PSoC™ 4 HVMS 128K: KIT_PSoC4-HVMS-128K_LITE kit user guide

About this document

Scope and purpose

KIT_PSoC4-HVMS-128K_LITE is a lite kit for the PSoC™ high-voltage (HV) mixed signal (MS) 128K microcontrollers, a fully integrated programmable embedded systems for automotive HMI, low-end body control, PTC heaters, safety applications, such as hands-on detect, passenger occupant detection, and other smart edge sensors. The system features an Arm® Cortex®-M0+ processor with programmable and reconfigurable analog and digital blocks.

It is a combination of a microcontroller with the following:

- A 12-bit SAR ADC
- Fifth-generation multi-sense converter (MSC) block supporting capacitive sensing (CAPSENSE™)
- Digital peripherals, such as PWMs
- Serial communication interfaces along with a LIN/CXPI interface with integrated PHY
- High-voltage subsystem to operate directly off the 12-V car battery

Intended audience

This document is intended for design engineers and evaluation for automotive HMI, low-end body control, PTC heaters, safety applications such as hands-on detect, passenger occupant detection, and other smart edge sensors.

Important notice

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Safety precautions

Note: *Please note the following warnings regarding the hazards associated with development systems.*

Table 1 Safety precautions

	**Warning**: *The evaluation or reference board contains DC bus capacitors which take time to discharge after removal of the main supply. Before working on the drive system, wait for five minutes for the capacitors to discharge to safe voltage levels. Failure to do so may result in personal injury or death. Darkened display LEDs are not an indication that capacitors have discharged to safe voltage levels.*
	**Warning:** *The evaluation or reference board is connected to the grid input during testing. Therefore, high-voltage differential probes must be used when measuring voltage waveforms by oscilloscope. Failure to do so may result in personal injury or death. Darkened display LEDs are not an indication that capacitors have discharged to safe voltage levels.*
	**Warning:** *Remove or disconnect power from the drive before you disconnect or reconnect wires or perform maintenance work. Wait for five minutes after removing power to discharge the bus capacitors. Do not attempt to service the drive until the bus capacitors have discharged to zero. Failure to do so may result in personal injury or death.*
	**Caution:** *The heat sink and device surfaces of the evaluation or reference board may become hot during testing. Therefore, necessary precautions are required while handling the board. Failure to comply may cause injury.*
	**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:** *A drive that is incorrectly applied or installed can lead to component damage or reduction in product lifetime. Wiring or application errors such as undersizing the motor, supplying an incorrect or inadequate AC supply, or excessive ambient temperatures may result in system malfunction.*
	**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 KIT_PSoC4-HVMS-128K_LITE kit contents

The kit includes one main board and a USB cable.

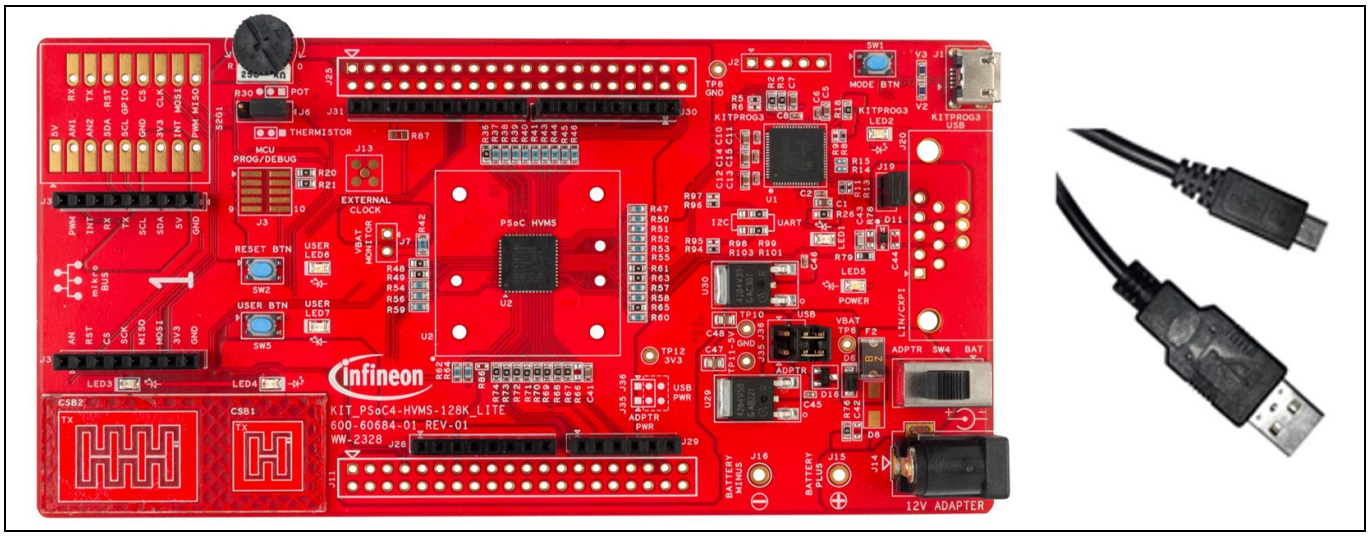

Figure 1 KIT_PSoC4-HVMS-128K_LITE kit contents

KIT_PSoC4-HVMS-128K_LITE kit contents

1.1 Overview

The KIT_PSoC4-HVMS-128K_LITE board can mount the 56-QFN package of PSoC™ 4 HVMS 128K microcontrollers (MCU). The kit features and blocks are shown in Figure 2.

