PSoC™ 5LP (CY8C5868LTI-LP039, U2)
36. Battery connector (J15)**
37. USB PD output voltage (9V/12V) connector (J16)*

*Footprints only, not populated on the board
**Components at the bottom side of the board

Figure 2 Pioneer Board

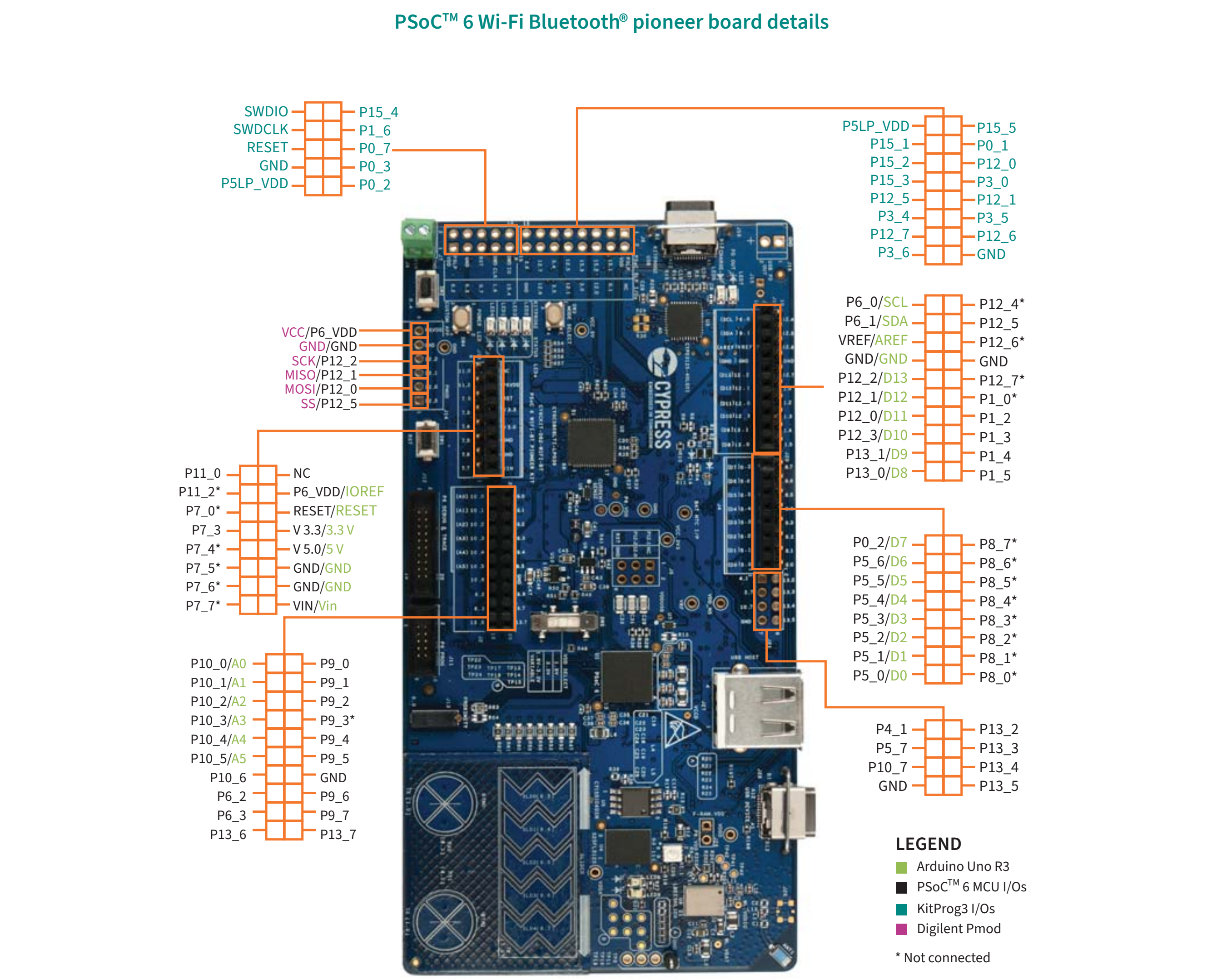


Figure 3 Pioneer Board pinout

Table 1 Pioneer Board pinout

PSoC™ 6 pin	Primary onboard function	Secondary onboard function	Connection details
XRES	Reset	–	–
P0.0	WCO IN	–	–
P0.1	WCO OUT	–	–
P0.2	Header compatible with Arduino J4.8, D7	–	–
P0.3	RGB LED (red)	–	–
P0.4	User button with Hibernate wakeup capability	–	–
P0.5	PMIC control	–	–

Table 1 Pioneer Board pinout (continued)

PSoC™ 6 pin	Primary onboard function	Secondary onboard function	Connection details
P1.0	CAPSENSE™ Tx	GPIO on non-Arduino header (J19.5)	Populate R174 to connect to the header or remove R62 to disconnect from CAPSENSE™.
P1.1	RGB LED (green)	–	–
P1.2	GPIO on non-Arduino header (J19.4)	–	–
P1.3	GPIO on non-Arduino header (J19.3)	–	–
P1.4	GPIO on non-Arduino header (J19.2)	–	–
P1.5	User LED (orange)	GPIO on non-Arduino header (J19.1)	Connected to primary and secondary functions by default. Remove R27 to disconnect from the LED.
P2.0	SDIO DATA0	J25.7 (WL_JTAG_TMS)	Remove R122 (or R110) and mount R115 to disconnect from PSoC™ 6 MCU and connect the Wi-Fi/Bluetooth® module to the JTAG connector.
P2.1	SDIO DATA1	J25.3 (WL_JTAG_TDI)	Remove R32 (or R111) and mount R116 to disconnect from PSoC™ 6 MCU and connect the Wi-Fi/Bluetooth® module to the JTAG connector.
P2.2	SDIO DATA2	J25.5 (WL_JTAG_TDO)	Remove R128 (or R112) and mount R117 to disconnect from PSoC™ 6 MCU and connect the Wi-Fi/Bluetooth® module to the JTAG connector.
P2.3	SDIO DATA3	J25.1 (WL_JTAG_TRSTN)	Remove R109 (or R132) and mount R114 to disconnect from PSoC™ 6 MCU and connect the Wi-Fi/Bluetooth® module to the JTAG connector.
P2.4	SDIO CMD	–	–
P2.5	SDIO CLK	J25.9 (WL_JTAG_TCK)	Remove R108 (or R28) and mount R113 to disconnect from PSoC™ 6 MCU and connect the Wi-Fi/Bluetooth® module to the JTAG connector.
P3.0	BT UART TXD	–	BT UART TXD pin of the Wi-Fi/Bluetooth® module
P3.1	BT UART RXD	–	BT UART RXD pin of the Wi-Fi/Bluetooth® module
P3.2	BT UART CTS	–	BT UART CTS pin of the Wi-Fi/Bluetooth® module
P3.3	BT UART RTS	–	BT UART RTS pin of the Wi-Fi/Bluetooth® module

Table 1 Pioneer Board pinout (continued)

PSoC™ 6 pin	Primary onboard function	Secondary onboard function	Connection details
P3.4	BT REG ON	–	BT REG ON pin of the Wi-Fi/Bluetooth® module
P3.5	BT HOST WAKE	–	BT HOST WAKE pin of the Wi-Fi/Bluetooth® module
P4.0	BT DEV WAKE	–	BT DEV WAKE pin of the Wi-Fi/Bluetooth® module
P4.1	Header J21.1	–	–
P5.0	GPIO on Arduino header J4.1, D0 UART RX KitProg3 UART TX	–	Remove R159 to disconnect from KitProg3 UART TX.
P5.1	GPIO on Arduino header J4.2, D1 UART TX KitProg3 UART RX	–	Remove R156 to disconnect from KitProg3 UART RX.
P5.2	GPIO on Arduino header J4.3, D2 UART RTS KitProg3 UART CTS	–	Remove R93 to disconnect from KitProg3 UART CTS. This will also disconnect RTS and SPI lines from KitProg3.
P5.3	GPIO on Arduino header J4.4, D3 UART CTS KitProg3 UART RTS	–	Remove R88 to disconnect from KitProg3 UART RTS. This will also disconnect CTS and SPI lines from KitProg3.
P5.4	GPIO on Arduino header J4.5, D4	–	–
P5.5	GPIO on Arduino header J4.6, D5	–	–
P5.6	GPIO on Arduino header J4.7, D6	–	–
P5.7	GPIO on non-Arduino header J21.3	–	–
P6.0	GPIO on Arduino header J3.10, SCL KitProg3 I2C SCL	–	Remove R141 to disconnect from KitProg3 I2C SCL.
P6.1	GPIO on Arduino header J3.9, SDA KitProg3 I2C SDA	–	Remove R150 to disconnect from KitProg3 I2C SDA.
P6.2	GPIO on non-Arduino header (J2.15)	–	–
P6.3	GPIO on non-Arduino header (J2.17)	CAPSENSE™ shield	Remove R44 to disconnect from GND and populate R145 to connect to the CAPSENSE™ shield (hash pattern on the board).

Table 1 Pioneer Board pinout (continued)

PSoC™ 6 pin	Primary onboard function	Secondary onboard function	Connection details
P6.4	TDO/SWO	–	–
P6.5	TDI	–	–
P6.6	TMS/SWDIO	–	Remove R194 to disconnect from KitProg3 SWDIO.
P6.7	TCLK/SWCLK	–	Remove R183 to disconnect from KitProg3 SWCLK.
P7.0	TRACECLK	GPIO on non-Arduino header (J18.6)	Populate R181 to connect to J18 header.
P7.1	CINTA	–	–
P7.2	CINTB	CSH	Remove C31 (0.47 nF) and populate 10 nF for CSH.
P7.3	GPIO on non-Arduino header (J18.5)	CSH	Remove R146 to disconnect from header and populate C29 (10 nF) for CSH.
P7.4	TRACEDATA[3]	GPIO on non-Arduino header (J18.4)	Populate R178 to connect to J18.
P7.5	TRACEDATA[2]	GPIO on non-Arduino header (J18.3)	Populate R179 to connect to J18.
P7.6	TRACEDATA[1]	GPIO on non-Arduino header (J18.2)	Populate R180 to connect to J18.
P7.7	CMOD	GPIO on non-Arduino header (J18.1)	Populate R142 to connect to J18.
P8.0	Proximity	GPIO on non-Arduino header (J20.1)	Populate R64 with zero ohm to connect to header.
P8.1	CAPSENSE™ Button0 Rx	GPIO on non-Arduino header (J20.2)	Remove R61 to disconnect CAPSENSE™ pad and populate R172 to connect to header.
P8.2	CAPSENSE™ Button1 Rx	GPIO on non-Arduino header (J20.3)	Remove R60 to disconnect CAPSENSE™ pad and populate R166 to connect to header.
P8.3	CAPSENSE™ Silder0 Rx	GPIO on non-Arduino header (J20.4)	Remove R53 to disconnect CAPSENSE™ pad and populate R153 to connect to header.
P8.4	CAPSENSE™ Silder1 Rx	GPIO on non-Arduino header (J20.5)	Remove R52 to disconnect CAPSENSE™ pad and populate R152 to connect to header.

Table 1 Pioneer Board pinout (continued)

PSoC™ 6 pin	Primary onboard function	Secondary onboard function	Connection details
P8.5	CAPSENSE™ Silder2 Rx	GPIO on non-Arduino header (J20.6)	Remove R47 to disconnect CAPSENSE™ pad and populate R149 to connect to header.
P8.6	CAPSENSE™ Silder3 Rx	GPIO on non-Arduino header (J20.7)	Remove R58 to disconnect CAPSENSE™ pad and populate R158 to connect to header.
P8.7	CAPSENSE™ Silder4 Rx	GPIO on non-Arduino header (J20.8)	Remove R59 to disconnect CAPSENSE™ pad and populate R160 to connect to header.
P9.0	GPIO on non-Arduino header (J2.2)	–	–
P9.1	GPIO on non-Arduino header (J2.4)	–	–
P9.2	GPIO on non-Arduino header (J2.6)	–	–
P9.3	TRACEDATA[0]	GPIO on non-Arduino header (J2.8)	Populate R162 to connect to header.
P9.4	GPIO on non-Arduino header (J2.10)	–	–
P9.5	GPIO on non-Arduino header (J2.12)	–	–
P9.6	GPIO on non-Arduino header (J2.16)	–	–
P9.7	GPIO on non-Arduino header (J2.18)	–	–
P10.0	GPIO on header compatible with Arduino J2.1, A0	–	–
P10.1	GPIO on header compatible with Arduino J2.3, A1	–	–
P10.2	GPIO on header compatible with Arduino J2.5, A2	–	–
P10.3	GPIO on header compatible with Arduino J2.7, A3	–	–
P10.4	GPIO on header compatible with Arduino J2.9, A4 PDM Clock	–	–

Table 1 Pioneer Board pinout (continued)

PSoC™ 6 pin	Primary onboard function	Secondary onboard function	Connection details
P10.5	GPIO on header compatible with Arduino J2.11, A5 PDM Data	–	–
P10.6	GPIO on non-Arduino header (J2.13)	–	–
P10.7	Header J21.5	–	–
P11.0	FRAM CS	GPIO on non-Arduino header (J18.8)	Connected to primary and secondary functions by default. Remove R175 to disconnect from J18 and load R39 (10K) as FRAM pull-up.
P11.1	RGB Blue LED	–	–
P11.2	QSPI FLASH CS	GPIO on non-Arduino header (J18.7)	Populate R177 to connect to J18, remove R176 to disconnect from flash.
P11.3	QSPI FLASH DATA3	FRAM	R17 need to be populated while using FRAM
P11.4	QSPI FLASH DATA2	FRAM	R38 need to be populated while using FRAM
P11.5	QSPI FLASH DATA1	FRAM	–
P11.6	QSPI FLASH DATA0	FRAM	–
P11.7	QSPI FLASH CLK	FRAM	–
P12.0	J3.4 on header compatible with GPIO on Arduino header, D11 SPI MOSI	ICSP header (J5.4) and Pmod header (J14.2)	Remove R77 to disconnect from KitProg3_SPI lines.
P12.1	J3.5 on header compatible with GPIO on Arduino header, D12 SPI MISO	ICSP header (J5.1) and Pmod header (J14.3)	Remove R85 to disconnect from KitProg3_SPI lines.
P12.2	J3.6 on header compatible with GPIO on Arduino header, D13 SPI CLK	ICSP header (J5.3) and header compatible with Pmod (J14.4)	Remove R81 to disconnect from KitProg3_SPI lines.
P12.3	J3.3 on header compatible with Arduino	–	–
P12.4	KitProg3 SPI SELECT	GPIO on non-Arduino header (J19.10)	Connected to primary function by default. Populate R74 to connect to J19 or remove R83 to disconnect KitProg3_SPI_SELECT.
P12.5	PMOD SPI SELECT, J14.1	GPIO on non-Arduino header (J19.9)	Connected to primary and secondary functions by default. Remove R73 to disconnect from J19 or remove R82 to disconnect PMOD_SPI_SELECT.

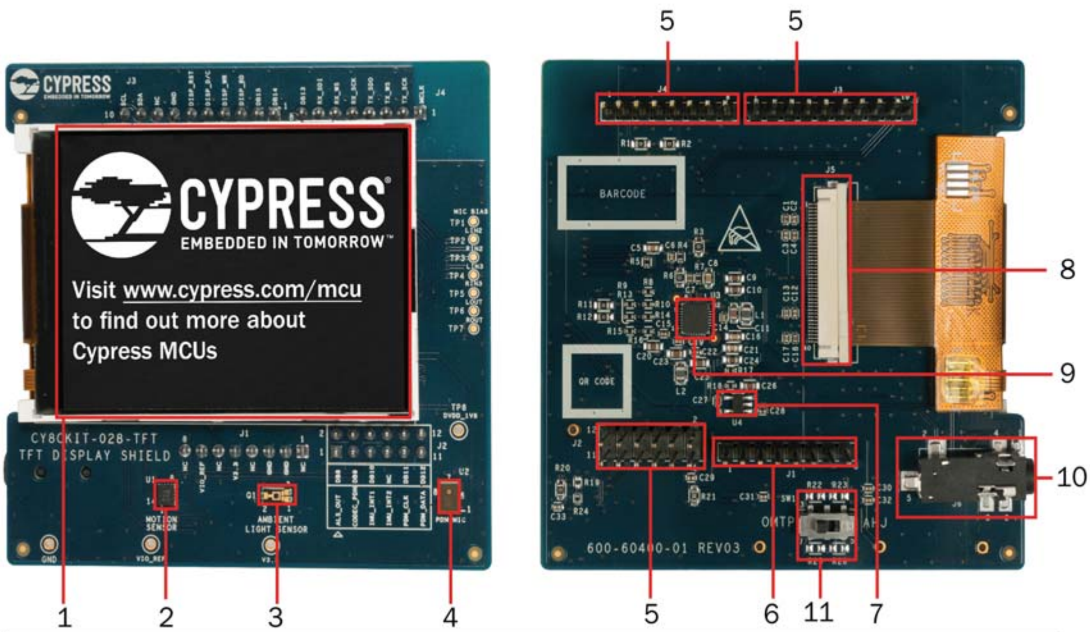
Table 1 Pioneer Board pinout (continued)

PSoC™ 6 pin	Primary onboard function	Secondary onboard function	Connection details
P12.6	ECO IN	GPIO on non-Arduino header (J19.8)	Conne
P12.7	ECO OUT	GPIO on non-Arduino header (J19.6)	–
P13.0	GPIO on header compatible with Arduino J3.1, D8	–	–
P13.1	GPIO on header compatible with Arduino J3.2, D9	–	–
P13.2	USB HOST EN	GPIO on non-Arduino header (J21.2)	–
P13.3	USB_INT_L	GPIO on non-Arduino header (J21.4)	–
P13.4	USB_DEV_VBUS_DET	GPIO on non-Arduino header (J21.6)	–
P13.5	GPIO on non-Arduino header J21.8	–	–
P13.6	GPIO on non-Arduino header J2.19	CAPSENSE™ shield	Remove R44 to disconnect from GND and populate R45 to connect to the CAPSENSE™ shield (hash pattern on the board).
P13.7	User LED (red)	GPIO on non-Arduino header (J2.20)	Remove R31 to disconnect from LED.

1.3.2 CY8CKIT-028-TFT board details

Figure 4 shows the thin-film transistor (TFT) display shield that has the following features:

- A 2.4-inch TFT LCD module with 240 × 320 pixel resolution.
- A three-axis acceleration and three-axis gyroscopic motion sensor.
- A PDM microphone for voice input.
- A 32-bit stereo codec with microphone, headphone, and speaker amplifier capability.
- An audio jack with a provision of connecting both AHJ and OMTP headphones. The headset standard can be set by an on-board switch.
- An ambient light sensor IC made of an NPN phototransistor.
- An LDO that converts 3.3 V to 1.8 V for the digital supply of the audio codec.