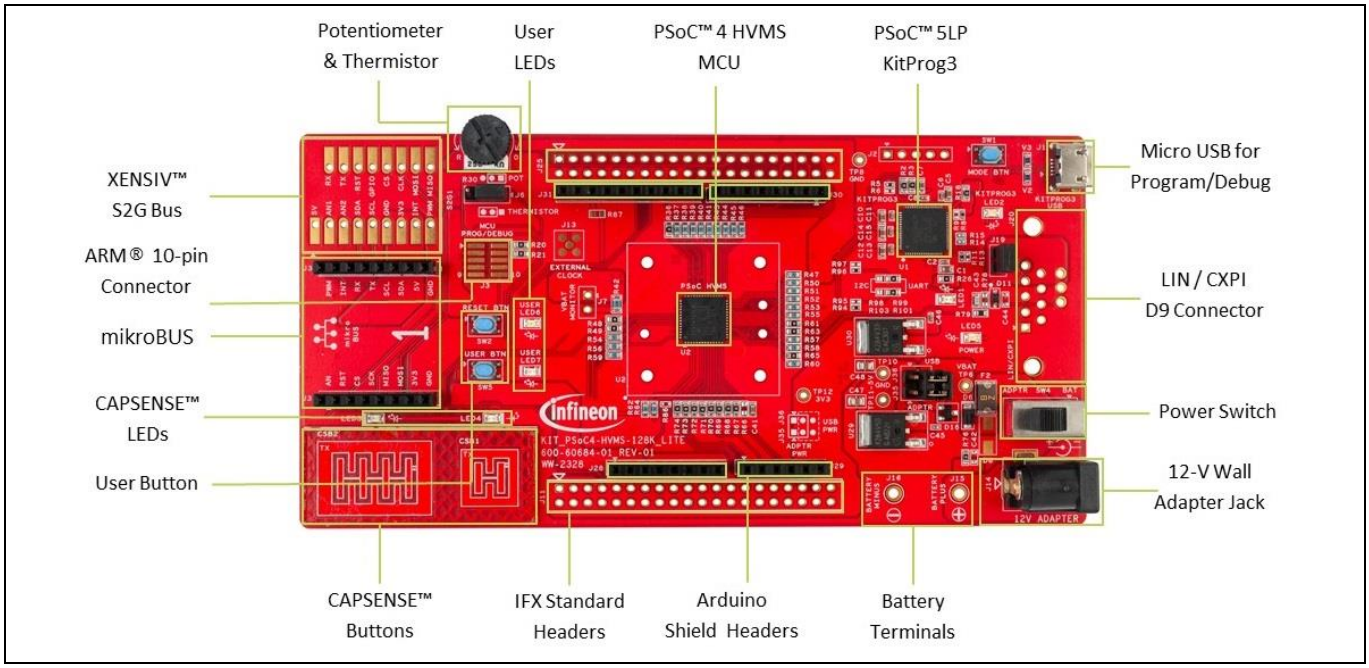

Figure 2 KIT_PSoC4-HVMS-128K_LITE board - top view

1.2 Block diagram

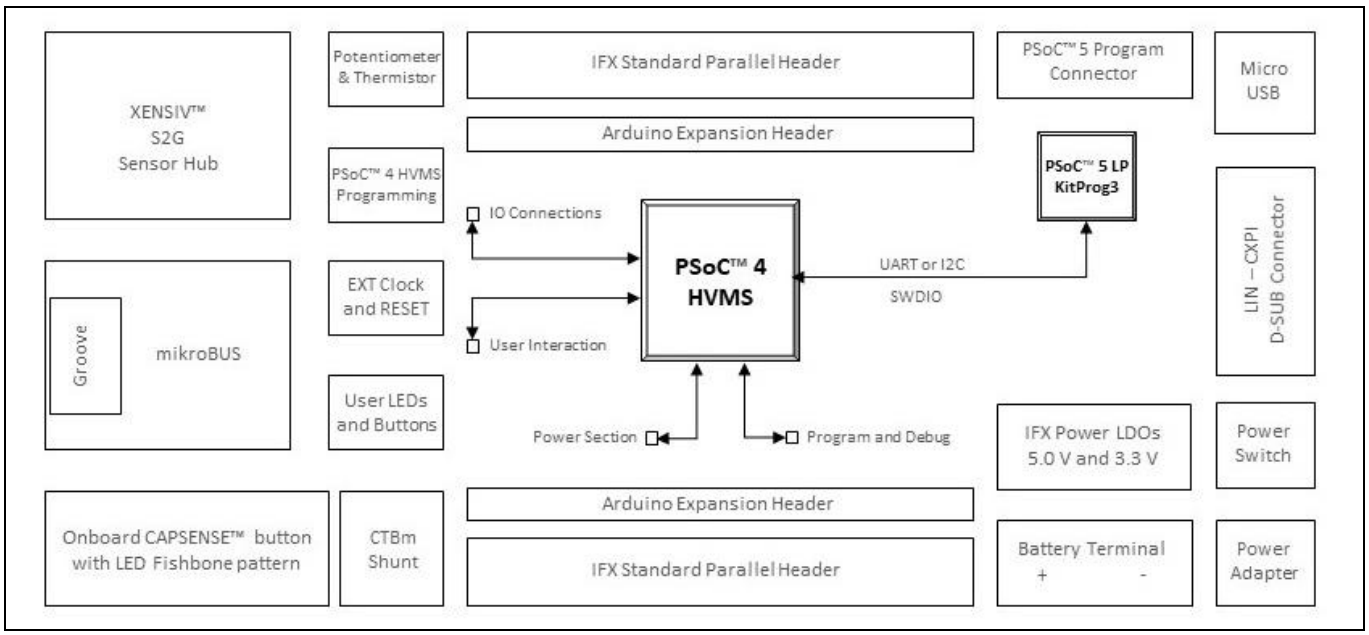

Figure 3 KIT_PSoC4-HVMS-128K_LITE kit board – block diagram

1.3 Board functions

Table 2 KIT_PSoC4-HVMS-128K_LITE kit board functions

#	Function	Specification	Remarks	Note
1	PSoC™ 4 HVMS MCU	CY8C4147LWE	U2: 56-QFN (0.5-mm pitch)	–
2	PSoC™ 5LP KitProg3	CY8C5868LTI-LP039	U1: 68-QFN	–
3	Power input	12-V wall adapter (1 A)	J14 (DC Jack)	–
4	Power input	Automotive battery input	J15/J16	No load
5	Power input	Power input select jumpers (USB or 12-V wall adapter)	J35/J36	–
6	Power switch	Input power select switch	SW4	–
7	Power LED	VBAT monitor LED	LED5 (blue)	–
8	USB connector	Micro USB connector	J1	–
9	Power LED	USB VBUS monitor LED	LED2 (blue)	–
10	Status LED	KitProg3 status LED	LED1 (Green)	–
11	Program connector	10-pin MIPI connector for MCU	J3	No load
12	Program connector	2.54-pitch connector for KitProg3	J2 (5 pins)	No load
13	CAPSENSE™ button	CSX button 100x100	CSB1	PCB tracks
14	CAPSENSE™ button	CSX button 200x130	CSB2	PCB tracks
15	CAPSENSE™ LEDs	Button LEDs for CAPSENSE™	LED3/LED4 (green)	–
16	Temperature sensor selector	Temperature sensor select jumper (thermistor or potentiometer)	J6 (3 pins)	–
17	LIN/CXPI connector	DSUB-9 connector for LIN/CXPI	J20	No load
18	Resistors	Serial connect resistors (I2C or UART)	R98/R103 (I2C), R99/R101 (UART)	–
19	CTBm shunt resistor	100 mΩ shunt resistor	R107	–
20	Extension header	40-pin (2-row) female header for CAPSENSE™ extension boards	J11/J25	No load
21	External clock	SMA connector for clock input	J13	No load
22	Test header	Current measurement header for MCU	J7	No load
23	Arduino headers	1x6 (1), 1x8 (2) and 1x10 (1) for Arduino compatibility	J29/J28/J30/J31	–
24	mikroBUS header	Two 1x8 mikroBUS headers	J32/J33	–
25	Groove connector	5-pin, 100mils, SMBus	J26	No load
26	XENSIV™ S2G bus connector	Infineon's XENSIV™ bus sensor 17-pin interface	S2G1	No load
27	User LED	User LED connected to MCU	LED6 (red)	–
28	User LED	User LED connected to MCU	LED7 (green)	–
29	User switch	User push switch connects to MCU	SW5	–
30	Reset switch	System reset switch	SW2	–

2 Getting started

2.1 Initial jumper configuration

The initial jumpers are configured according to the factory default settings.

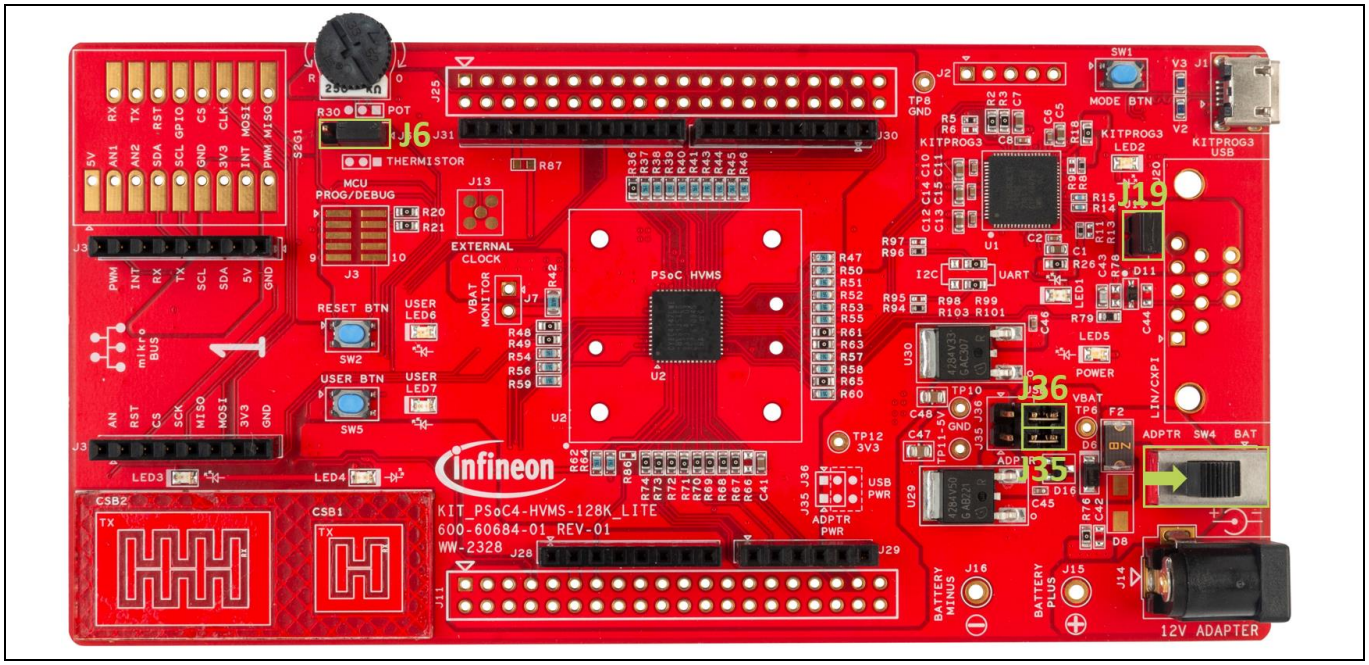

Figure 4 Initial jumper configuration and switch setting

Table 3 lists the jumper's configuration.

Table 3 Jumper details

Reference	Details	Default function	Alternate function
J6	Configure analog input connected to the IO port pin P5.3 of MCU	Potentiometer (1-2)	Thermister (2-3)
J19	Connects VBAT (12 V) to the LIN/CXPI bus voltage	LIN/CXPI bus (1-2)	-
J35, J36	Configures the power inputs for the entire board	5-V power from USB (2-3)	12-V power from the adapter (1-2)

2.2 Power up the lite kit

The KIT_PSoC4-HVMS-128K_LITE kit can be powered either from the USB port or from the wall adapter. Set the appropriate jumper configuration before connecting any of the power sources.