1. 2.4-inch TFT display
2. Motion Sensor (U1)
3. Ambient Light Sensor (Q1)
4. PDM microphone (U2)
5. Ardunio compatible I/O headers (J2, J3, J4)
6. Ardunio compatible power header (J1)
7. TFT display power control load switch (U4)
8. TFT display connector (J5)
9. Audio CODEC (U3)
10. Audio Jack (J6)
11. Audio Jack Selection (OMTP/AHJ) Switch (SW1)

Figure 4 TFT display shield

Table 2 TFT shield pinout

Pin #	Arduino pin	Arduino function	TFT shield function	Pioneer Board connection
J1.1	VIN	VIN	NC	VIN
J1.2	GND	GND	GND	GND
J1.3	GND	GND	GND	GND
J1.4	5 V	5 V	NC	5 V
J1.5	3.3 V	3.3 V	VCC 3.3V	3.3 V
J1.6	RESET	RESET	NC	SWD RESET
J1.7	I/O REF	I/O REF	VIO REF	P6 VDD
J1.8	–	–	NC	NC
J2.1	A0	ADC0	ALS OUT	P10[0]
J2.2	–	–	TFT DISP DB8	P9[0]
J2.3	A1	ADC1	Codec PDN SW	P10[1]
J2.4	–	–	TFT DISP DB9	P9[1]
J2.5	A2	ADC2	IMU INT1	P10[2]
J2.6	–	–	TFT DISP DB10	P9[2]

Table 2 TFT shield pinout (continued)

Pin #	Arduino pin	Arduino function	TFT shield function	Pioneer Board connection
J2.7	A3	ADC3	IMU INT2	P10[3]
J2.8	–	–	NC	P9[3]
J2.9	A4	ADC4 / SDA (I2C)	PDM CLK	P10[4]
J2.10	–	–	TFT DISP DB11	P9[4][a)]
J2.11	A5	ADC5	PDM DATA	P10[5]
J2.12	–	–	TFT DISP DB12	P9[5]
J3.1	D8	DIGITAL I/O	TFT DISP DB14	P13[0]
J3.2	D9	PWM	TFT DISP DB15	P13[1]
J3.3	D10	SS/PWM	TFT DISP RD_L	P12[3]
J3.4	D11	MOSI/PWM	TFT DISP WR_L	P12[0]
J3.5	D12	MISO	TFT DISP D/C	P12[1]
J3.6	D13	SCK	TFT DISP RST_L	P12[2]
J3.7	GND	GND	GND	GND
J3.8	AREF	analog ref i/p	NC	VREF
J3.9	SDA	SDA	I2C SDA (IMU and audio codec)	P6[1]
J3.10	SCL	SCL	I2C SCL (IMU and audio codec)	P6[0]
J4.1	D0	RX	I2S MCLK	P5[0]
J4.2	D1	TX	I2S TX SCK	P5[1]
J4.3	D2	DIGITAL I/O	I2S TX WS	P5[2]
J4.4	D3	PWM, I/O	I2S TX SDO	P5[3]
J4.5	D4	DIGITAL I/O	I2S RX SCK	P5[4]
J4.6	D5	PWM, I/O	I2S RX WS	P5[5]
J4.7	D6	PWM, I/O	I2S RX SDI	P5[6]
J4.8	D7	DIGITAL I/O	TFT DISP DB13	P0[2]

a) Mount R162 (on the Pioneer Board) to connect J2.10 of the TFT board to P9[4].

1.4 Additional learning resources

Infineon provides a wealth of data to help you to select the right **PSoC™** device for your design and to help you to quickly and effectively integrate the device into your design.

1.5 Technical support

For assistance, go to **www.infineon.com/support**. Visit **community.infineon.com** to ask your questions in Infineon developer community.

1.6 Documentation conventions

Table 3 Document conventions for guides

Convention	Usage
`Courier New`	Displays user entered text and source code
Italics	Displays file locations, file names, and reference documentation: Read about the *sourcefile.hex* file in the *PSoC™ Creator user guide*.
File > Open	Represents menu paths: File > Open > New Project
Bold	Displays commands, menu paths, and icon names in procedures: Click the **File** icon and then click **Open**.
Times New Roman	Displays an equation: $2 + 2 = 4$
Text in gray boxes	Describes cautions or unique functionality of the product.

1.7 Acronyms

Table 4 Acronyms used in this document

Acronym	Definition
ADC	analog-to-digital converter
BOM	bill of materials
CINT	integration capacitor
CMOD	modulator capacitor
CPU	central processing unit
CSD	CAPSENSE™ sigma delta
CTANK	shield tank capacitor
DC	direct current
Del-Sig	delta-sigma
ECO	external crystal oscillator
ESD	electrostatic discharge
FPC	flexible printed circuit
GPIO	general-purpose input/output
HID	human interface device
I^2C	Inter-Integrated Circuit
IC	integrated circuit
ICSP	in-circuit serial programming
IDAC	current digital-to-analog converter
IDE	integrated development environment
LED	light-emitting diode
PC	personal computer
PCM	pulse code modulation
PD	power delivery
PDM	pulse density modulation

Table 4 Acronyms used in this document (continued)

Acronym	Definition
PTC	positive temperature coefficient
PWM	pulse width modulation
RGB	red green blue
SAR	successive approximation register
SMIF	serial memory interface
SPI	serial peripheral interface
SRAM	serial random access memory
SWD	serial wire debug
TFT	thin-film transistor
UART	universal asynchronous receiver transmitter
USB	Universal Serial Bus
WCO	watch crystal oscillator

2 Kit operation

This chapter introduces you to various features of the PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board, including the theory of operation and the on-board KitProg3 programming and debugging functionality, USB-to-UART, USB-I2C and USB-SPI bridges.

2.1 Theory of operation

The PSoC™ 6 Wi-Fi Bluetooth® Pioneer Kit is built around the PSoC™ 6 MCU; **Figure 5** shows the block diagram of the device. For details of the PSoC™ 6 MCU features, see the **device datasheet**.

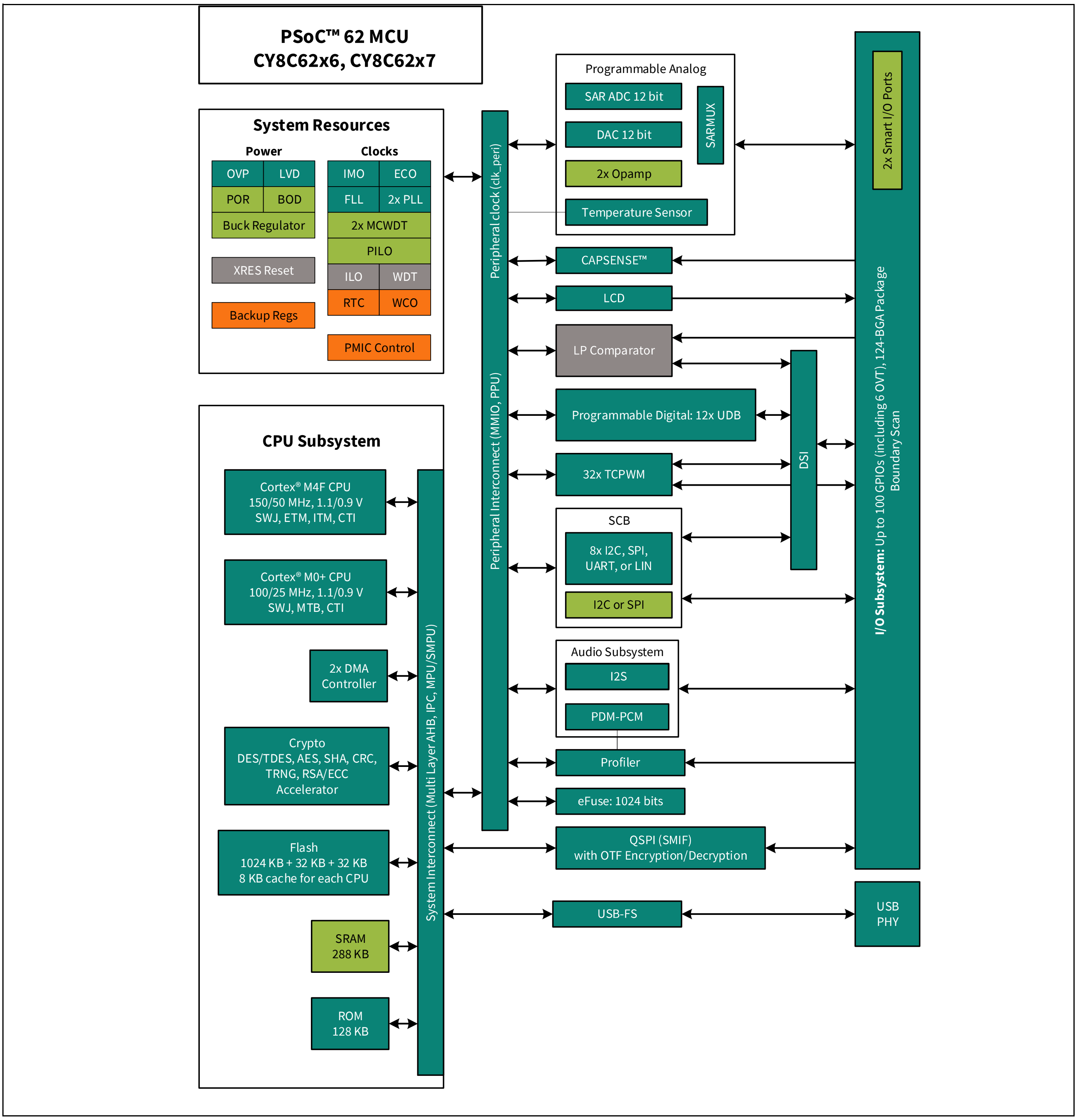


Figure 5 **PSoC™ 6 MCU block diagram**

Figure 6 shows the block diagram of the Pioneer Board.

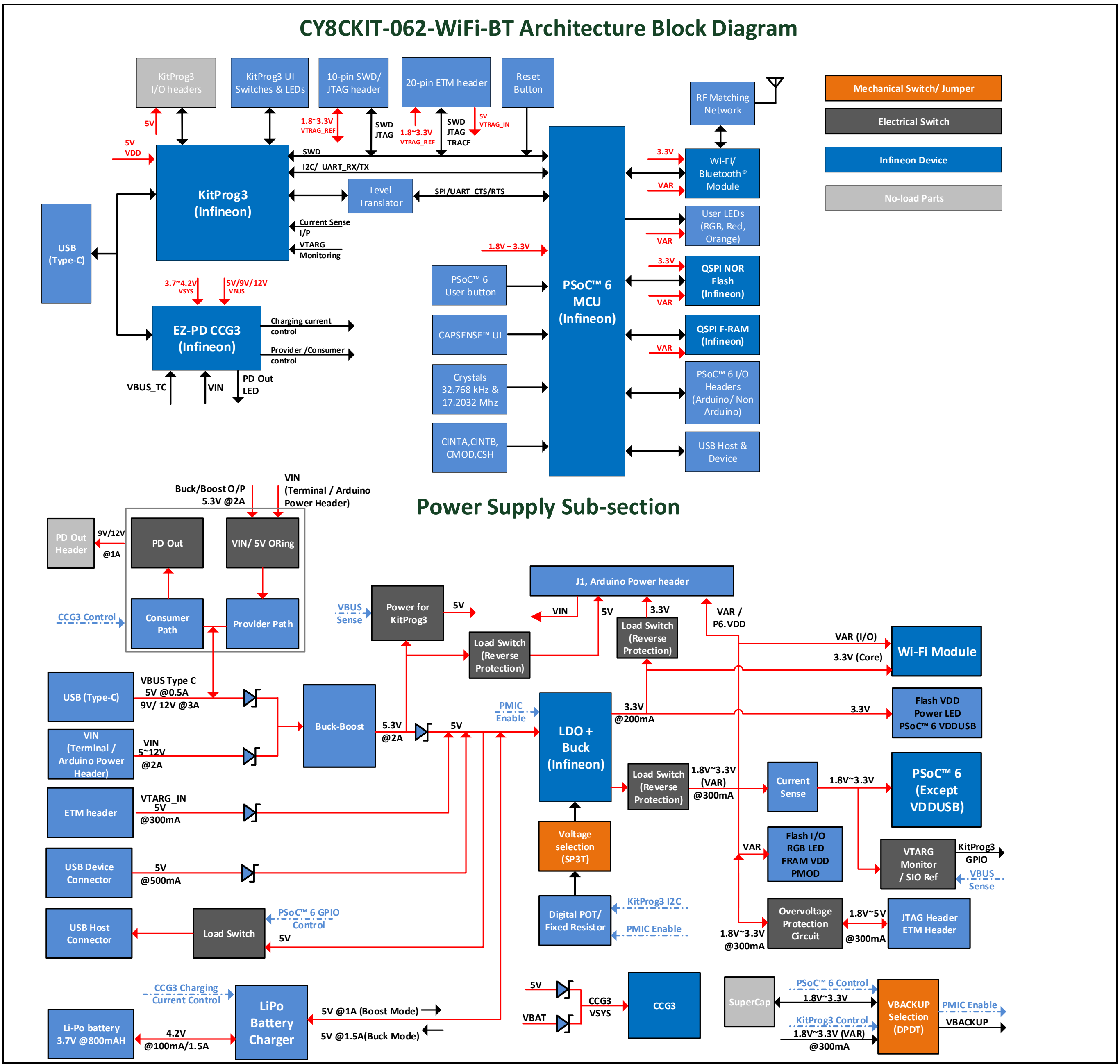


Figure 6 Pioneer Board block diagram

This Wi-Fi Bluetooth® Pioneer Kit comes with the PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board, which has the CY8CKIT-028-TFT display shield connected, as **Figure 7** shows.

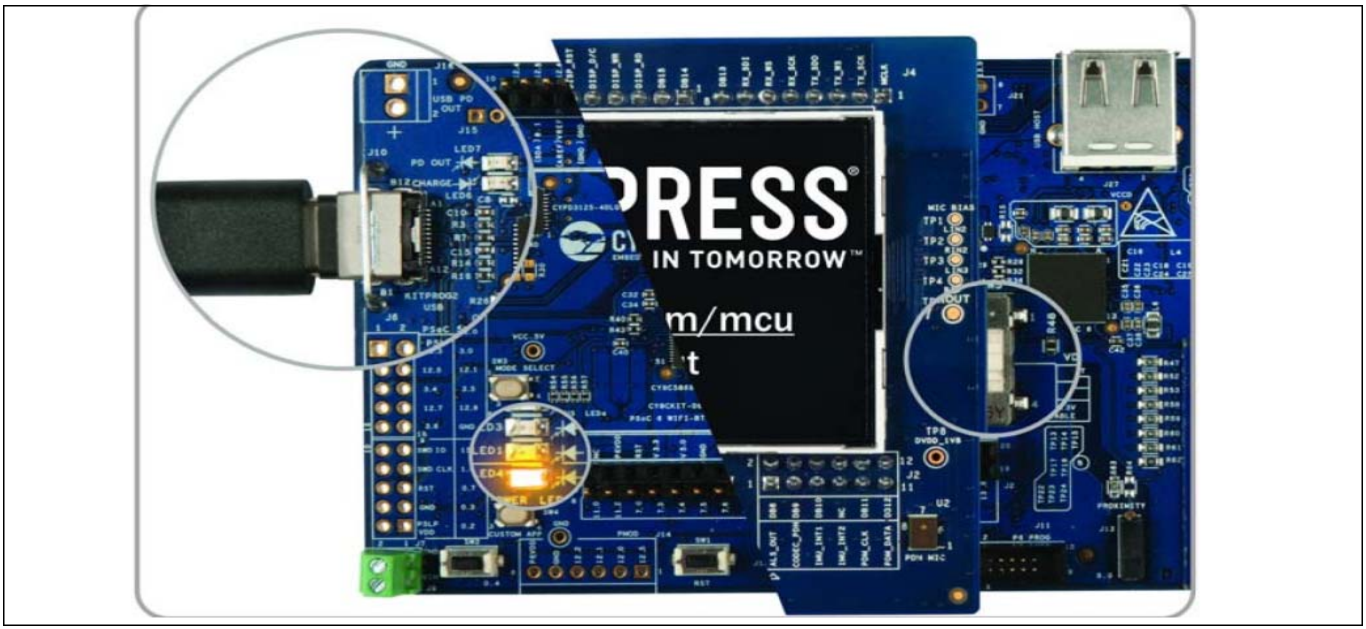


Figure 7 PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board and TFT display shield

Figure 8 shows the markup of the Pioneer Board.

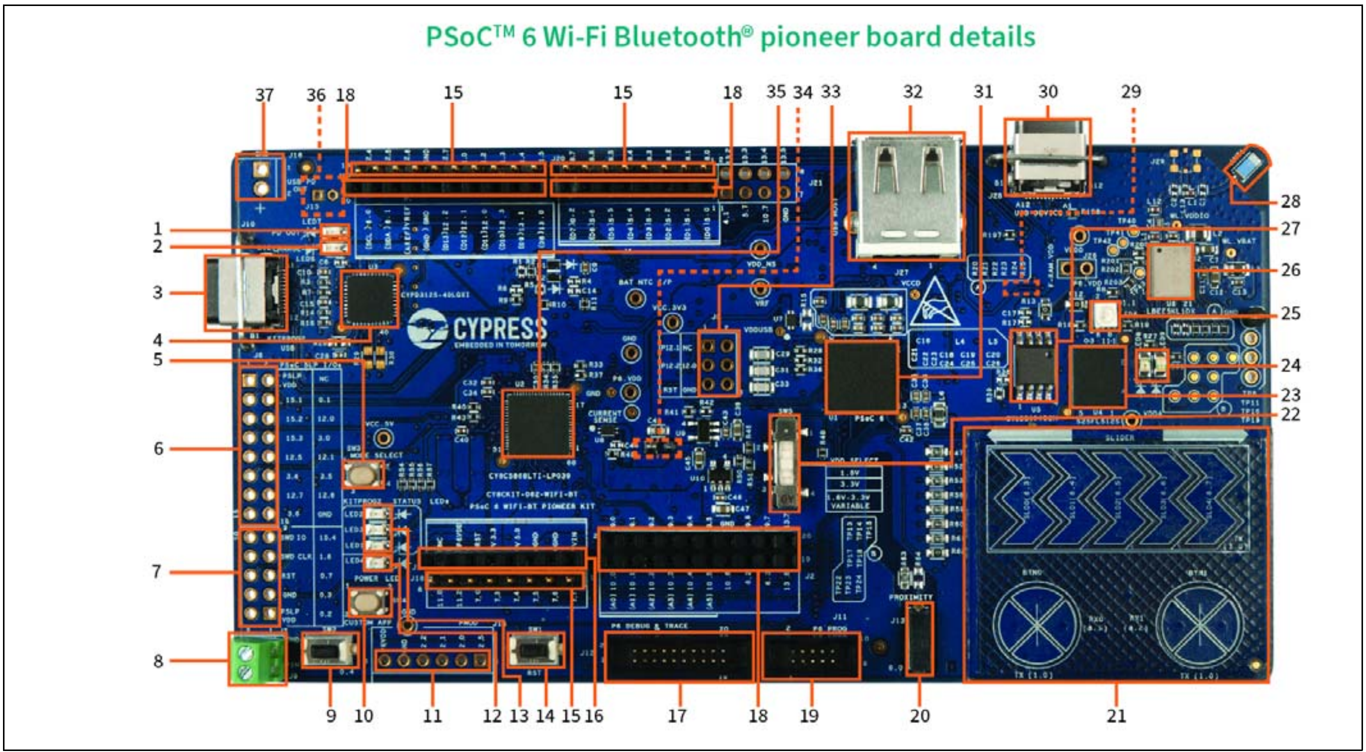


Figure 8 PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board - top view

The PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board has the following peripherals:

1. **USB PD out indicator (LED7):** This LED turns ON when the USB Type-C power delivery output is available for use.
2. **Battery charging indicator (LED6):** This LED turns ON when the onboard battery charger is charging a lithium-ion polymer battery connected to J15. Note that the battery connector and battery are not included in the kit and should be purchased separately if you want to test the battery charging functionality.
3. **KitProg3 USB connector (J10):** The USB cable provided along with the PSoC™ 6 Wi-Fi Bluetooth® Pioneer Kit connects between this USB connector and the PC to use the KitProg3 on-board programmer and debugger and to provide power to the Pioneer Board.
4. **Infineon EZ-PD™ CCG3 Type-C Port Controller with PD (CYPD3125-40LQXIT, U3):** The Pioneer Board includes an EZ-PD™ CCG3 USB Type-C port controller with power delivery system. This device is preprogrammed and can deliver power from a Type-C port to an onboard header J16, while simultaneously charging a lithium-ion polymer battery connected to J15. In addition, the power delivery system can deliver power to a Type-C power sink or consumer, such as a mobile phone, with the power derived from the VIN supply. See **"EZ-PD™ CCG3 Type-C Power Delivery"** on page 32 for more details.
5. **KitProg3 programming button (SW3):** This button can be used to switch between the KitProg3 operation modes (proprietary SWD programming/CMSIS-DAP mode).
6. **KitProg3 I/O header (J6):** This header brings out several GPIOs of the on-board KitProg3 PSoC™ 5LP device. This includes the USB-I2C, USB-UART, and USB-SPI bridge lines. The additional PSoC™ 5LP MCU pins are direct connections to the internal programmable analog logic of the PSoC™ 5LP MCU. For details on KitProg3, see the **KitProg3 user guide**.
7. **KitProg3 programming (J7):** This header brings out more GPIOs of the PSoC™ 5LP MCU. It also contains a five-pin SWD programming header for the PSoC™ 5LP MCU.
8. **External power supply VIN connector (J9):** This connector connects an external DC power supply input to the on-board regulators. The voltage input from the external supply should be between 5 V and 12 V.
9. **PSoC™ 6 MCU user button (SW2):** This button can be used to provide an input to the PSoC™ 6 MCU. Note that by default the button connects the PSoC™ 6 MCU pin to ground when pressed, so you need to configure the PSoC™ 6 MCU pin as a digital input with resistive pull-up for detecting the button press. This button also provides a wake-up source from low-power modes of the device.
10. **I/O header compatible with Digilent Pmod (J14):** This header can be used to connect 1 × 6 pin modules compatible with Digilent Pmod.
11. **Power LED (LED4):** This is the amber LED that indicates the status of power supplied to the board.
12. **KitProg3 status LEDs (LED1, LED2, and LED3):** Red, amber, and green LEDs (LED1, LED2, and LED3 respectively) indicate the status of KitProg3. For details on the KitProg3 status, see the **KitProg3 user guide**.
13. **PSoC™ 6 MCU reset button (SW1):** This button is used to reset the PSoC™ 6 MCU. It connects the PSoC™ 6 MCU reset (XRES) pin to ground.
14. **PSoC™ 6 MCU I/O headers (J18, J19, and J20):** These headers provide connectivity to PSoC™ 6 MCU GPIOs that are not connected to the headers compatible with Arduino. Most of these pins are multiplexed with on-board peripherals and are not connected to the PSoC™ 6 MCU by default. For detailed information on how to rework the kit to access these pins, see **Table 1**.
15. **Power header compatible with Arduino (J1):** This header powers the shields compatible with Arduino. It also has a provision to power the kit though the VIN input.
16. **PSoC™ 6 MCU debug and trace header (J12):** This header can be connected to an embedded trace macrocell (ETM)-compatible programmer/debugger.
17. **I/O headers compatible with Arduino Uno R3 (J2, J3, and J4):** These I/O headers bring out pins from the PSoC™ 6 MCU to interface with the shields compatible with Arduino. Some of these pins are multiplexed with on-board peripherals and are not connected to PSoC™ 6 MCU by default. For detailed information on how to rework the kit to access these pins, see **Table 1**.

18. **PSoC™ 6 MCU program and debug header (J11):** This 10-pin header allows you to program and debug the PSoC™ 6 MCU using an external programmer such as **MiniProg3** / **MiniProg4**. In addition, an external PSoC™ 4, PSoC™ 5LP, or PSoC™ 6 device can be connected to this header and programmed using KitProg3.
19. **CAPSENSE™ proximity header (J13):** A wire can be connected to this header to evaluate the proximity sensing feature of CAPSENSE™.
20. **CAPSENSE™ slider (SLIDER) and buttons (BTN0 and BTN1):** The CAPSENSE™ touch-sensing slider and two buttons, all of which are capable of both self-capacitance (CSD) and mutual-capacitance (CSX) operation, allow you to evaluate the CAPSENSE™ technology. The slider and buttons have a 1-mm acrylic overlay for smooth touch sensing.
21. **System power V_{DD} selection switch (SW5):** This switch is used to select the PSoC™ 6 MCU V_{DD} supply voltage between a constant 1.8 V, a constant 3.3 V, and a variable 1.8 to 3.3 V. In the variable 1.8 to 3.3 V mode, the PSoC™ Programmer software can control the voltage via KitProg3.
22. **512-Mbit serial NOR flash memory (S25FL512S, U4):** The **S25FL512S** NOR flash of 512Mb capacity is connected to the serial memory interface (SMIF) of the PSoC™ 6 MCU. The NOR device can be used for both data and code memory with execute-in-place (XIP) support and encryption.
23. **PSoC™ 6 MCU user LEDs (LED8 and LED9):** These two user LEDs can operate at the entire operating voltage range of PSoC™ 6 MCU. The LEDs are active LOW, so the pins must be driven to ground to turn ON the LEDs.
24. **RGB LED (LED5):** This on-board RGB LED can be controlled by the PSoC™ 6 MCU. The LEDs are active LOW, so the pins must be driven to ground to turn ON the LEDs.
25. **Wi-Fi and Bluetooth® module (LBEE5KL1DX-883, U6):** This kit features the on-board Wi-Fi and Bluetooth® combination module to demonstrate the IoT features. LBEE5KL1DX is a Type 1DX module available with 2.4-GHz WLAN and Bluetooth® functionality. Based on Infineon AIROC™ CYW4343W Wi-Fi & Bluetooth® combo chip, this module provides high-efficiency RF front-end circuits.
26. **4-Mbit serial F-RAM (CY15B104QSN, U5):** This kit contains the CY15B104QSN 4-Mbit (512K × 8) Excelon™ F-RAM device, which can be accessed through the Quad SPI interface, which is capable of Quad SPI speed up to 108 MHz but PSoC™ 6 MCU is limited to 80 MHz.
27. **Wi-Fi-Bluetooth® antenna (ANT1):** This is the on-board antenna connected to the Wi-Fi and Bluetooth® module.
28. **VBACKUP and PMIC control selection switch (SW7, on the bottom side of the board):** This switches the VBACKUP supply connection to the PSoC™ 6 MCU between VDDD/KITPROG3 and the SUPER CAP/PSOC™ 6.

Note: *Starting with Rev. *F of the kit, the super capacitor is removed. Therefore, you must keep SW7 at VDDD/KITPROG3 position. If not, the kit will be unpowered, and you will notice flickering on the TFT display.*

29. **PSoC™ 6 USB Type-C connector (J28):** The USB cable provided with the PSoC™ 6 Wi-Fi Bluetooth® Pioneer Kit can also be connected between this USB connector and the PC to use the PSoC™ 6 MCU USB device applications.
30. **PSoC™ 6 MCU (CY8C6247BZI-D54, U1):** This kit is designed to highlight the features of the PSoC™ 6 MCU. For details on PSoC™ 6 MCU pin mapping, see **Table 1**.
31. **PSoC™ 6 USB Type-A connector (J27):** USB devices can be connected to this USB Type-A connector and communicate with the PSoC™ 6 MCU USB host applications.
32. **ICSP header compatible with Arduino (J5):** This header provides an SPI interface for shields compatible with Arduino ICSP.
33. **PSoC™ 6 MCU current measurement jumper (J8, on the bottom side of the board):** An ammeter can be connected to this jumper to measure the current consumed by the PSoC™ 6 MCU.
34. **KitProg3 (PSoC™ 5LP) programmer and debugger (CY8C5868LTI-LP039, U2):** The PSoC™ 5LP device (CY8C5868LTI-LP039) serving as KitProg3, is a multi-functional system, which includes a programmer, debugger, USB-I2C bridge, USB-UART bridge, and a USB-SPI bridge. For details, see the **KitProg3 user guide**.

35. **Battery connector (J15, on the bottom side of the board):** This connector can be used to connect a lithium-ion polymer battery. Note that a battery is not included in the kit package and should be purchased separately if you want to demonstrate battery charging.
36. **USB PD output (J16):** This header provides a voltage output when the USB Type-C power delivery system receives power from an external host connected to J10. See **"EZ-PD™ CCG3 Type-C Power Delivery"** on page 32 for more details.

See **"Hardware functional description"** on page 35 for details on various hardware blocks.

For some devices in the PSoC™ 6 MCU family, simultaneous GPIO switching with unrestricted drive strengths and frequency can induce noise in on-chip subsystems affecting CAPSENSE™ and ADC results. For more details, see the Errata section of the corresponding **device datasheet**.

Table 5 shows the functionalities of the on-board selection switches.

Table 5 Selection switches on the Pioneer Board

Switch	Location on the board	Purpose	Default position
SW5	Front	Selects the V_{DD} supply of the PSoC™ 6 MCU between 1.8 V, 3.3 V, and the variable 1.8 V to 3.3 V, which is controlled by KitProg3.	3.3 V

Note:

1. *Starting with Rev. *F of the kit, the super capacitor is removed. Therefore, you must keep SW7 at VDDD/KITPROG3 position. If not, the kit will be unpowered, and you will notice flickering on the TFT display.*
2. *In the Rev *F version of the kit, the silkscreen on the board shows KitProg2. However, the KitProg3 is loaded on the kit.*

2.2 CY8CKIT-028-TFT details

2.2.1 CY8CKIT-028-TFT display shield

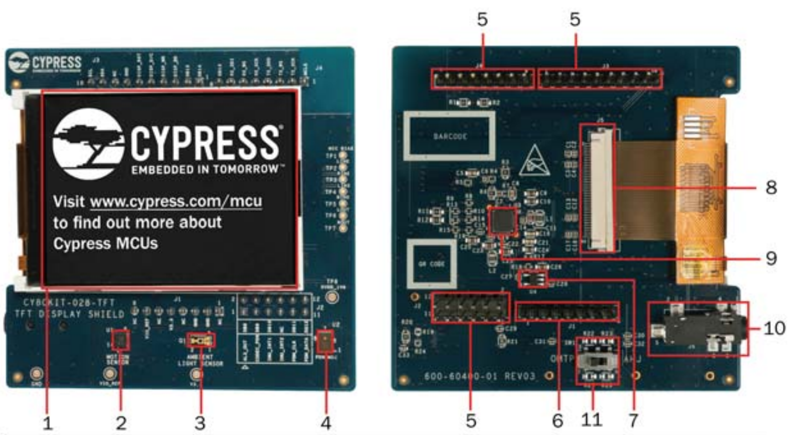


Figure 9 TFT display shield

The TFT display shield has the following peripherals:

1. **2.4-inch TFT display:** This is a **Newhaven 2.4-inch TFT LCD** module with 240 × 320 pixel resolution and uses a **Sitronix ST7789 display controller**. This display module is configured for an 8-bit parallel pinout connection (8080-Series) to interface with the PSoC™ 6 device on the baseboard.
2. **Inertial measurement unit (U1):** This inertial measurement unit (IMU) is a three-axis acceleration and three-axis gyroscopic motion sensor that can be used to count steps to emulate a pedometer or similar application.
3. **Ambient light sensor (Q1):** This is a high photosensitive NPN phototransistor IC that can be used to detect intensity of ambient light.
4. **PDM microphone (U2):** This microphone converts voice inputs to pulse-density modulated (PDM) digital signals.
5. **I/O header compatible with Arduino (J2, J3, and J4):** These headers interface with the PSoC™ 6 MCU GPIOs on the baseboard.
6. **Power header compatible with Arduino (J1):** This header receives power from header J1 on the board.
7. **Voltage regulator - 1.8 V (U4):** An LDO that converts 3.3 V to 1.8 V for the digital supply of the audio codec.
8. **TFT display connector (J5):** This connector is used to connect the TFT display to the circuits on the TFT display shield.
9. **Audio codec (U3)**: This is a low power consumption, 32-bit stereo codec with speaker amplifiers. The left channel and right channel amplifier output pins of the device are connected to the on-board audio jack.
10. **Audio jack (J6)**: The on-board audio jack provides a provision of connecting both AHJ and OMTP headphones. The headset standard can be set by an on-board switch SW1.
11. **Audio jack selection switch (SW1)**: This on-board selection switch can set the headphone type either to AHJ and OMTP standard connected to the audio jack.

Figure 10 shows the connectivity of the TFT display shield with the CY8CKIT-062-Wi-Fi Bluetooth® baseboard through the headers.

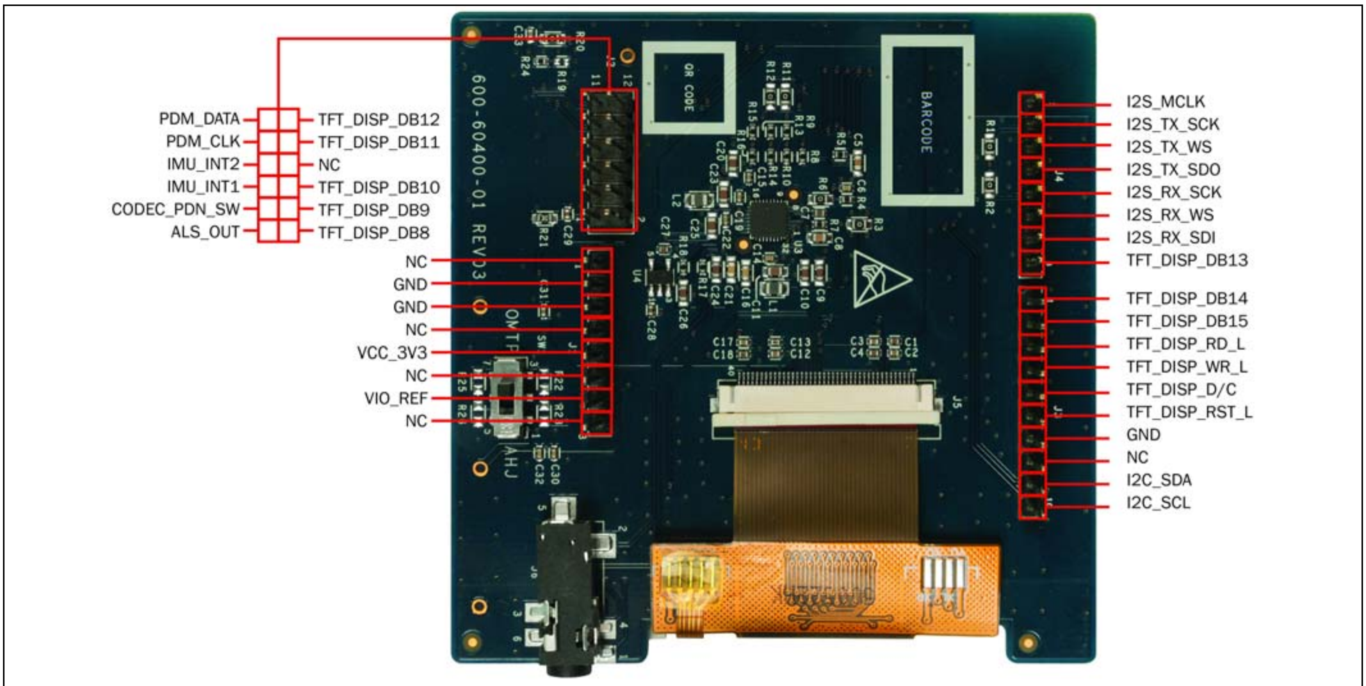


Figure 10 TFT shield pinout

Note: The TFT display operation at 1.8 V is currently not supported in this version of the kit. Ensure that the following conditions are met when the CY8CKIT-028-TFT display shield is mounted on the PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board.

1. *Ensure that SW5 is either set to 3.3 V or set to the 1.8 V–3.3 V VARIABLE with PSoC™ Programmer selecting a voltage of 2.5 V or higher.*
2. *If you want to erase the internal flash of the PSoC™ 6 MCU, ensure that the PSoC™ Programmer setting is not 1.8 V when the SW5 is set to the 1.8 V–3.3 V VARIABLE position.*

2.3 KitProg3: On-board programmer/debugger

The PSoC™ 6 Wi-Fi Bluetooth® Pioneer Kit can be programmed and debugged using the KitProg3 onboard programmer/debugger with USB-UART, USB-I2C, and USB-SPI Bridge functionality. KitProg3 supports CMSIS-DAP and DAPLink mode for programming. A PSoC™ 5LP device is used to implement the KitProg3 functionality. For more details on the KitProg3 functionality, see the **KitProg3 user guide**.

*Note: If you are using Rev *F or higher (see Kit Revision on the box), please note that the silkscreen of the kit shows KitProg2 but KitProg3 is loaded on the kit.*

2.3.1 Programming and debugging using ModusToolbox™ software

1. Connect the board to the PC using the provided USB cable through the KitProg3 USB connector, as shown in **Figure 11**. The kit enumerates as a composite device when you connect it to your PC.
2. The KitProg3 on this kit is in CMSIS-DAP Bulk mode by default. The status LED (amber), LED2 and power LED (amber), LED4 are turned ON at this time. If you do not see the desired LED status, see the **KitProg3 user guide** for details on the KitProg3 status and troubleshooting instructions.

Note: Programming can be done in either KitProg3 programming modes, but it is recommended to program the kit in CMSIS-DAP Bulk mode.

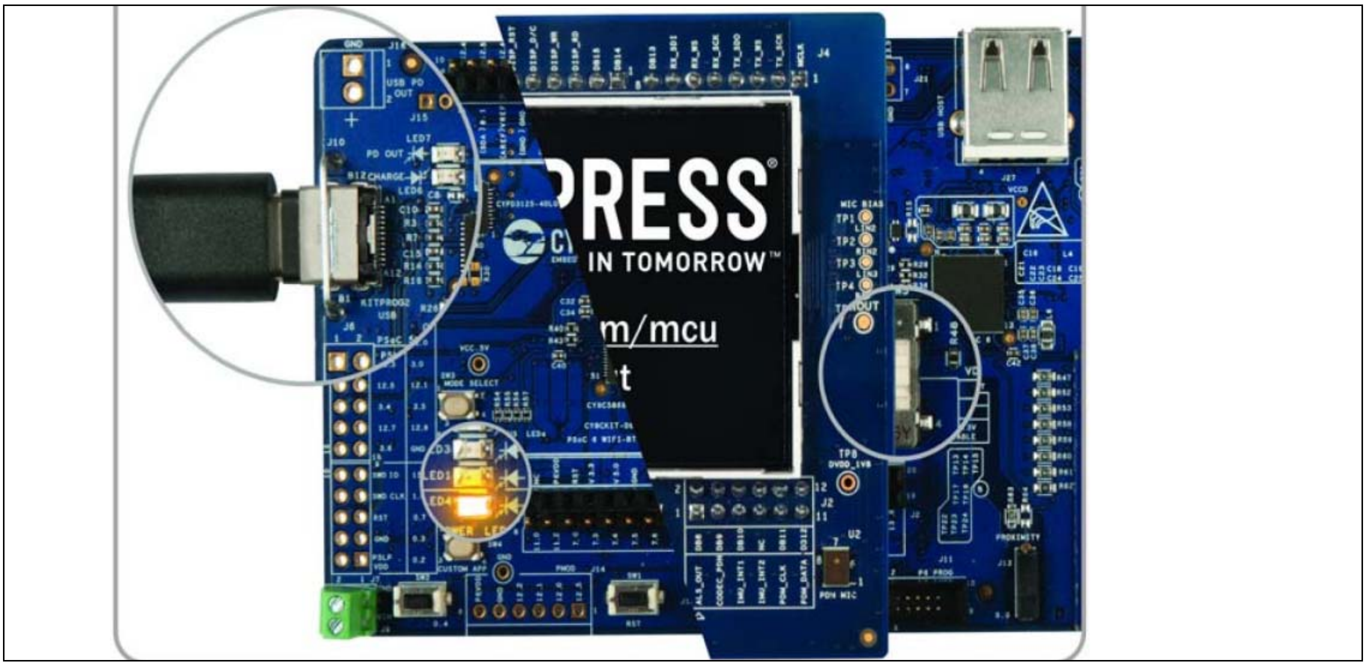


Figure 11 Connect USB cable to the USB connector on the board

3. In the Eclipse IDE for ModusToolbox™ software, import the desired code example (application) into a new workspace.
   a) Click **New Application** from the **Quick Panel**.