To power up the lite kit, connect the Micro-USB cable between the lite kit and the host system. The same connection (KitProg3) also provides the programming and debugging over the CMSIS-DAP interface.

2.2.1 Power from USB

By default, the lite kit is configured to run on 5 V. Ensure the power jumpers J35 and J36 are closed on position (J35_2-J35_3 and J36_2-J36_3) for USB-powered configuration. In case of USB power, the different sections power requirements are as follows:

- MCU power: VBAT from USB (5 V)
- mikroBUS power: 5 V from USB (5 V) and 3V3 from LDO
- XENSIV™ bus power: 5 V from USB (5 V) and 3V3 from LDO
- Arduino bus power: 5 V from USB (5 V) and 3V3 from LDO
- IFX bus power: 5 V from USB (5 V) and 3V3 from LDO
- Peripheral power: 3V3 from LDO

2.2.2 Power from wall adapter

The lite kit provides an option to run on 12 V from the power adapter or the automotive battery. Ensure the power jumpers J35 and J36 are closed on positions (J35_1-J35_2 and J36_1-J36_2) for a 12 V powered configuration. In case of the power adapter, the different sections power requirements are as follows:

- MCU power: VBAT from power adapter (12 V)
- mikroBUS power: 5 V from LDO (5 V) and 3V3 from LDO
- XENSIV™ bus power: 5 V from LDO (5 V) and 3V3 from LDO
- Arduino bus power: 5 V from LDO (5 V) and 3V3 from LDO
- IFX bus power: 5 V from LDO (5 V) and 3V3 from LDO
- Peripheral power: 3V3 from LDO

To power up the lite kit from the battery or adapter, connect the wall adapter to J14, and slide SW4 to the adapter side. The power LED (LED5) lights up when the power switch is set to the wall adapter.

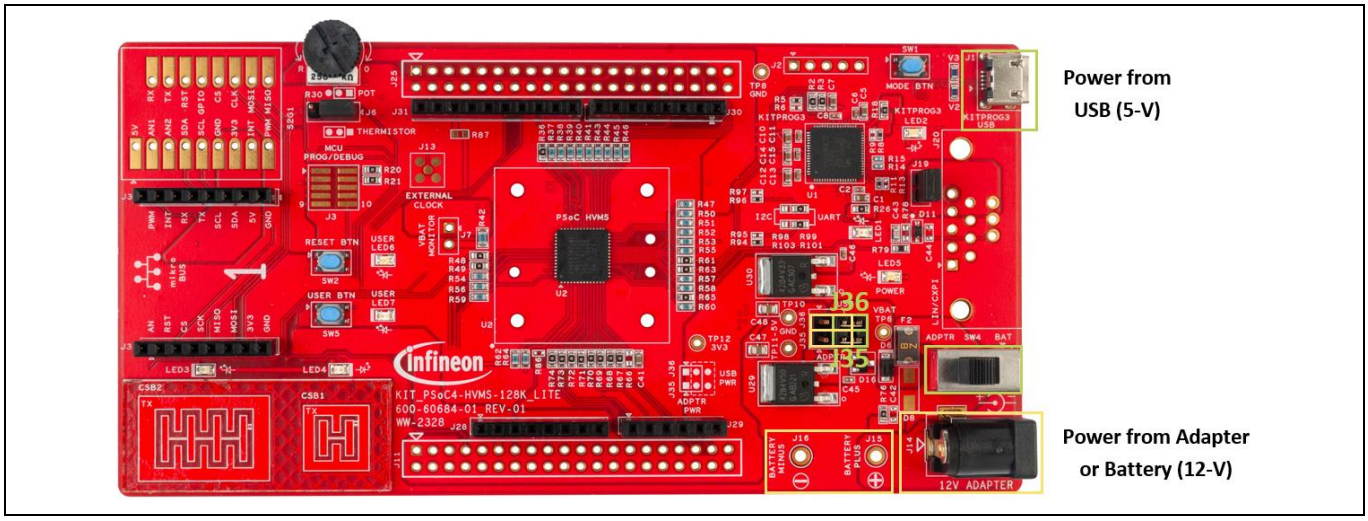

Figure 5 Available power inputs for lite kit

Note: With the USB Power mode, the PSoC™ 4 HVMS device supports LIN/CXPI slave configuration only.

2.3 Hands-on shipping firmware

The KIT_PSoC4-HVMS-128K_LITE kit comes with preinstalled firmware to check all the onboard peripherals. The firmware logs different events on the serial USB or LIN slave interface. For simplicity, the serial console is set as a default mode and all the events will be sent to the serial terminal with the fixed event IDs.

2.3.1 Hardware and tool setup

To check the preinstalled firmware on the KIT_PSoC4-HVMS-128K_LITE kit, follow these steps to set up and communicate with the host system:

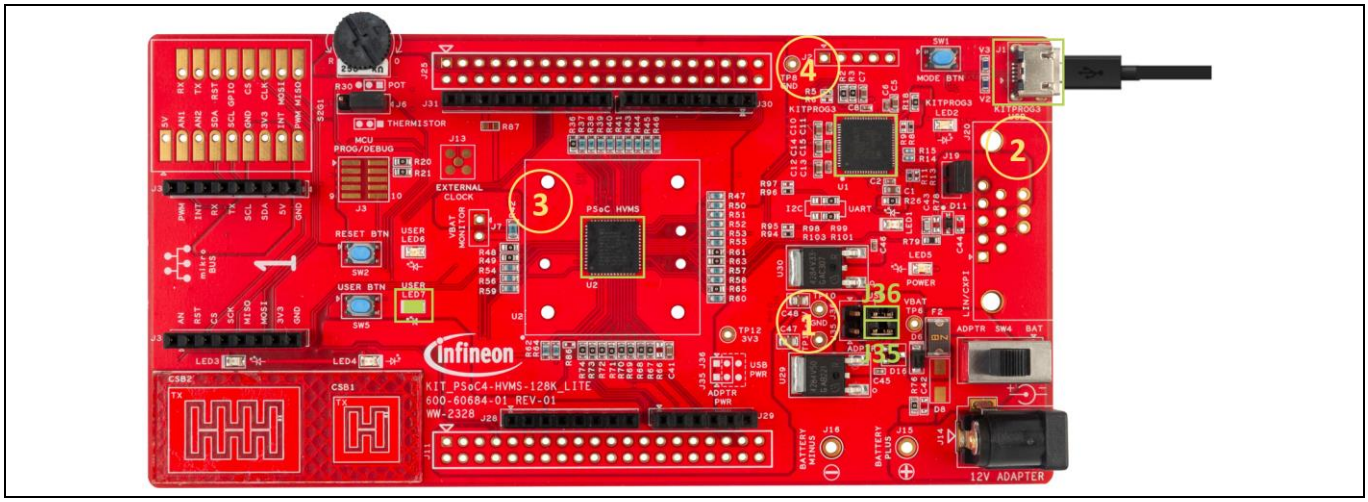

Figure 6 KIT_PSoC4-HVMS-128K_LITE kit and tool setup

1. Before powering up the lite kit, ensure that the power selection jumpers J35 and J36 are at the 5-V position.
2. Connect the USB cable from the PC to the lite kit. The lite kit is powered by the PC via the USB cable (5 V). Ensure that the power LED5 (blue LED) is turned ON.
3. When powered on, the PSoC™ HVMS device starts executing the pre-installed firmware, which is indicated by the blinking User LED7 (green LED).

4. To communicate with the PC, set up TeraTerm on the PC to send and receive messages to or from the lite kit. Follow these configurations in the TeraTerm:

   Port: COMx: KitProg3 USB-UART (COMx)

   Speed: 115200

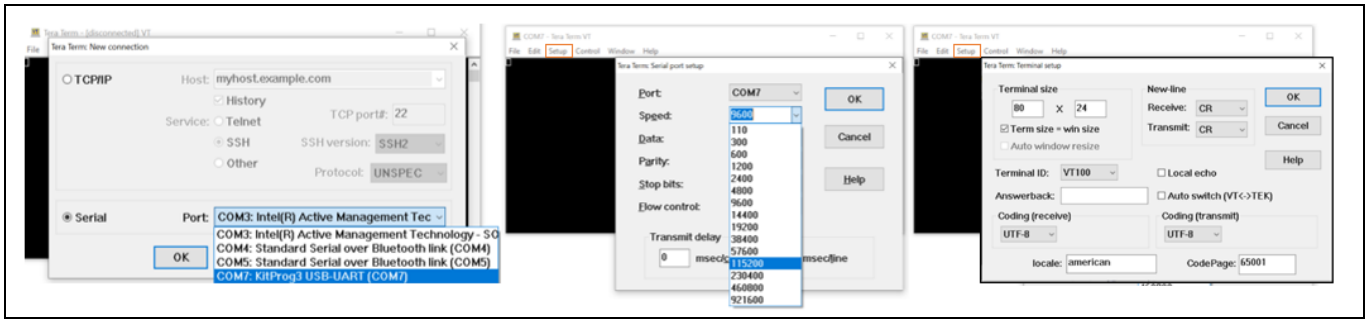

Figure 7 TeraTerm setup

2.3.2 Software checks

The lite kit comes with the pre-installed firmware and as soon as it is powered on, it will start executing. After completing the tool setup, follow these steps to check the firmware and lite kit features:

1. Reset the PSoC™ HVMS device using the reset switch SW2; User LED7 starts blinking.
2. Press the user switch SW5 to toggle the user LED6 (red LED) and monitor the switch event in the TeraTerm window with event ID 1.
3. Touch on any of the CAPSENSE™ buttons CSB1 or CSB2 to trigger the event with event ID 2, and the same can be verified using the onboard LEDs (LED3 and LED4).
4. Move the potentiometer R30 to check the voltage applied to the ADC pin; the millivolt readings will be logged as event ID 3 on the TeraTerm window.

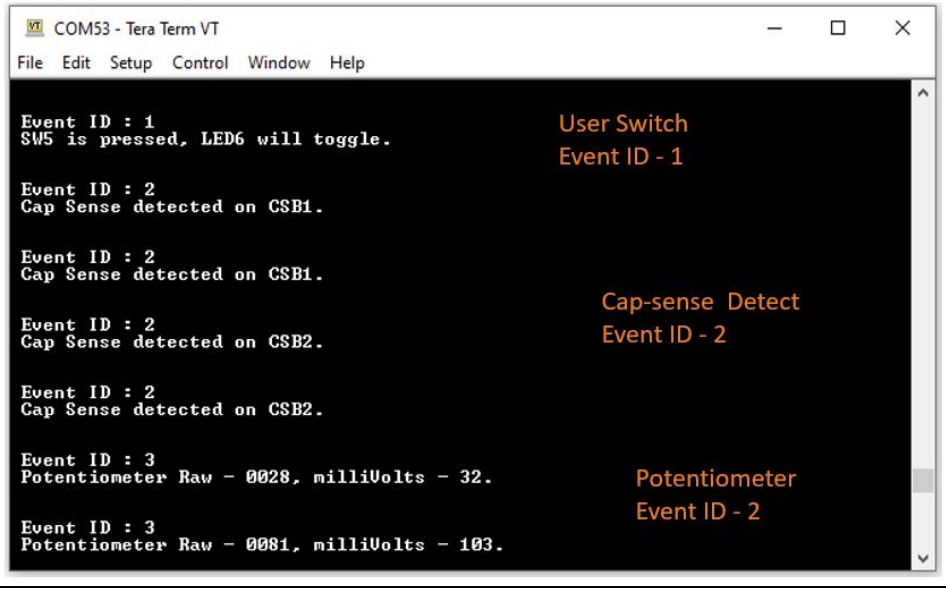

Figure 8 Firmware checks with onboard peripherals

3 Hardware

3.1 PSoC™ HVMS device

The KIT_PSoC4-HVMS-128K_LITE kit comes with the PSoC™ HVMS device CY8C4147LWE soldered onto the board. The board also has a provision to install the MCU socket; a supported socket part is given for reference.

Table 4 IC socket description

Reference	Manufacturer	Part number	Size	Supported package
U2	Infineon Technologies	CY8C4147LWE	8 mm × 8 mm	56-QFN
Socket	Enplas Corporation	QFN-56AMG-0.5-005S-00	25 mm × 25 mm	56-QFN (8 x 8 mm)

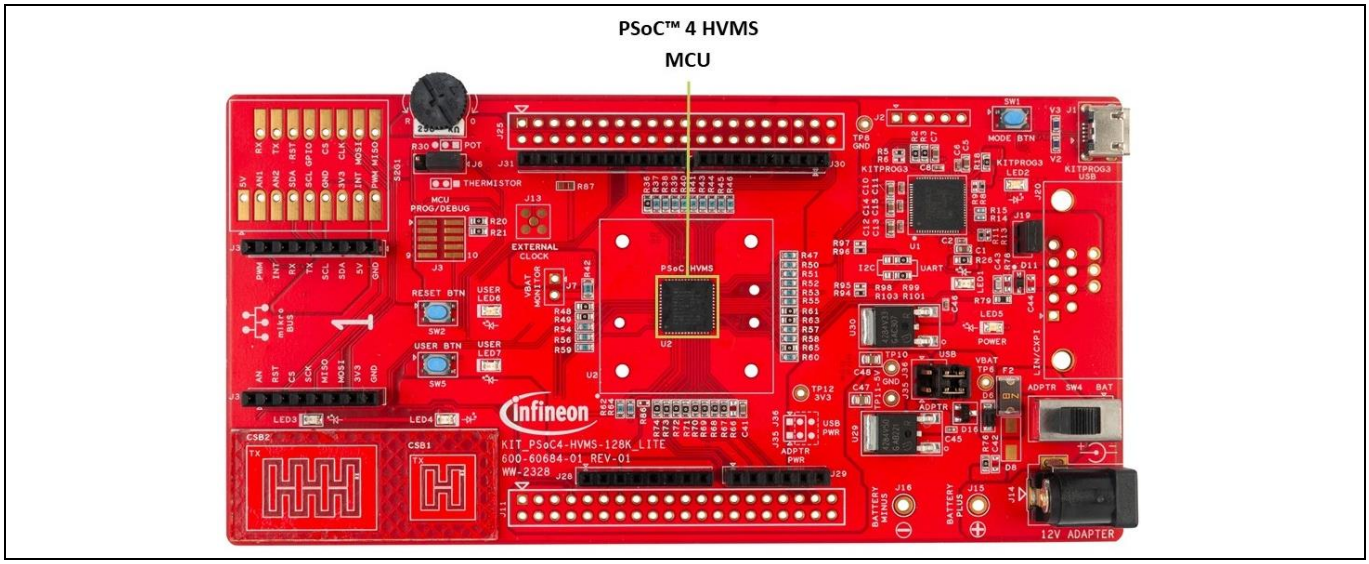

Figure 9 PSoC™ HVMS device

3.2 Power supply

The following are three power inputs:

- 5 V from the USB connector
- 12 V from the wall adapter
- 12 V from battery connector (optional)

The power switch SW4 controls the wall adapter and battery connector. The USB connector is diode-ORed with the VBAT input of the CPU. It is the main power supply for devices with VDDD = 3.3 V (see ordering information from PSoC™ HVMS datasheet [1]) and the cable comes with the kit package.

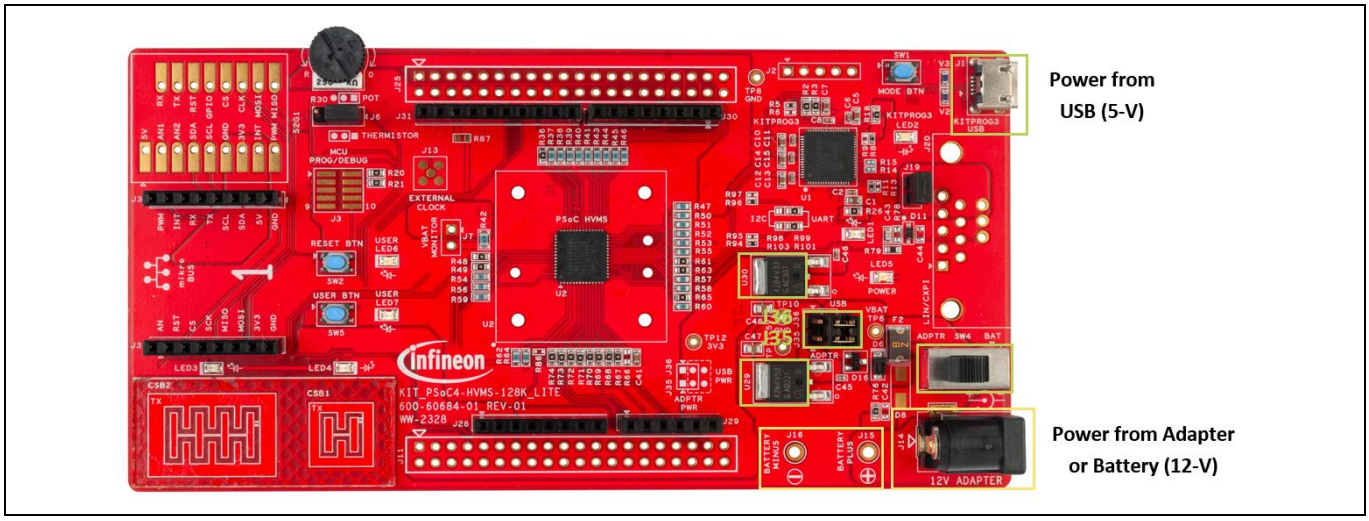

Figure 10 Power supply configuration on lite kit

Note:

1. *By default, the KIT_PSoC4-HVMS-128K_LITE kit supports 5-V power input from the USB port. To change the power input configuration, remove the resistor from positions 2-3 of connectors J35 and J36 and install the resistor on positions 1-2 of connectors J35 and J36.*
2. *To power up the entire lite kit, two LDOs are used to generate the 5 V (U29) and 3.3 V (U30). If using USB (5 V) power, bypass the LDO used for generating 5 V (U29).*

3.3 CAPSENSE™ buttons

The KIT_PSoC4-HVMS-128K_LITE kit has two onboard CSX buttons (100 x 100 mm (CSB1) and 200 x 130 mm (CSB2)). The board uses a fishbone pattern for mutual-capacitance CAPSENSE™ buttons. The Tx terminal forms a box or ring around the button for shielding the Rx terminal from noise. There are interlaced Tx and Rx prongs inside the border to form an electric field (for more details, see AN85951- PSoC™ 4 and PSoC™ 6 MCU CAPSENSE™ design guide).

Two dedicated LEDs are available on board (LED3 and LED4) to indicate the events on the CSX buttons (CSB1 and CSB2).

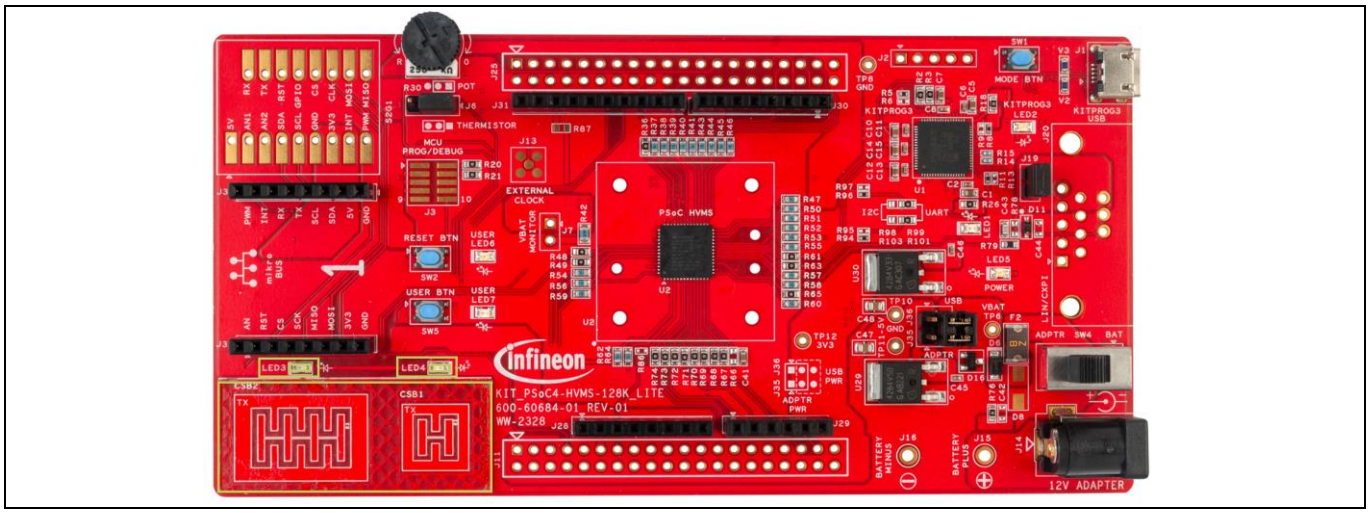

Figure 11 CAPSENSE™ buttons on lite kit

3.4 Potentiometer and temperature sensor

The KIT_PSoC4-HVMS-128K_LITE kit has a temperature sensor and potentiometer onboard to evaluate the analog functions. The temperature sensor uses a thermistor (R29) with a divider resistor and the potentiometer (R30) uses a 250k variable resistor.

Table 5 Thermistor description

Reference	Manufacturer	Part number	Description
R29	TDK Corporation	NTCG103JF103FT1S	10 kΩ, 1%, 1/8 W, 0402
R30	Bourns	3352T-1-254LF	POT, 250k, 20%, 1/2 W

Note: See the vendor page for resistance and temperature characteristics.

The source for temperature monitoring can be selected by jumper J6 between a thermistor (by closing positions 2-3) and a potentiometer (by closing positions 1-2).

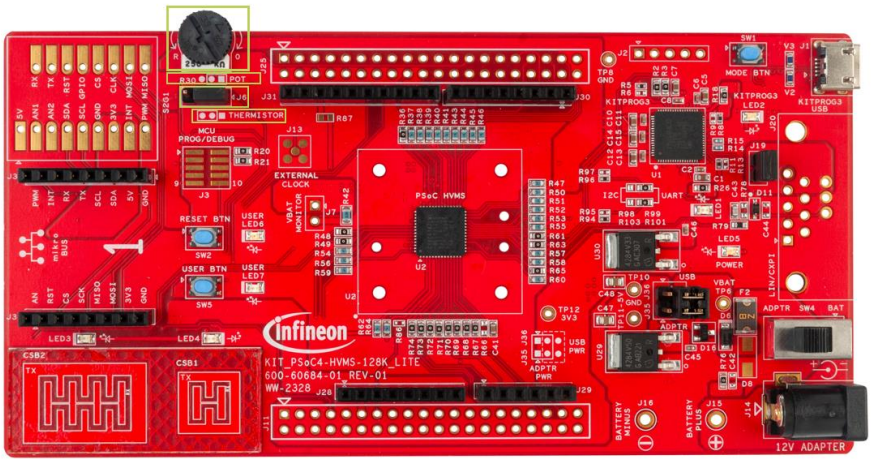

Figure 12 Temperature sensor block of lite kit

3.5 LIN and CXPI interfaces

The PSoC™ HVMS devices include a Local Interconnect Network (LIN)/Clock Extension Peripheral Interface (CXPI) transceiver and controller. It can connect the physical layer directly to the device. The KIT_PSoC4-HVMS-128K_LITE kit supports D-SUB9 male type connector and a 3-pin male connector (should be installed separately) for interfacing to the LIN/CXPI bus. The VBAT voltage is connected to pin 9 of the connector via a jumper J19.