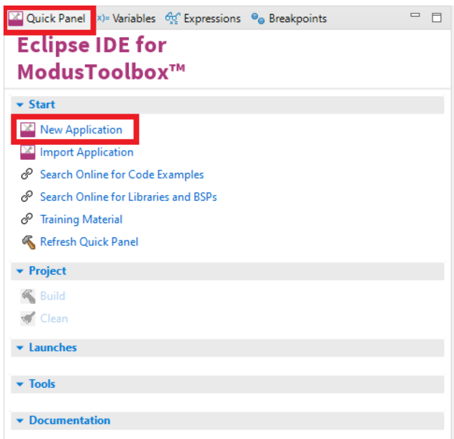


Figure 12 Create new application

   b) Select the BSP in the **Choose Board Support Package** window and click **Next**.
      The rest of the steps uses the CY8CKIT-062-WIFI-BT BSP for the sake of explanation.

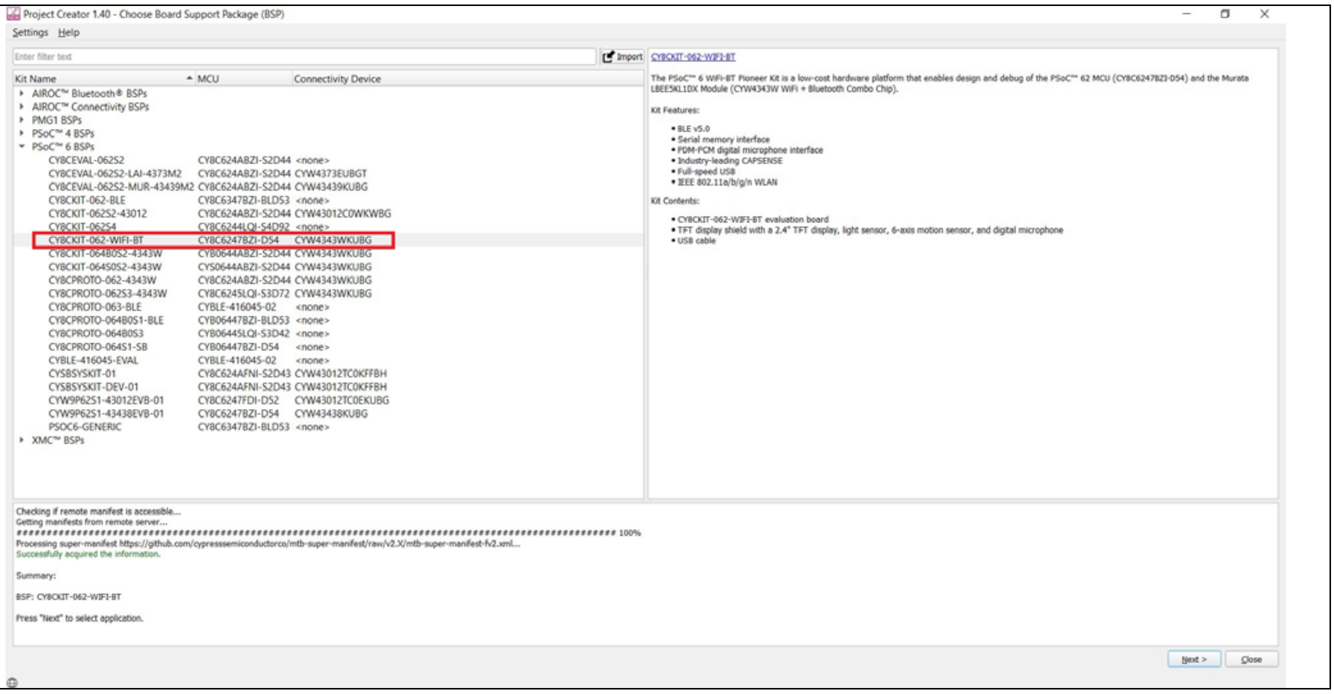


Figure 13 Creating a new application: Choose board support package

c) Select the application in the **Select Application** window and click **Create**.

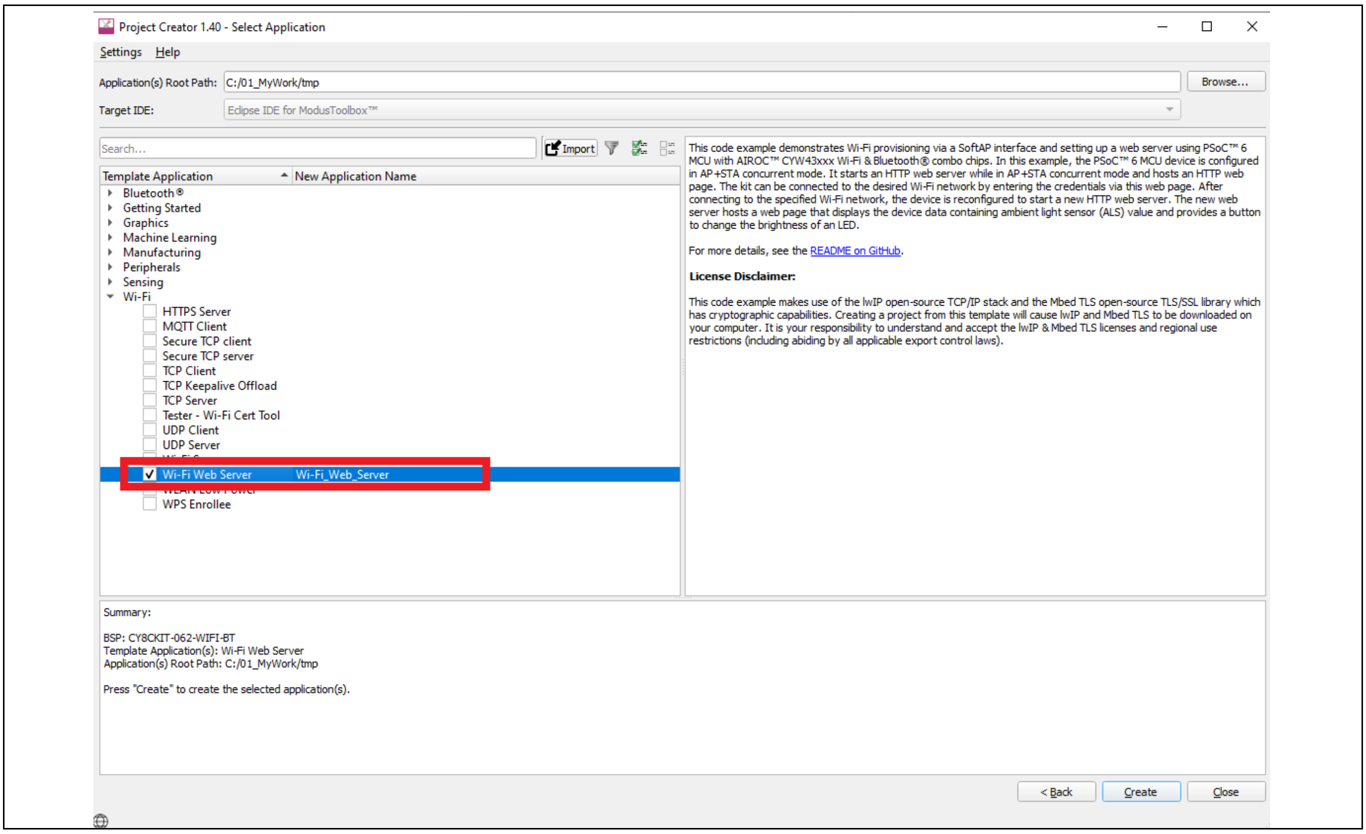


Figure 14 Creating a new application: Select Application

4. To build and program a PSoC™ 6 MCU application, in the Project Explorer, select **<App_Name>** project. In the Quick Panel, scroll to the **Launches** section and click the **<App_Name> Program (KitProg3_MiniProg4)** configuration as shown in **Figure 15**.

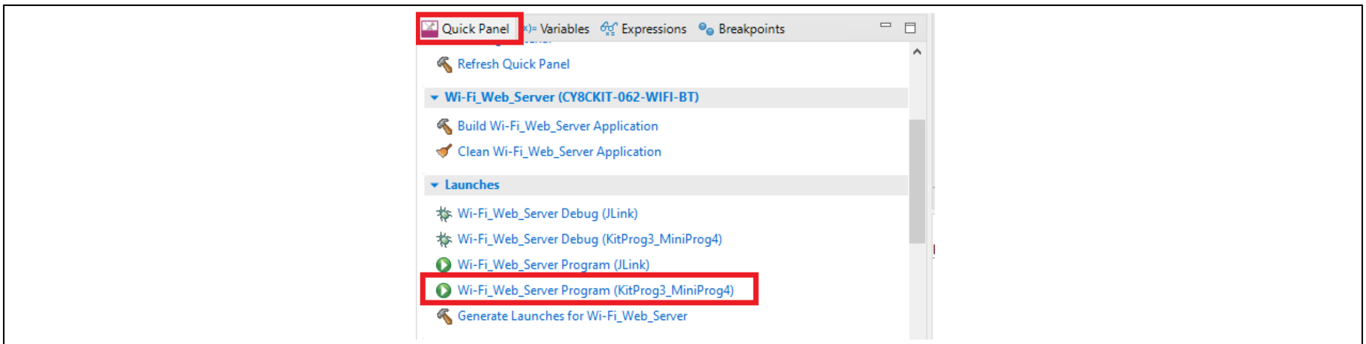


Figure 15 Programming in ModusToolbox™ software

5. ModusToolbox™ software has an integrated debugger. To debug a PSoC™ 6 MCU application, in the Project Explorer, select **<App_Name>** project. In the Quick Panel, scroll to the **Launches** section and click the **<App_Name> Debug (KitProg3_MiniProg4)** configuration as shown in **Figure 16**. For more details, see the "Program and debug" section in the **Eclipse IDE for ModusToolbox™ user guide**.

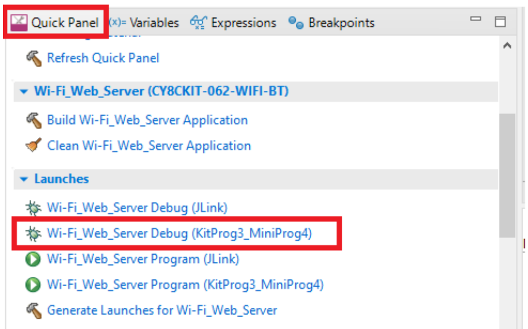


Figure 16 Debugging in ModusToolbox™ software

2.3.1.1 Using the OOB example – Wi-Fi_Web_Server

By default, the PSoC™ 6 Wi-Fi Bluetooth® Pioneer Kit is programmed with the *Wi-Fi_Web_Server* code example. The following steps describe on how to use the example. For a detailed description of the project, see the example's README.md file in the **GitHub repository**. The README.md file is also in the application directory after the application is created.

Note: At any point of time, if you overwrite the OOB example, you can restore it by programming the Wi-Fi_Web_Server application.

1. Connect the board to your PC using the provided USB cable through the KitProg3 USB connector.

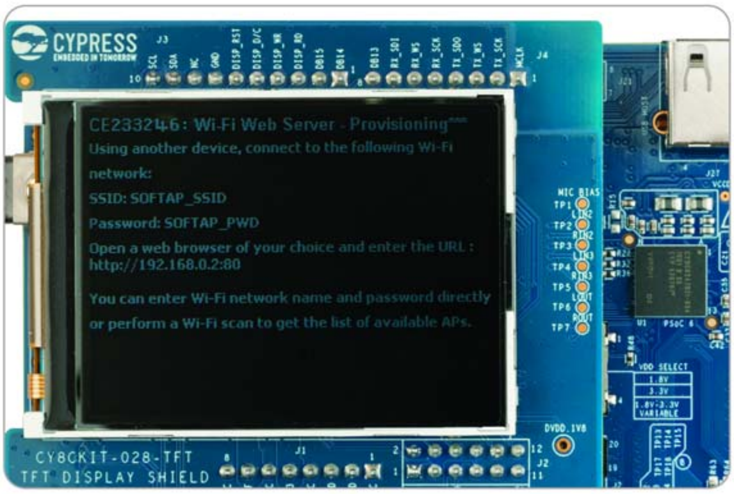


Figure 17 Kit connected to the PC

2. Connect to the Wi-Fi network "SOFTAP_SSID" using "SOFTAP_PWD" as the password.
3. On your PC, open a web browser of your choice and enter the URL: **https://192.168.0.2:80**
4. Ensure you have a non-enterprise Wi-Fi network or a mobile hotspot operating at 2.4 GHz on another device.

5. On the Web Server Demo – Home Page, enter your Wi-Fi network name and password of the non-enterprise network directly or perform a Wi-Fi Scan to select the network you wish to use to connect to the cloud.
6. Once the device connection is successful, the TFT display is updated to show the Wi-Fi network name and the URL to be used to view the sensor data.
7. Swipe your finger on the CAPSENSE™ slider to change the PWM duty cycle and LED8 brightness.

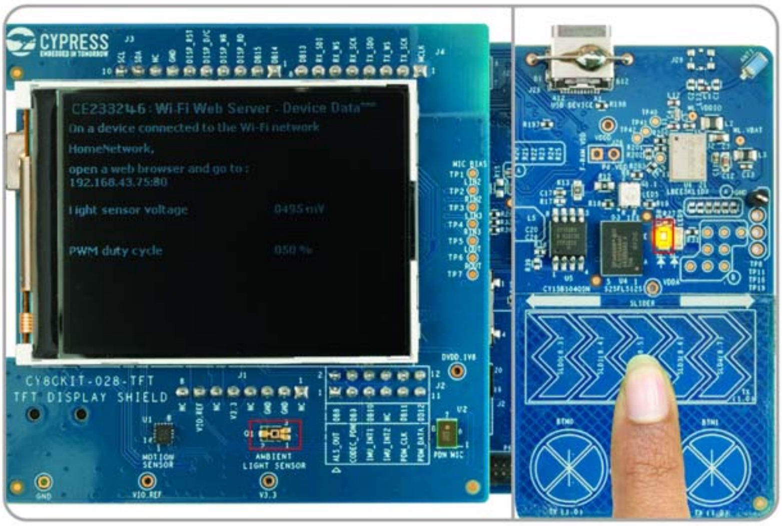


Figure 18 Use CAPSENSE™ slider to change PWM duty cycle and LED8 brightness

Note: If more than one kit is connected at the same time during OOB evaluation, the pre-programmed SSID would be the same for all kits. Thus, it may be difficult to identify the kit with which the device has established the connection. To avoid this scenario, reprogram each kit by changing the SOFTAP_SSID macro in the web_server.h file.

2.3.2 USB-to-UART bridge

KitProg3 on the PSoC™ 6 Wi-Fi Bluetooth® Pioneer Kit can act as a USB-UART bridge.

The UART Rx and Tx pins of KitProg3 are connected to the PSoC™ 6 MCU UART pins as follows:

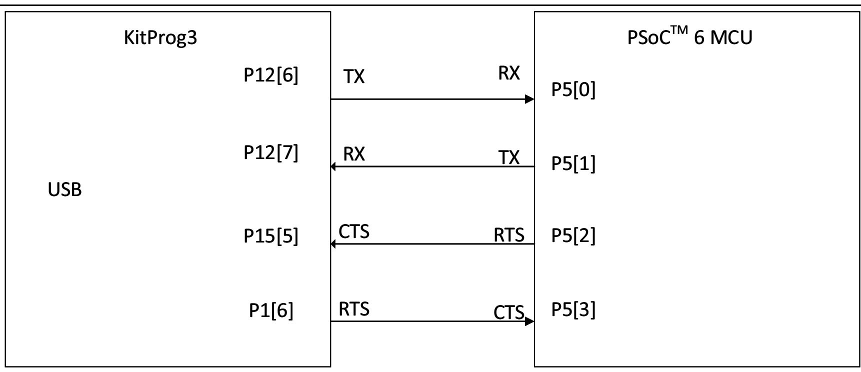


Figure 19 UART connection between KitProg3 and PSoC™ 6 MCU

For more details on the KitProg3 USB-UART functionality, see the **KitProg3 user guide**.

2.3.3 USB-I2C bridge

The KitProg3 can function as a USB-I2C bridge and communicate with an I2C master such as Bridge Control Panel (BCP). The I2C lines on the PSoC™ 6 MCU are hard-wired on the board to the I2C lines of the KitProg3, with onboard pull-up resistors as **Figure 20** shows. The USB-I2C bridge supports I2C speeds of 50 kHz, 100 kHz, 400 kHz, and 1 MHz. For more details on the KitProg3 USB-I2C bridge functionality, see the **KitProg3 user guide**.

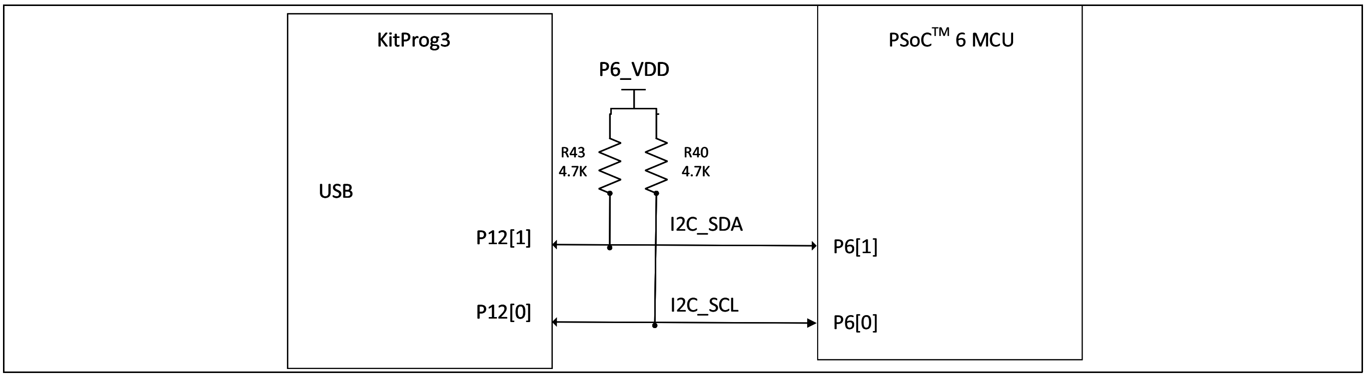


Figure 20 I2C connection between KitProg3 and PSoC™ 6 MCU

2.3.4 USB-SPI bridge

The KitProg3 can function as a USB-SPI bridge. The SPI lines between the PSoC™ 6 MCU and the KitProg3 are hard-wired on the board, as shown in the figure. For more details on KitProg3 USB-SPI functionality, see the **KitProg3 user guide**.

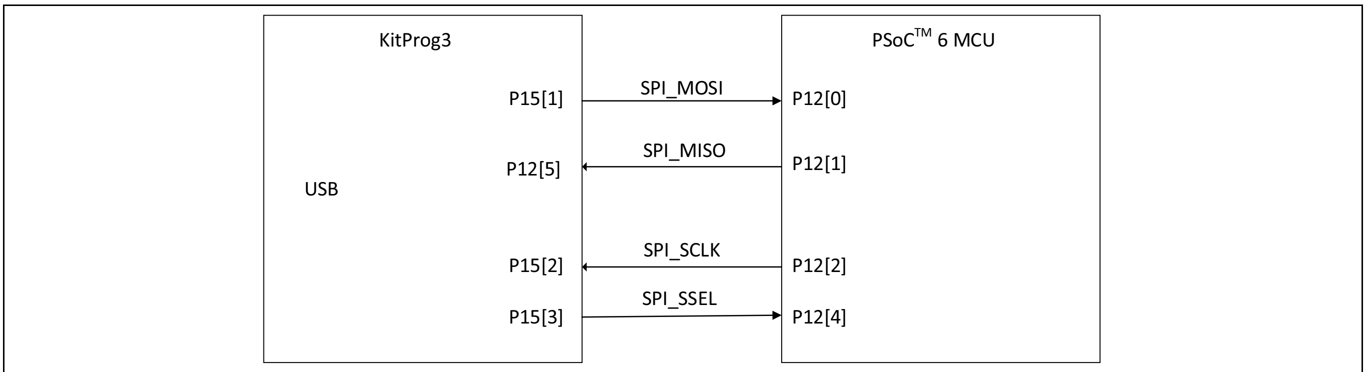


Figure 21 SPI connection between KitProg3 and PSoC™ 6 MCU

2.4 EZ-PD™ CCG3 Type-C Power Delivery

The Pioneer Board includes a Infineon EZ-PD™ CCG3 Power Delivery system. The EZ-PD™ CCG3 is pre-programmed and can deliver power from a Type-C port to the onboard header **J16** (known as the consumer path), while simultaneously charging a 3.7-V, lithium-ion polymer battery connected to **J15**. In addition, the power delivery system can deliver power to a Type-C peripheral, such as a mobile phone, with the power derived from the VIN **(J9)** supply (known as the provider path). Note that to use the EZ-PD™ CCG3 Type-C Power Delivery system, a power delivery capable USB Type-C to Type-C cable should be connected to **J10**. This cable is not included in the kit, and should be purchased separately.

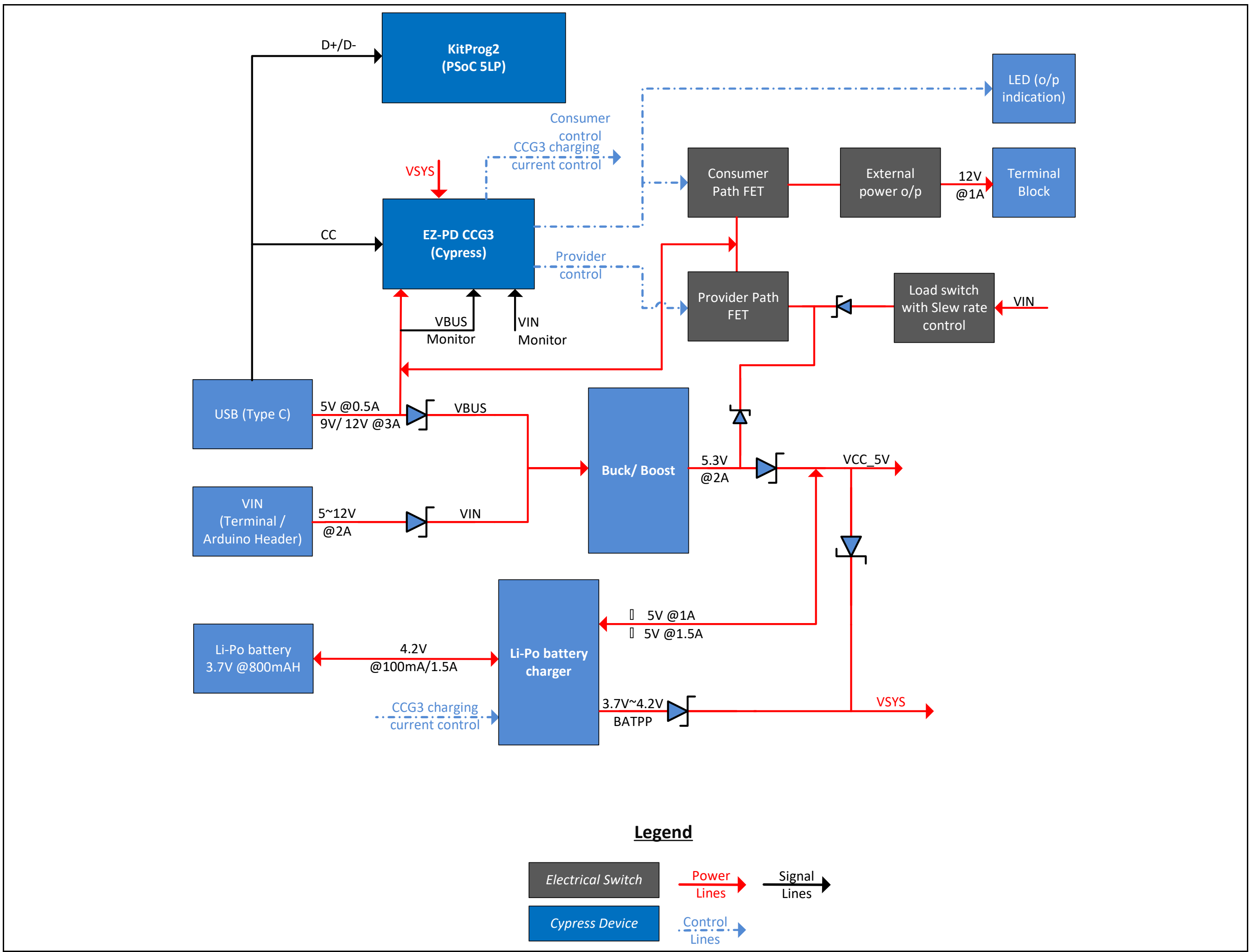


Figure 22 Type-C block diagram

The power delivery system works as follows:

1. If the power delivery system detects a non Type-C power adapter (legacy USB), EZ-PD™ CCG3 will charge the battery at 100 mA. EZ-PD™ CCG3 will also disable the consumer and provider paths.
2. On detection of a Type-C power adapter, EZ-PD™ CCG3 will request 5 V at 3 A, 9 V at 3 A, or 12 V at 3 A depending on the host capability. After the power level is successfully negotiated, the consumer path is enabled by turning ON the load switch **U13**. This load switch is hardware-limited to supply up to 1 A through header **J16** to an external device. CCG3 will use the remaining current to charge the battery connected to **J15** at a higher charging rate up to 1.5 A and PD output voltage availability indicator (**LED7**) will be turned ON.
3. EZ-PD™ CCG3 will also advertise that it can provide 5 V, 9 V, or 12 V if a DC power supply capable of providing either of these voltages is connected at VIN **(J9)**. The current is limited in this case to 1 A. Note that the external supply must be capable of providing this current. If a connected, Type-C device requests power, the provider path is enabled by turning on load switch **U31**. **Table 6** details the power delivery scenarios for onboard EZ-PD™ CCG3.

Table 6 Type-C table power delivery scenarios

USB host/Consumer capability	VIN	Consumer capability	Provider capability	External USB PD Out (J16 Header)	Battery charging current
Non Type-C power adapter (Legacy USB)	<5 V	N/A	0	0	100 mA
	>5 V	N/A	0	0	0
Type-C, PD power adapter (12-V capable)[a)]	<12 V	12 V@3 A	0	12 V@1 A[b)]	1.5 A max
	>12 V	N/A	0	0	0
Type-C, capable of providing max 9 V[a]	<9 V	9 V@3 A	0	9 V@1 A	1.5 A max
	>9 V	N/A	0	0	0
Type-C only, capable of providing max 5 V[a]	<5	5 V@3 A	0	5 V@1 A	1.5 A max
	>5	N/A	0	0	0
Type-C, requesting 12 V[a]	≠12 V	0	5 V@1 A	0	0
	12 V	0	12 V@1 A	0	0
Type-C, requesting 9 V[a]	≠9 V	0	5 V@1 A	0	0
	9 V	0	9 V@1 A	0	0
Type-C, requesting 5 V[a]	≠5 V	0	5 V@1 A	0	0
	5 V	0	5 V@1 A	0	0
Type-C, requesting another voltage	5 V < VIN <12 V	0	5 V@1 A	0	0

a) The table is valid only if the Type-C cable is connected first and then VIN is applied. If VIN is applied first, consumer capability will be N/A.

b) Due to the voltage drop-in series components, the voltage at J16 is ~9 V when 12 V PD power adapter is used.

For more information on USB Type-C Power Delivery with EZ-PD™ CCG3 device, see the **EZ-PD™ CCG3 webpage**.

3 Hardware

3.1 Schematics

See the schematic files available on the **kit webpage**.

3.2 Hardware functional description

This section explains the individual hardware blocks of the PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board.

3.2.1 PSoC™ 6 MCU (U1)

PSoC™ 6 MCU is an ultra-low-power PSoC™ family device specifically designed for wearables and IoT products. It is a programmable embedded system-on-chip, integrating a 150-MHz CM4 as the primary application processor, a 100-MHz CM0+ that supports low-power operations, up to 1 MB Flash and 288 KB SRAM, CAPSENSE™ touch-sensing, and custom analog and digital peripheral functions. The programmable analog and digital peripheral functions allow higher flexibility, in-field tuning of the design, and faster time-to-market.

For more information, see the **PSoC™ 6 MCU webpage** and the **datasheet**.

Simultaneous GPIO switching with unrestricted drive strengths and frequency can affect CAPSENSE™ and ADC performance. For details, see the "Errata" section of the corresponding **device datasheet.**

3.2.2 PSoC™ 5LP (U2)

An on-board PSoC™ 5LP MCU (CY8C5868LTI-LP039) is used as KitProg3 to program and debug the PSoC™ 6 MCU. The PSoC™ 5LP MCU connects to the USB port of a PC through a USB connector and to the SWD and other communication interfaces of PSoC™ 6 MCU. The PSoC™ 5LP MCU is a 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. Analog capability spans the range from thermocouples (near DC voltages) to ultrasonic signals.

For more information, visit the **PSoC™ 5LP webpage**. Also, see the **CY8C58LPxx family datasheet**.

3.2.3 Serial interconnection between PSoC™ 5LP and PSoC™ 6 MCU

In addition to being used as an on-board programmer, the PSoC™ 5LP MCU functions as an interface for the USB-UART, USB-I2C, and USB-SPI bridges, as shown in **Figure 23**. The USB-Serial pins of the PSoC™ 5LP are hard-wired to the I2C/UART/SPI pins of the PSoC™ 6 MCU. These pins are also available on the I/O headers compatible with Arduino; therefore, the PSoC™ 5LP MCU can be used to control shields compatible with Arduino with an I2C/UART/SPI interface.

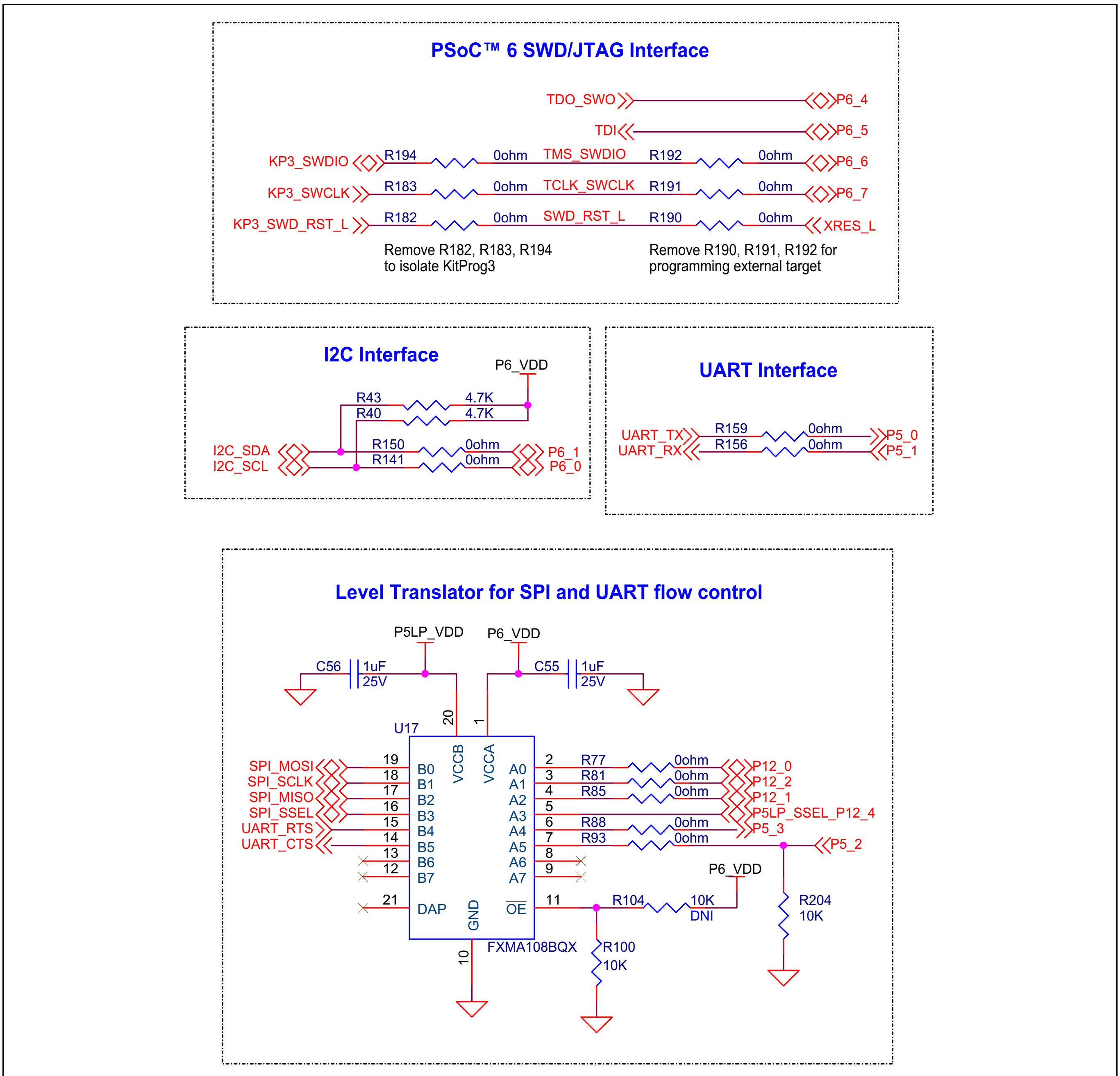


Figure 23 Schematics of programming and serial interface connections

3.2.4 EZ-PD™ CCG3 power delivery system

Infineon EZ-PD™ CCG3 provides a complete solution ideal for power adapters, power banks, Type-C dongles, monitors, docks, and notebooks. See **“EZ-PD™ CCG3 Type-C Power Delivery”** on page 32 for more details of the power delivery system implementation on the Pioneer Board.

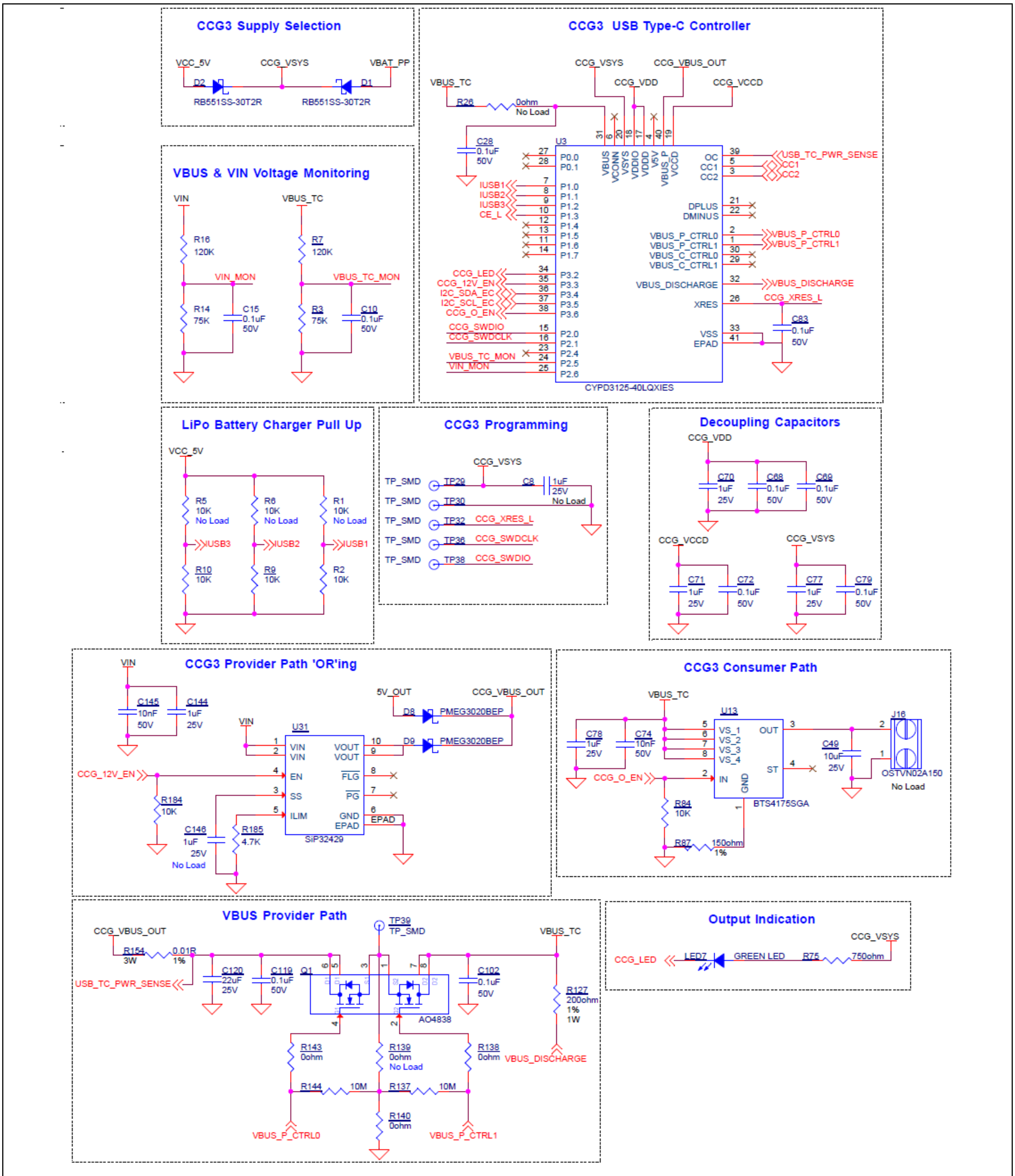


Figure 24 Schematics of EZ-PD™ CCG3 power delivery system

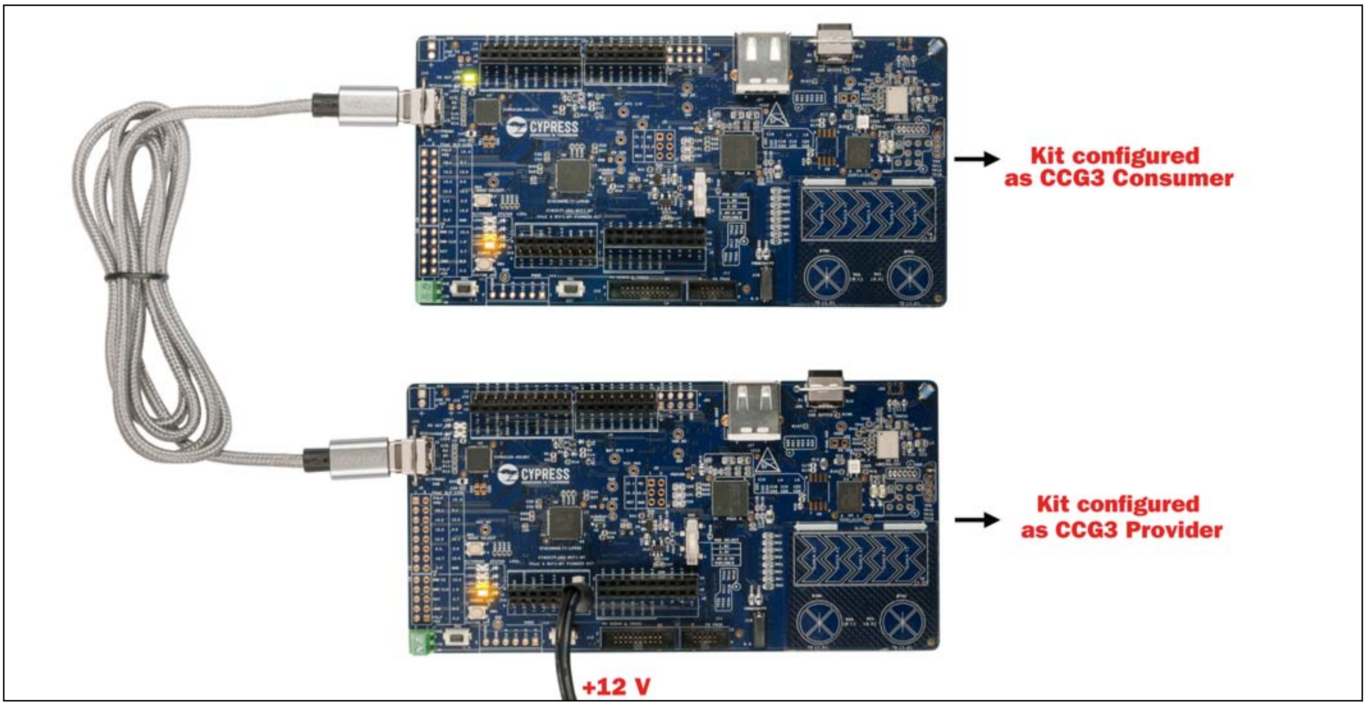


Figure 25 **EZ-PD™ CCG3 power delivery setup using two CY8CKIT-062-Wi-Fi Bluetooth® kits**

3.2.5 Power supply system

The power supply system on this board is versatile, allowing the input supply to come from the following sources:

- 5 V, 9 V, or 12 V from the on-board USB Type-C connector
- 5 V to 12 V power from a shield compatible with Arduino or from external power supply through VIN header **J9** or **J1**
- 3.7 V from a rechargeable Li-Po battery connected to J15
- 5 V from an external programmer/debugger connected to **J11** and **J12**

The power supply system is designed to support 1.8 V to 3.3 V operation of the PSoC™ 6 MCU. In addition, an intermediate voltage of 5 V is required for operation of the KitProg3. Therefore, three regulators are used to achieve 1.8 V to 3.3 V and 5 V outputs – a buck boost regulator **(U30)** that generates a fixed 5 V from an input of 5 V to 12 V, and a main regulator **(U10)** that generates either a variable 1.8 V to 3.3 V, or a fixed 1.8 V, or a fixed 3.3 V from the output of **U30**. **Figure 26** shows the schematics of the voltage regulator and power selection circuits.

The voltage selection is made through switch **SW5**. For details of the PSoC™ 6 MCU backup system and power supply, see the **PSoC™ 62 architecture reference manual**.

Note: *Starting with Rev. *F of the kit, the super capacitor is removed. Therefore, you must keep SW7 at VDDD/KITPROG3 position. If not, the kit will be unpowered, and you will notice flickering on the TFT display.*

Table 7 details the different powering scenarios for Pioneer Board.

Table 7 Power supply scenarios

Power inputs					Board condition		
USB	**VIN**	**ETM header (VTARG_IN)**	**Battery connected**	**JTAG/SWD header (VTARG_REF)**	**Main regulator powered by**	**PSoC™ powered by**	**Battery charging**
Non Type-C power adapter (legacy USB), 5 V	<5	N/A	Yes	N/A	Type-C	Main regulator	100 mA
	>5	N/A	N/A	N/A	VIN	Main regulator	No
Type-C, PD power adapter	< PD power adapter	N/A	Yes	N/A	Type-C	Main regulator	1.5 A
	> PD power adapter, <12 V	N/A	N/A	N/A	VIN	Main regulator	No
0 V	5 V–12 V	N/A	N/A	N/A	VIN	Main regulator	No
0 V	0 V	5 V	N/A	N/A	ETM (VTARG_IN)	Main regulator	No
0 V	0 V	0 V	3.2 V–4.2 V	N/A	Battery	Main regulator	No
0 V	0 V	0 V	0 V	1.8 V–3.3 V	N/A	JTAG/SWD (VTARG_REF)	No

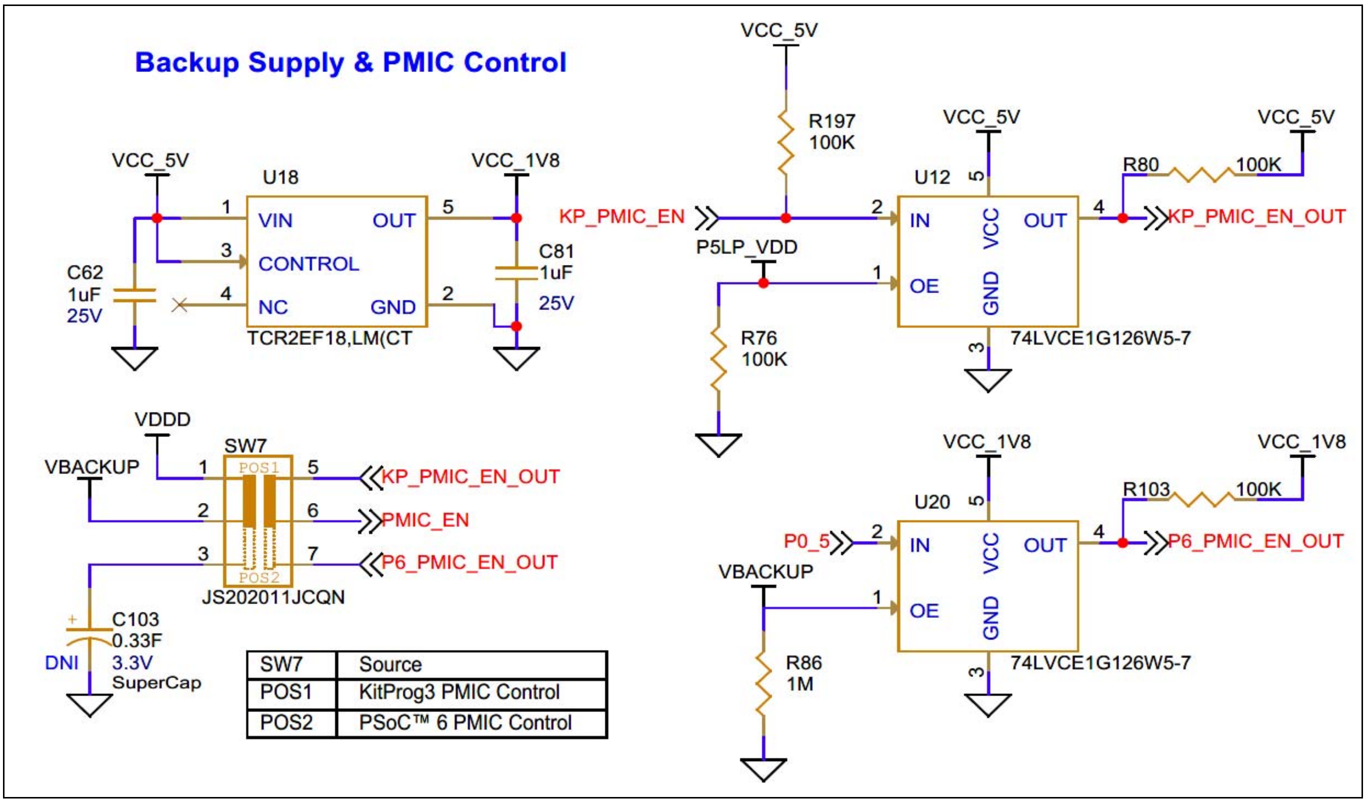


Figure 26 **Schematics of power supply system**

3.2.6 Expansion connectors

3.2.6.1 Headers compatible with Arduino (J1, J2, J3, J4, and J5)

The board has five headers compatible with Arduino: **J1**, **J2**, **J3**, **J4**, and **J5** (**J5** is not populated by default). You can connect 3.3-V shields compatible with Arduino to develop applications based on the shield's hardware. Note that 5-V shields are not supported and connecting a 5-V shield may permanently damage the board. See **Table 1** for details on the PSoC™ 6 MCU pin mapping to these headers.

3.2.6.2 PSoC™ 6 MCU I/O headers (J18, J19, and J20)

These headers provide connectivity to PSoC™ 6 MCU GPIOs that are not connected to the headers compatible with Arduino. Most of these pins are multiplexed with on-board peripherals and are not connected to the PSoC™ 6 MCU by default. For detailed information on how to rework the kit to access these pins, see **"PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board reworks"** on page 47.

3.2.6.3 PSoC™ 5LP MCU GPIO header (J6)

J6 is a 8 × 2 header provided on the board to bring out several pins of the PSoC™ 5LP MCU to support advanced features such as a low-speed oscilloscope and a low-speed digital logic analyzer. This header also contains the USB-UART, USB-I2C, and USB-SPI bridge pins that can be used when these pins are not accessible on the Arduino headers because a shield is connected. The additional PSoC™ 5LP pins MCU are connected directly to the internal programmable analog logic of PSoC™ 5LP MCU. J6 is not populated by default. Note that the SPI, RTS, and CTS lines on these headers are directly from PSoC™ 5LP MCU (before level translator).

3.2.6.4 KitProg3 programming/GPIO header (J7)

A 5 × 2 header is provided on the board to bring out more PSoC™ 5LP MCU GPIOs. This header also brings out the PSoC™ 5LP MCU programming pins and can be programmed using **MiniProg4** and a five-pin programming connector. J7 is not populated by default.

Note: *In the Rev *F version of the kit, the silkscreen on the board shows KitProg2. However, the KitProg3 is loaded on the kit.*

3.2.7 CAPSENSE™ circuit

A CAPSENSE™ slider and two buttons, all of which support both self-capacitance (CSD) and mutual-capacitance (CSX) sensing, and a CSD proximity sensor (header) are connected to PSoC™ 6 MCU as **Figure 27** shows. Four external capacitors – C_{MOD} and C_{SH} for CSD, C_{INTA} and C_{INTB} for CSX are present on the Pioneer Board. Note that CSH is not loaded by default. For details on using CAPSENSE™ including design guidelines, see the **Getting started with CAPSENSE™ design guide**.

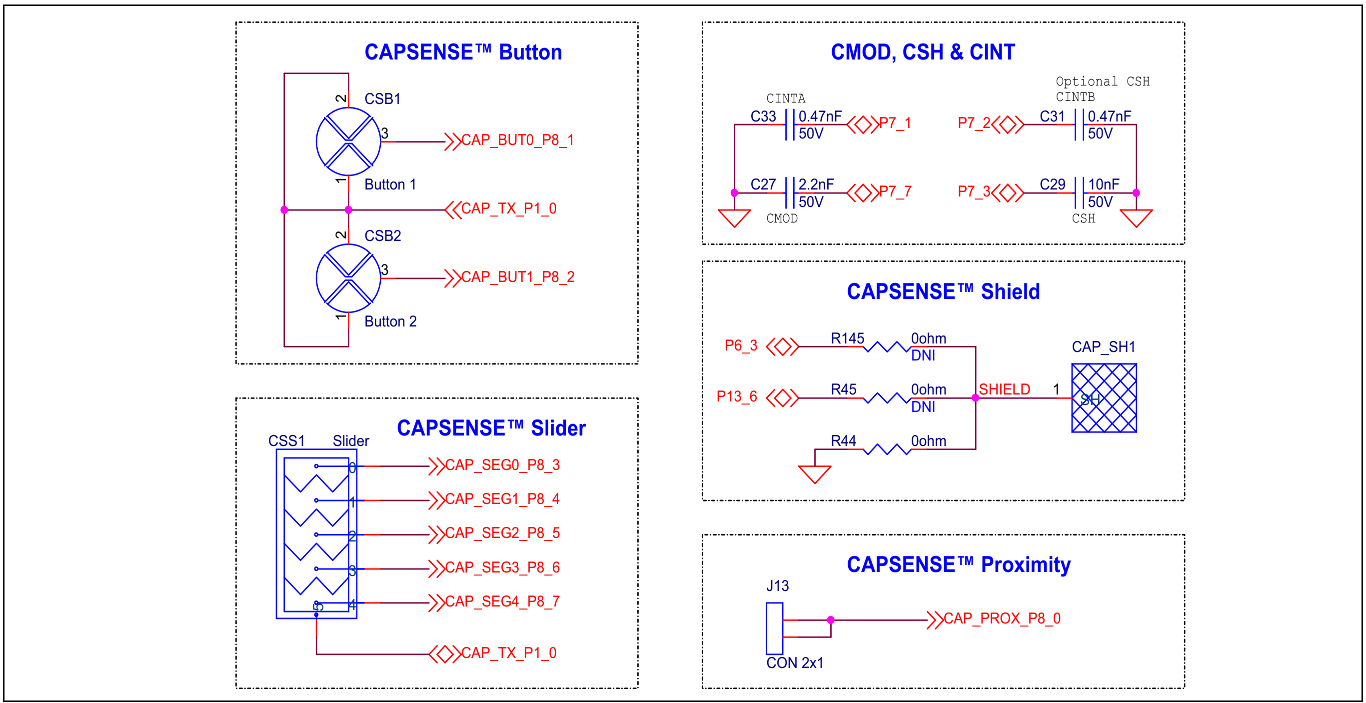


Figure 27 Schematics of CAPSENSE™ circuit

3.2.8 LEDs

LED1, **LED2**, and **LED3** (red, amber, and green respectively) indicate the KitProg3 status (see the **KitProg3 user guide** for details). **LED4** (amber) indicates the status of power supplied to the PSoC™ 6 MCU.

The Pioneer Board also has two user-controllable LEDs **(LED8** and **LED9)** and an RGB LED **(LED5)** connected to the PSoC™ 6 MCU pins for user applications.

3.2.9 Push buttons

The PSoC™ 6 Wi-Fi Bluetooth® pioneer kit has a reset button and three user buttons:

- The reset button **(SW1)** is connected to the XRES pin of the PSoC™ 6 MCU, and is used to reset the device.
- The user button **(SW2)** is connected to pin P0[4] of the PSoC™ 6 MCU. **(SW2)** can be changed to active HIGH mode by changing the zero resistors as shown in the figure below.
- **SW3** is connected to PSoC™ 5LP MCU for programming mode (see **KitProg3 user guide** for details).

All the buttons connect to ground on activation (active LOW) by default.

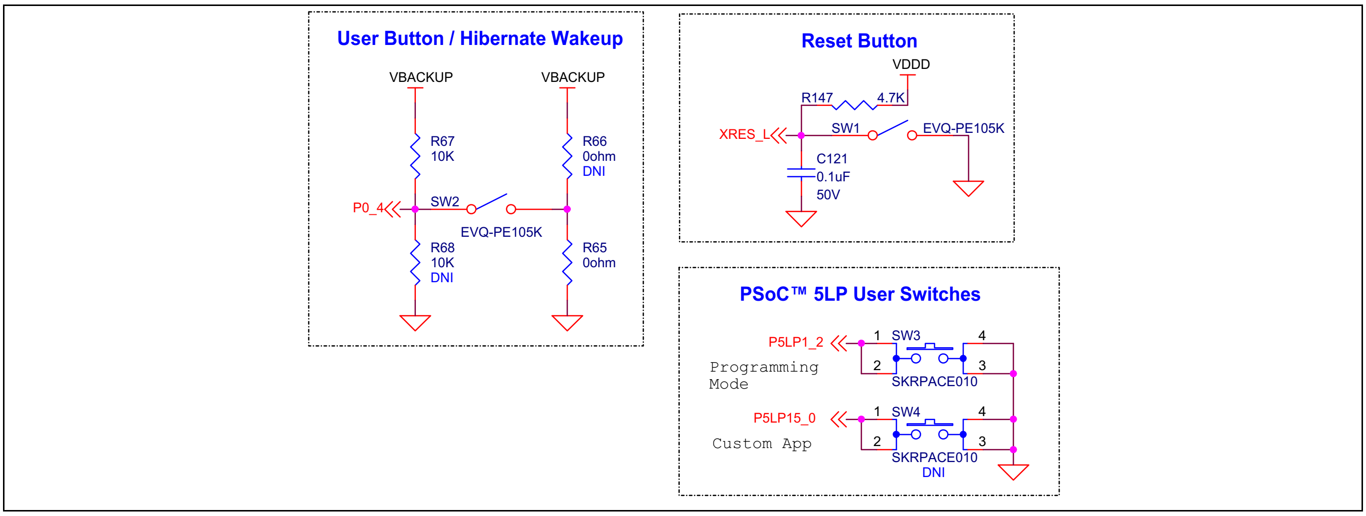


Figure 28 Schematics of push buttons

3.2.10 NOR flash

The Pioneer Board has a NOR flash memory (**S25FL512SAGMFI011**) of 512 Mb capacity. The NOR flash is connected to the serial memory interface (SMIF) of the PSoC™ 6 MCU. The NOR flash device can be used for both data and code memory with execute-in-place (XIP) support and encryption.

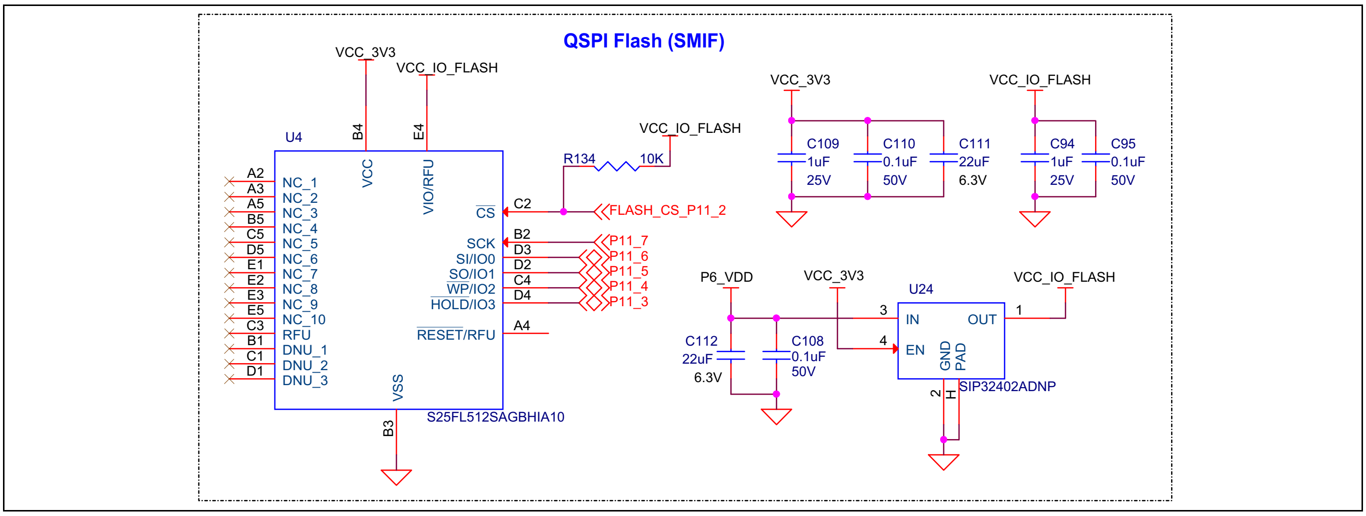


Figure 29 Schematics of NOR flash

3.2.11 Quad SPI F-RAM

The Pioneer Board contains the CY15B104QSN EXCELON™ F-RAM device, which can be accessed through Quad SPI interface. The F-RAM is 4-Mbit (512K × 8) and is capable of Quad SPI speed up to 108 MHz but the PSoC™ 6 MCU is limited to 80 MHz.

Note that if P6_VDD is set to 1.8 V, the speed is limited to 75 MHz. This limitation is only specific to this kit.

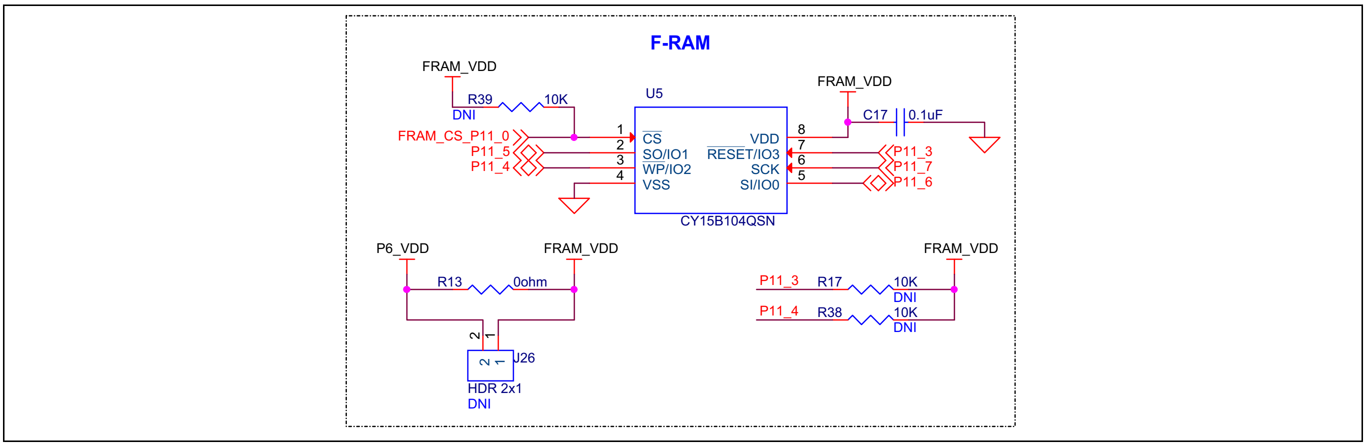


Figure 30 Schematics of Quad SPI F-RAM

3.2.12 Wi-Fi and Bluetooth® module

The Pioneer Board features an on-board Wi-Fi and Bluetooth® combination module to demonstrate the wireless communication features. This LBEE5KL1DX is a Type 1DX module available with 2.4-GHz WLAN and Bluetooth® functionality. Based on AIROC™ CYW4343W Wi-Fi & Bluetooth® combo chip, this module provides high-efficiency RF front-end circuits.

Hardware

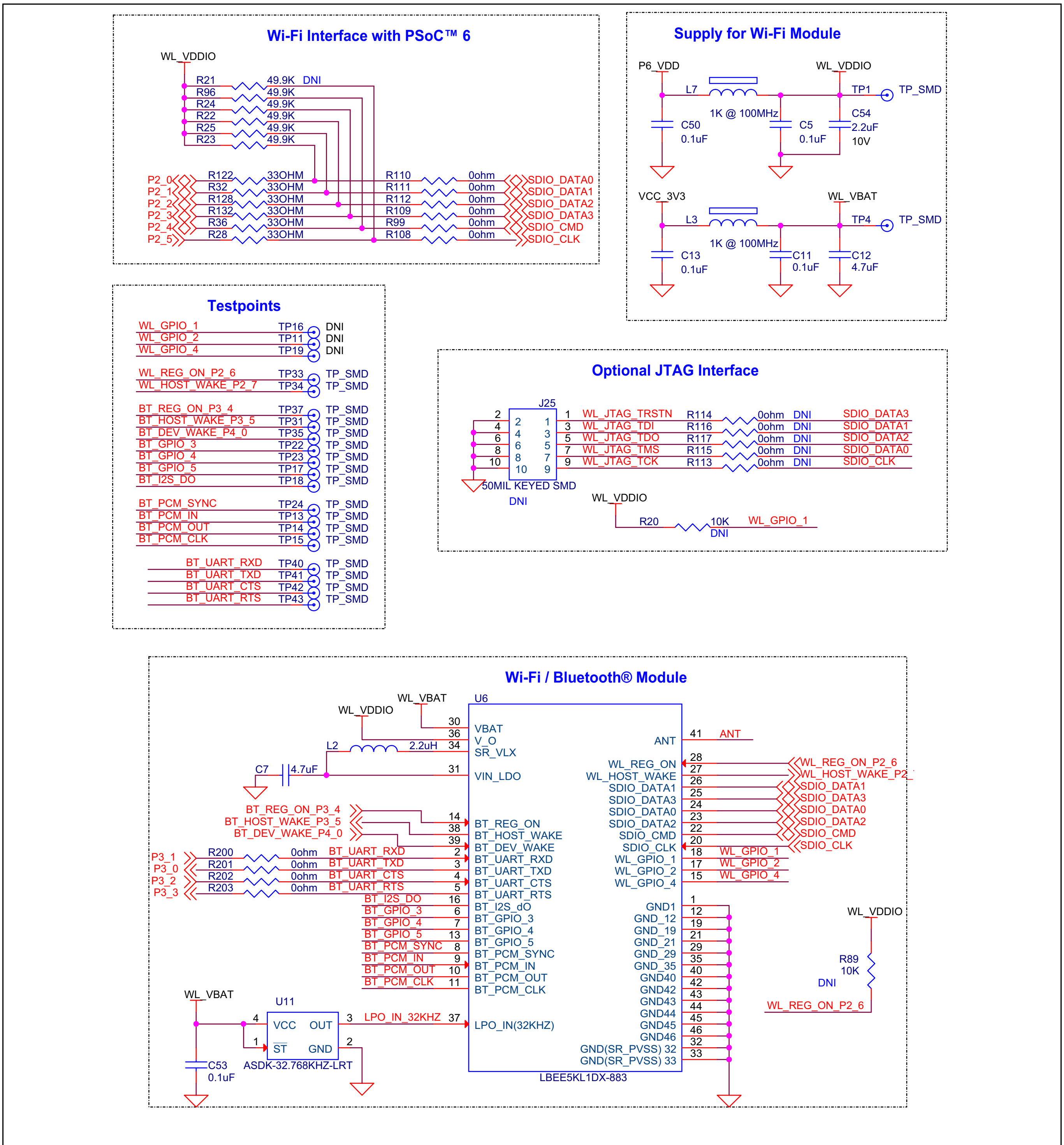


Figure 31 Schematics of Wi-Fi and Bluetooth® module

3.2.13 USB host and USB device connections

The PSoC™ 6 MCU can be configured as either a USB host or USB device. When PSoC™ 6 is programmed as a host controller, you can connect an external device such as mouse, keyboard, and flash memory to the USB Type-A receptacle port (J27). When the PSoC™ 6 MCU is programmed as a USB device, you can connect the kit either to a PC or to another host controller through a Type-C cable at the USB Type-C connector (J28).

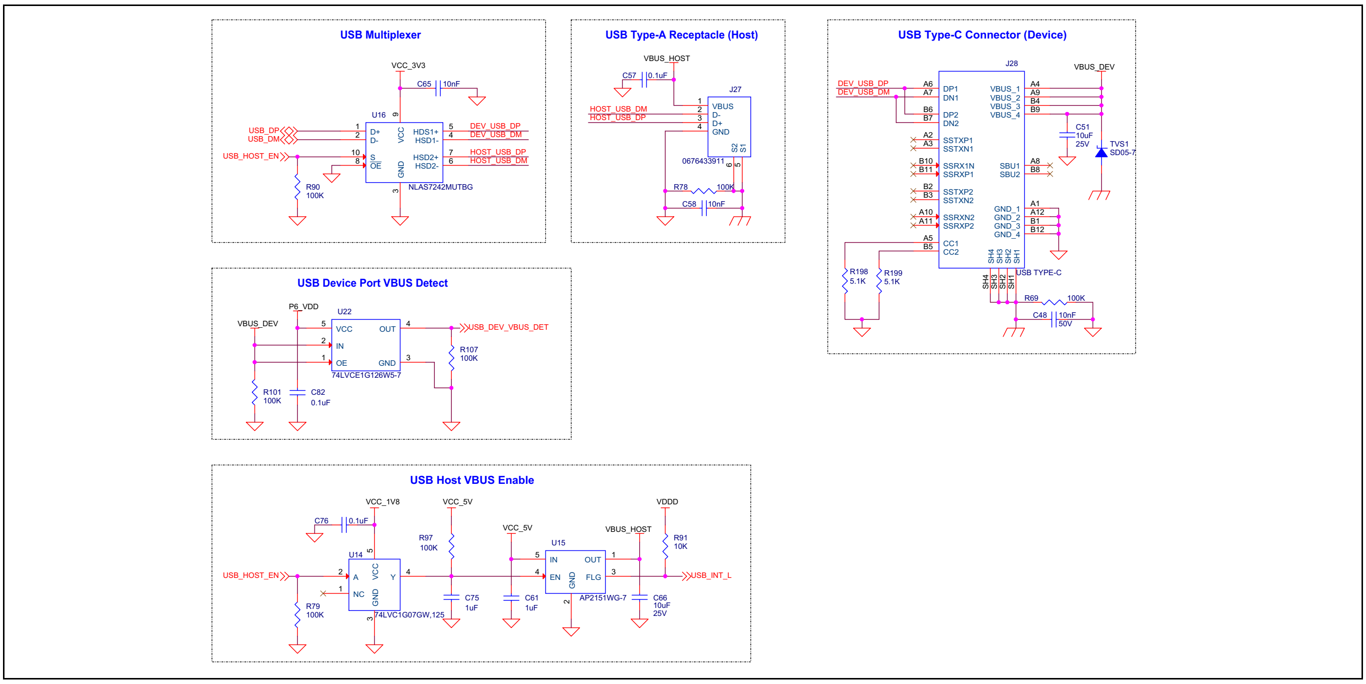


Figure 32 Schematics of USB host

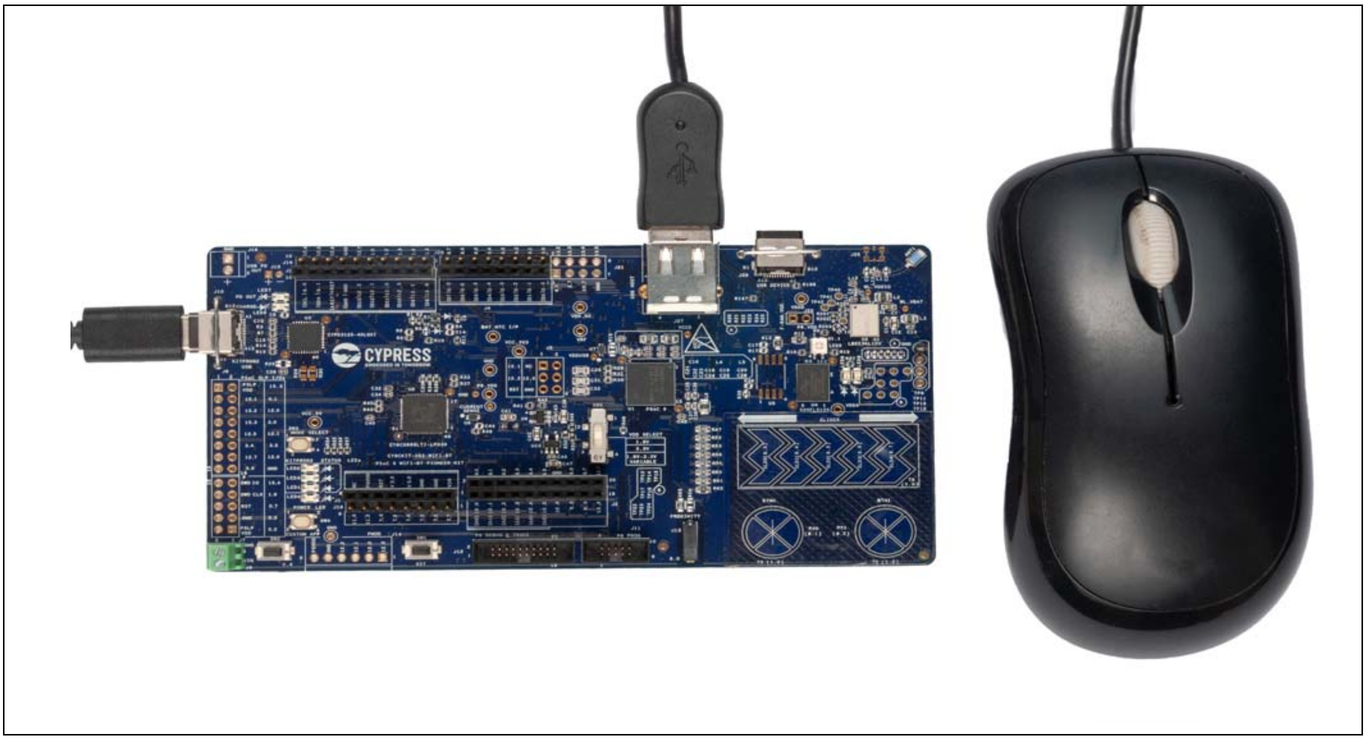


Figure 33 USB device connections

3.3 PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board reworks

3.3.1 Bypass protection circuit on program and debug header (J11)

The 10-pin header allows you to program and debug the PSoC™ 6 MCU using an external programmer such as MiniProg4. This header has a protection circuit that cuts-off any voltage greater that 3.4 V on VTARG_REF pin. This is to ensure that the PSoC™ 6 MCU and other 3.3-V devices do not get damaged due to overvoltage.

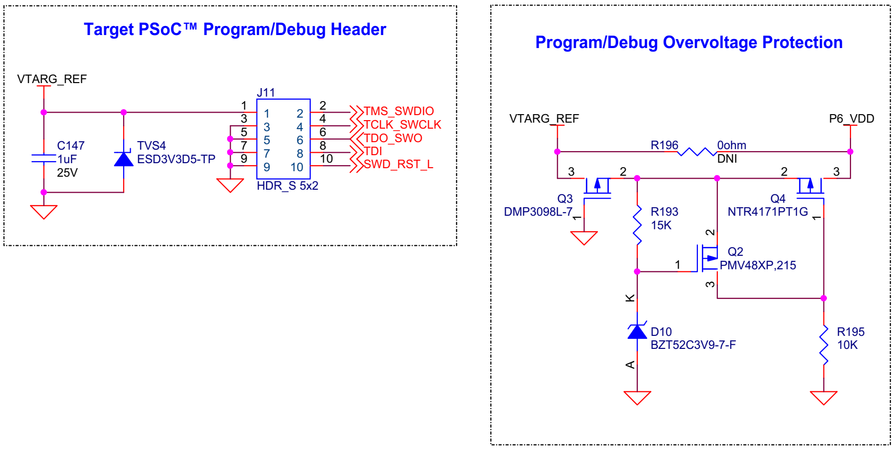


Figure 34 Schematics of bypass protection circuit on program and debug header (J11)

If the external programmer provides a slightly higher voltage, say 3.42 V, and you still need to use the programmer, you can bypass this protection circuit by populating the bypass zero-ohm resistor R196.

Note that this change will compromise the protection circuit when an external supply is used and will permanently damage any 3.3-V device if the external voltage exceeds absolute maximum limit of the device. See the respective device datasheet for absolute maximum voltage limits.

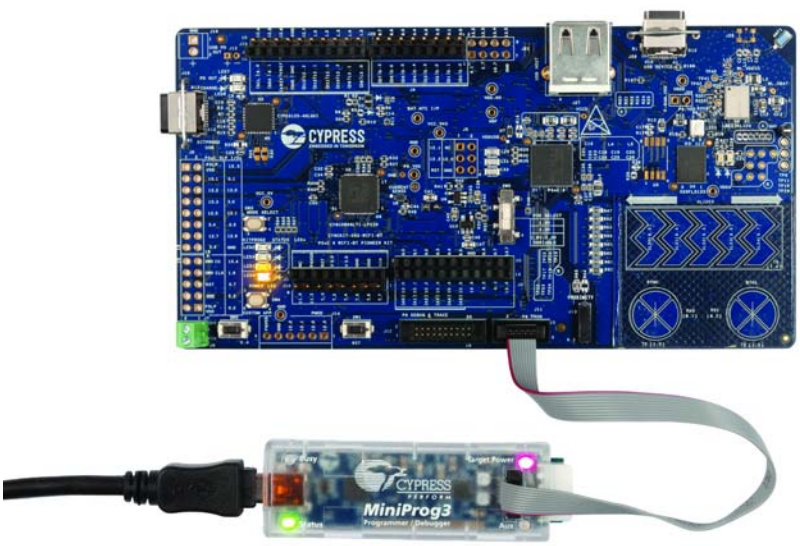


Figure 35 PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board connection with MiniProg3

Notes:

1. *If you are programming the PSoC™ 6 MCU using a MiniProg4 connected to J11, make sure that the voltage is set at either 2.5 V or at 3.3 V.*
2. *If you want to program the PSoC™ 6 MCU using MiniProg4 at the 1.8 V condition, make sure that you are populating the 0-ohm resistor R196 on the board. This is to bypass the overvoltage protection circuit, as the protection circuit does not allow programming of the device at 1.8 V.*
3. *Powering PSoC™ 6 through MiniProg4 sometimes turns on the LED4. This is due to the reverse conduction from PSoC™ 6 VDD domain to the VCC_3V3 domain when there is no USB device connected at J10.*
4. *Do not mount the CY8CKIT-028-Display shield on the PSoC™ 6 Pioneer Board at the time of programming and debugging through the J11 header. This causes extra load on the external programmer, and hence the programmer may not be able to power-up the PSoC™ 6 supply domain.*

3.3.2 PSoC™ 6 MCU user button (SW2)

By default, this button connects the PSoC™ 6 MCU pin to ground when pressed; you need to configure the PSoC™ 6 MCU pin as a digital input with resistive pull-up for detecting the button press. If you want to sense active HIGH on the PSoC™ 6 MCU pin, resistor R67 should be removed and R68 should be populated. This will connect the button connecting the PSoC™ 6 MCU pin to VBACKUP when pressed. Additionally, footprints are provided for pull-up and pull-down resistors that can be populated if external pull-up is required.

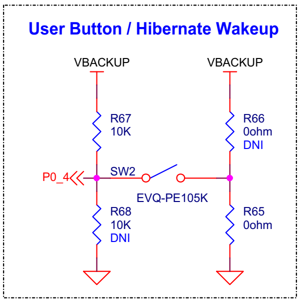


Figure 36 Schematics of PSoC™ 6 MCU user button (SW2)

3.3.3 SWD connector receptacle (J29)

This connector can be used for conductive measurements and can also be used to connect external antenna. This is not loaded by default. Remove L1, populate L13, and the SWD connector (J29) to connect the external antenna. See the BOM for recommended part numbers.

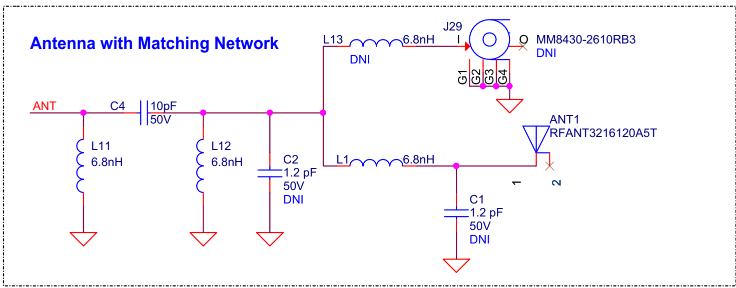


Figure 37 Schematics of SWD connector receptacle (J29)

3.3.4 CAPSENSE™ shield

The hatched pattern around the CAPSENSE™ buttons and slider are connected to ground. If liquid tolerance is required, this pattern needs to be connected to the shield pin. This pattern can be connected to either of the two ports P6.3 or P13.6 populated by R145 or R45, respectively. In both cases, resistor R44 connecting the hatched pattern to ground needs to be removed.

Connecting the hatched pattern to shield instead of ground will also reduce the parasitic capacitance of the sensors.

3.3.5 CSH

The shield tank capacitor (CSH) is not populated by default. This capacitor is optional, and can be used for an improved shield electrode driver when CSD sensing is used. You can remove R146 to disconnect port 7.3 from header and populate C29 (10 nF) for CSH. See the bill of material (BOM) for the recommended part number.

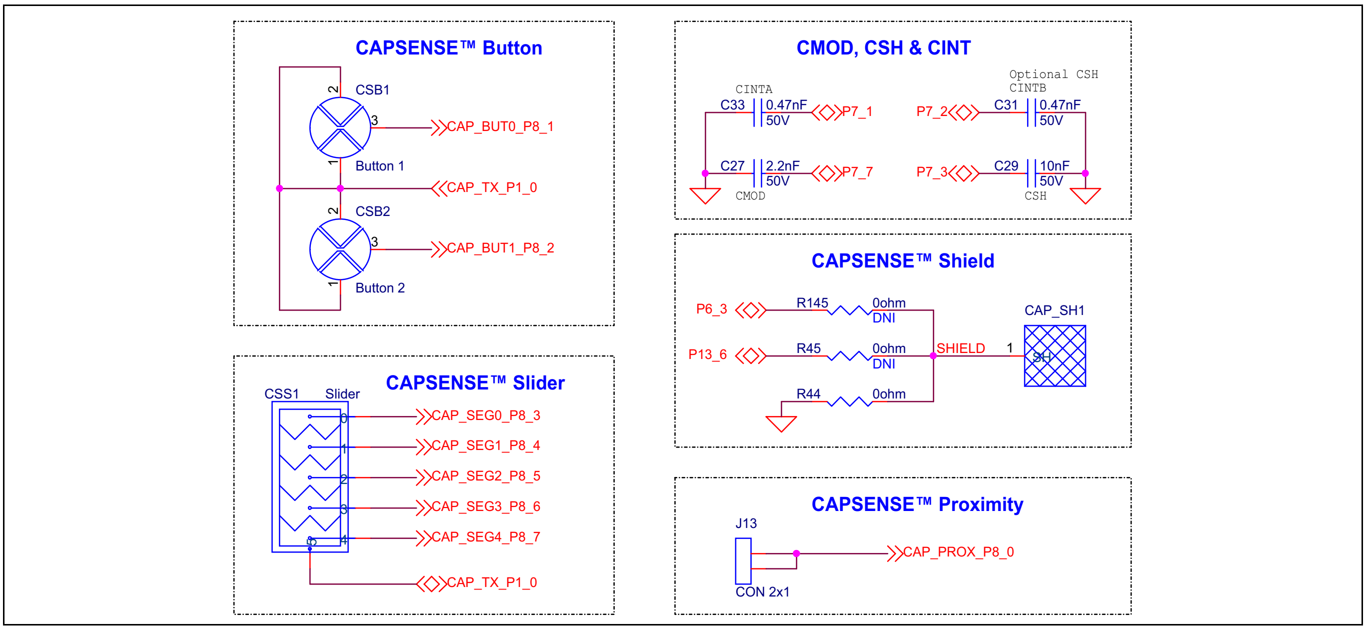


Figure 38 Schematics of CAPSENSE™ shield and CSH

3.3.6 Multiplexed GPIOs

Some PSoC™ 6 MCU pins are multiplexed with on-board peripherals and are not connected to connectors or other secondary components by default. See **Table 1** for details on modification required to access these pins.

3.4 Bill of materials

See the BOM files in the **kit webpage**.

3.5 Frequently asked questions

1. I do not have a Type-C connector on my PC. Can I still connect and use this kit?
2. How does CY8CKIT-062-WIFI-BT handle voltage connection when multiple power sources are plugged in?
3. How can I access smart I/O and other GPIOs connected to on-board peripherals?
4. What are the three selection switches on baseboard used for?
5. What is the on-board jumper for?
6. What are the input voltage tolerances? Are there any overvoltage protection on this kit?
7. Why is the voltage of the kit restricted to 3.3 V? Can it drive external 5-V interfaces?
8. I powered my board from Arduino by mistake while powering the PSoC™ 6 MCU. Is my PSoC™ 6 device alive?
9. I am unable to program the target device.
10. Does the kit get powered when I power it from another Infineon kit through the J1 header?
11. What additional overlays can be used with CAPSENSE™?
12. What is Pmod?
13. With what type of shield from Infineon can I use this baseboard?
14. Why am I not able to program PSoC™ 6 MCU using MiniProg4 at 1.8 V?
15. How can SW2 be used for PMIC wake up?
16. Can I charge any kind of Type-C device using this kit?
17. How can I evaluate the USB Type-C provider and consumer features to get started?

1. I do not have a Type-C connector on my PC. Can I still connect and use this kit?

Yes. To evaluate PSoC™ 6 MCU features, any PC with USB 2.0 connectivity is sufficient.

2. How does CY8CKIT-062-WIFI-BT handle voltage connection when multiple power sources are plugged in?

There are five options to power the baseboard: Type-C USB connector (J10), external DC supply via VIN connector (J9/ J1), debug and trace header (J12, VTARG_IN), program and debug header (J11). Type-C and VIN take priority over other supply options. These inputs are ORed using a diode, and the higher voltage between the two take precedence. The output of the ORing diode is given to a buck-boost regulator (**U30**) that generates a constant 5.2 V. This output is ORed with the ETM supply (J12), which is typically 5 V. For most practical applications, the output from the 5.2-V regulator takes priority and the same is given as an input to the voltage regulator (U10). LiPo battery voltage is used when all the above sources are absent. The output of the buck regulator (U30) is ORed with the supply voltage from the program and debug header (J11); the higher voltage takes precedence. See **Table 6** for more details on voltage input and output scenarios.

3. How can I access smart I/O and other GPIOs connected to the on-board peripherals?

The smart I/O (Port 8 and Port 9.3) and GPIO connected to the on-board peripherals are multiplexed with PSoC™ 6 MCU I/O headers (**J2** and **J20**). By default, some of these I/Os are connected to the on-board peripherals using series resistors. These resistors can be changed to route these I/Os to headers. See **Table 1** for the list of resistors that needs to be changed.

4. What are the three selection switches on the baseboard used for?

Table 5 gives details on all two selection switches.

5. What is the on-board jumper used for?

The jumper J8 can be used to measure the current of the PSoC™ 6 MCU without the need to desolder any component from the board. An ammeter can be connected across this jumper to measure the current consumed by the PSoC™ 6 MCU. Remove the jumper on J8, connect an ammeter (positive terminal of ammeter to Pin 2), and power the kit though USB connector J10.

6. What are input voltage tolerances? Are there any overvoltage protection on this kit?

Input voltage levels are as follows:

Table 8 Input voltage levels

Supply	Typical input voltage	Absolute maximum (overvoltage protection)
USB Type-C connector (J10)	4.5 V to 12 V	15 V
VIN connector (J9/J1)	5 V to 12 V	15 V
Debug and trace header (J12)	5 V	5.5 V
Program and debug header (J11)	1.8 V to 3.3 V	3.6 V
Li-Po battery connected (J15)	3.2 V to 4.2 V	5 V

7. Why is the voltage of the kit restricted to 3.3 V? Can it drive external 5-V interfaces?

The PSoC™ 6 MCU is not meant to be powered for more than 3.6 V. Powering the PSoC™ 6 MCU to more than 3.3 V will damage the chip. You cannot drive the I/O system with more than 3.3-V supply voltages.

8. I powered my board from Arduino by mistake while powering the PSoC™ 6 MCU. Is my PSoC™ 6 MCU device alive?

Yes. The 3.3 V and 5 V on the power header compatible with Arduino are not input pins and have protection circuit to prevent the voltage from entering the board. VIN is an input pin and this is routed to the regulator, which is capable of taking an absolute maximum of 15 V. The P6.V_{DD} pin is not protected and care should be taken not to supply voltage to this pin.

9. I am unable to program the target device.
   a) Ensure that SW7 is in the VDDD/KITPROG3 position.
   b) Make sure that no external devices are connected to J11.
   c) Update your KitProg3 version to the latest using the steps mentioned in the **KitProg3 user guide**.
   d) Ensure that the BSP selected in ModusToolbox™ software is CY8CKIT-062-WIFI-BT.

10. Is it possible to power the kit from another Infineon kit through the J1 header?

Yes, VIN pin on the J1 header is the supply input/output pin and can support up to 12 V.

11. What additional overlays can be used with CAPSENSE™?

Any overlay (up to 5-mm thickness) such as wood, acrylic, and glass can be used with CAPSENSE™. Note that additional tuning may be required when the overlay is changed.

12. What is Pmod?

The peripheral module or Pmod interface is an open standard defined by Digilent Inc. in the Digilent Pmod interface specification for peripherals used with FPGAs or microcontrollers. Several module types are available – from simple push buttons to more complex modules with network interfaces, analog to digital converters, or LCD displays. Peripherals compatible with Pmod are available from multiple vendors such as Diligent, Maxim Integrated, Analog Devices, and a variety of hobby sites. This kit supports only 1 × 6 pin interface compatible with Pmod.

13. What type of shield from Infineon is compatible with this baseboard?

Any shield compatible with Arduino Uno that supports 3.3-V operation is compatible with this Pioneer Board. The following Infineon shields are pin-compatible with this board:

- CY3280-MBR3
- CY8CKIT-022
- CY8CKIT-024
- CY8CKIT-026
- CY8CKIT-040
- CY8CKIT-046
- CY8CKIT-048

14. Why am I not able to program PSoC™ 6 MCU using MiniProg4 at 1.8 V?

The "program/debug overvoltage protection" circuit shown in **"Bypass protection circuit on program and debug header (J11)"** on page 47 does not allow programming of the device at 1.8 V through MiniProg4. If you want to program the PSoC™ 6 MCU using MiniProg4 at the 1.8-V condition, make sure you are populating the 0-ohm resistor at R196 on the board. This resistor will bypass the protection circuit and will allow programming of the device at 1.8 V. Make sure you are not populating this resistor at any other voltage of operation.

15. How can SW2 be used for PMIC wakeup?

SW2 is connected to the PMIC_Wakeup_In pin (P0.4) of the PSoC™ 6 MCU. A logic HIGH input at the PMIC_Wakeup_In pin can wake up the system and enable the PMIC. See the "Backup" chapter in **PSoC™ 6 MCU architecture reference manual** for more details of this feature.

SW2 should be externally pulled down to ground to use PMIC control. Moreover, when the switch is pressed, the active HIGH logic should push P0.4 to the VBACKUP supply. However, the kit is configured by default to use active LOW logic as described in **"Push buttons"** on page 43. In addition, in REV04 or later version of the kit, the active HIGH logic for SW2 pushes P0.4 to VBACKUP. Therefore, the following re-works on the kit are required to use the PMIC control feature:

- Remove R65 and populate the 0-Ω resistor R66.
- Remove R67 and populate a 10-kΩ resistor at R68.

16. Can I charge any kind of Type-C device using this kit?

The kit is programmed to advertise the VIN voltage with 1 A current rating. 5-V and 12-V devices are the recommended options. VIN needs to be 5 V and 12 V respectively for this to work

17. How can I evaluate the USB Type-C provider and consumer features to get started?

You can use any kind of Type-C laptop, mobile phone, or PD adapters based on the feature that you are trying to evaluate. When using as a consumer, note that devices such as laptops may be able to provide only 5 V out and may not support 9 V/12 V without a docking station. To use as a provider, any 5 V/9 V/12 V device that has a current requirement of less that 1 A may be used. Additionally, Infineon has its own USB Type-C evaluation kit, which can be used to evaluate the provider and consumer features and many more. See **USB-C Power Delivery Controllers** for more details on these kits..

Revision history

Document version	Date of release	Description of changes
**	2018-02-21	New kit guide.
*A	2018-03-30	Updated **"Kit operation"** on page 20: Updated **"CY8CKIT-028-TFT details"** on page 25: Updated **"CY8CKIT-028-TFT display shield"** on page 25: Updated description. Updated table "TFT Shield Pinout".
*B	201-05-03	Updated **"Hardware"** on page 35: Updated **"Hardware functional description"** on page 35: Updated **"Push buttons"** on page 43: Updated description. Updated **"NOR flash"** on page 43: Added image. Updated **"Frequently asked questions"** on page 50: Updated description.
*C	2018-12-05	Updated PSoC™ Creator chapter on page 19: Updated "Kit Code Examples" on page 22: Updated "Using the Kit Code Examples Built in PSoC™ Creator" on page 22: Updated table "Code Example in PSoC™ Creator". Updated **"Kit operation"** on page 20: Updated CY8CKIT-028-TFT Details: Updated CY8CKIT-028-TFT Display Shield: Updated description. Completing Sunset Review.
*D	2019-03-12	Updated **"Kit operation"** on page 20: Updated CY8CKIT-028-TFT Details: Updated CY8CKIT-028-TFT Display Shield: Updated description.
*E	2019-04-09	Updated **"Kit operation"** on page 20: Updated **"Theory of operation"** on page 20: Updated description. Updated **"Hardware"** on page 35: Updated **"Hardware functional description"** on page 35: Updated **"PSoC™ 6 MCU (U1)"** on page 35: Updated description.
*F	2019-12-13	Updated **Kit operation chapter on page 20**: Updated **"Theory of operation"** on page 20: Updated description. Updated hyperlinks. Updated **Hardware chapter on page 35**: Updated **"Hardware functional description"** on page 35: Added **"Quad SPI F-RAM"** on page 44. Updated to new template.

Revision history

Document version	Date of release	Description of changes
*G	2021-02-03	Updated **Safety and regulatory compliance information chapter on page 5**: Updated **"Regulatory compliance information" on page 5**: Updated description. Updated to new template.
*H	2021-03-29	Updated **Safety and regulatory compliance information chapter on page 5**: Updated **"Regulatory compliance information" on page 5**: Updated description.
*I	2019-08-29	Replaced "BT" with "Bluetooth®" in required instances across the document. Replaced "CY8CKIT-062-WiFi-BT" with "CY8CKIT-062-WIFI-BT" in all instances across the document. Updated Document Title to read as "CY8CKIT-062-WIFI-BT PSoC™ 6 Wi-Fi Bluetooth® pioneer kit guide". Updated **"Introduction"** on page 6: Updated description. Updated hyperlinks. Updated **"Kit contents"** on page 6: Updated **Figure 1**. Removed "Software introduction". Updated **"Board details"** on page 7: Replaced "Hardware Introduction" with "Board details" in heading. Updated **"CY8CKIT-062-WIFI-BT board details"** on page 7: Updated description. Updated **Figure 2**. Updated **Figure** . Added **Table 1**. Updated **"CY8CKIT-028-TFT board details"** on page 15: Updated **"Technical support"** on page 17: Updated description. Removed "PSoC™ Creator" chapter. Removed "WICED" chapter. Updated **"Kit operation"** on page 20: Replaced "Kit Hardware" with "Kit operation" in heading. Added description. Updated **"Theory of operation"** on page 20: Replaced "CY8CKIT-062-WiFi-BT Details" with "Theory of operation" in heading. Updated description. Updated **Figure 2-2**. Updated **Figure 4-1**. Updated **Table 5**. Removed table "Selection Switches on the Pioneer Board". Removed figure "Pioneer Board Pinout". Removed table "Pioneer Board Pinout". Removed table "TFT Shield Pinout". Updated **"CY8CKIT-028-TFT details"** on page 25: Updated **"CY8CKIT-028-TFT display shield"** on page 25: Updated description.

Revision history

Document version	Date of release	Description of changes
*I	2019-08-29	Removed “KitProg2”. Added **“KitProg3: On-board programmer/debugger”** on page 27. Removed “EZ-PD™ CCG3 Type-C Power Delivery”. Updated **“NOR flash”** on page 43: Replaced “Cypress NOR Flash” with “NOR Flash” in heading. Updated description. Updated **Figure 29**. Updated **“Quad SPI F-RAM”** on page 44: Replaced “Cypress Quad SPI F-RAM” with “Quad SPI F-RAM” in heading. Updated **Figure 30**. Updated **“Wi-Fi and Bluetooth® module”** on page 44: Updated description. Updated **Figure 31**. Updated **“USB host and USB device connections”** on page 46: Updated **Figure 32**. Updated **“PSoC™ 6 Wi-Fi Bluetooth® Pioneer Board reworks”** on page 47: Updated **“Bypass protection circuit on program and debug header (J11)”** on page 47: Updated description. Updated **Figure 34**. Updated **“PSoC™ 6 MCU user button (SW2)”** on page 48: Updated **Figure 36**. Updated **“SWD connector receptacle (J29)”** on page 48: Updated **Figure 37**. Updated **“CAPSENSE™ shield”** on page 49: Updated description. Updated **“CSH”** on page 49: Updated **Figure 38**. Removed “Li-Po battery charger”. Updated **“Bill of materials”** on page 49: Updated description. Removed “WICED Configuration”. Updated **“Frequently asked questions”** on page 50: Updated description. Updated **Table 8**. Updated hyperlinks.

Revision history

Document version	Date of release	Description of changes
*J	2023-12-18	Migrated to IFX template. Updated Introduction Updated **"CY8CKIT-062-WIFI-BT board details"** on page 7: Updated **Table 1** Updated **"Theory of operation"** on page 20 Updated **"Programming and debugging using ModusToolbox™ software"** on page 27 Updated **"USB-SPI bridge"** on page 32 Added **"EZ-PD™ CCG3 power delivery system"** on page 37 Updated **"Power supply system"** on page 38 Updated **Table 7** Updated **"KitProg3 programming/GPIO header (J7)"** on page 41 Updated **"Frequently asked questions"** on page 50:

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