Table 6 LIN/CXPI connector description

Reference	Manufacturer	Part number	Description
J20	NorComp Inc.	182-009-113R531	CONN D-SUB PLUG, 9POS
TP	Würth Elektronik	61300311121	Header Vertical, 3-pin, 2.54 mm

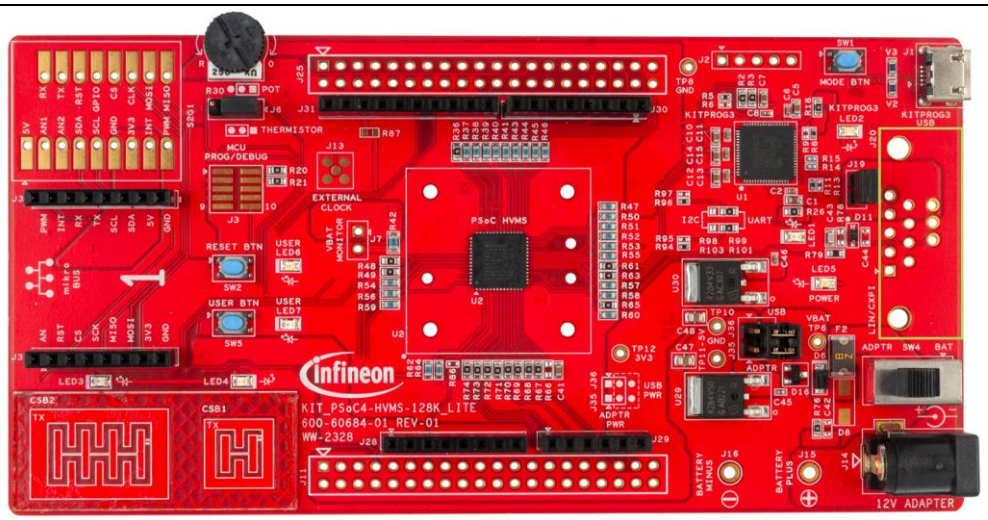

Figure 13 LIN/CXPI interface on lite kit

3.6 KitProg3 USB program interface

KitProg3 is the Infineon low-level communication firmware for programming and debugging. It provides communication between the programming tool (AutoFlash Utility) and a target PSoC™ HVMS device.

KitProg3 uses the industry-standard Serial Wire Debug (SWD) protocol. It uses CMSIS-DAP V2.0.0 and V1.2.0 as the bulk and HID endpoint transport mechanisms.

KitProg3 also supports bridging: USB-to-UART and USB-I2C. See the KitProg user guide [2] for more information.

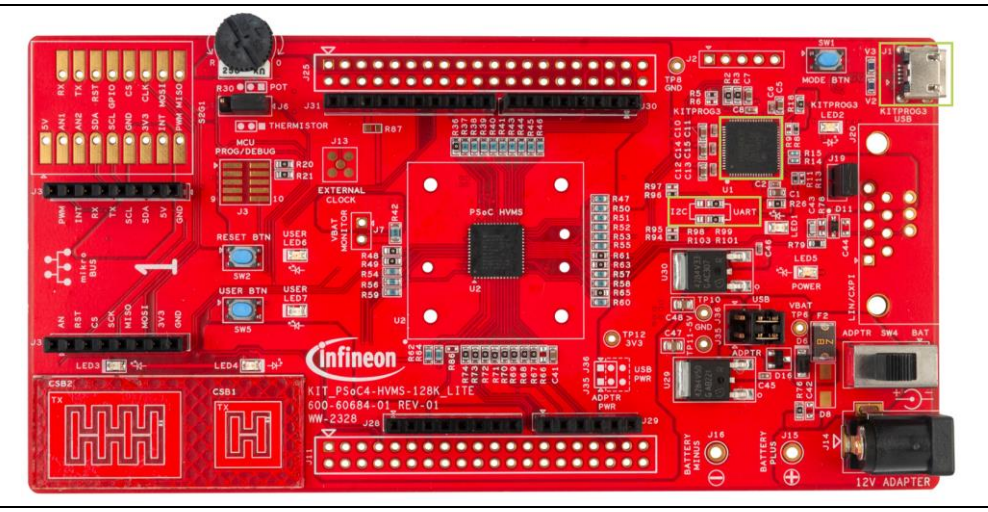

Figure 14 KitProg3 USB program interface on lite kit

Note: By default, the bridging between the KitProg3 and CPU is configured for the USB-to- UART interface. To use the USB-I2C bridge on the kit, remove the resistors from the UART position and install resistors in the I2C position, see Figure 14.

3.7 Third-party debugger connector

The KIT_PSoC4-HVMS-128K_LITE kit supports an Arm® 10-pin MIPI connector for programming and debugging. The connector is wired-ORed with the KitProg3 program interface and is directly connected to the PSoC™ HVMS device through the SWD interface. The connector J3 should be assembled separately.

Table 7 Arm® 10-pin MIPI connector

Reference	Manufacturer	Part number	Description
J3	Samtec Inc.	FTSH-105-01-L-DV-K	Header Male, 10-pin, 1.27 mm, SMD

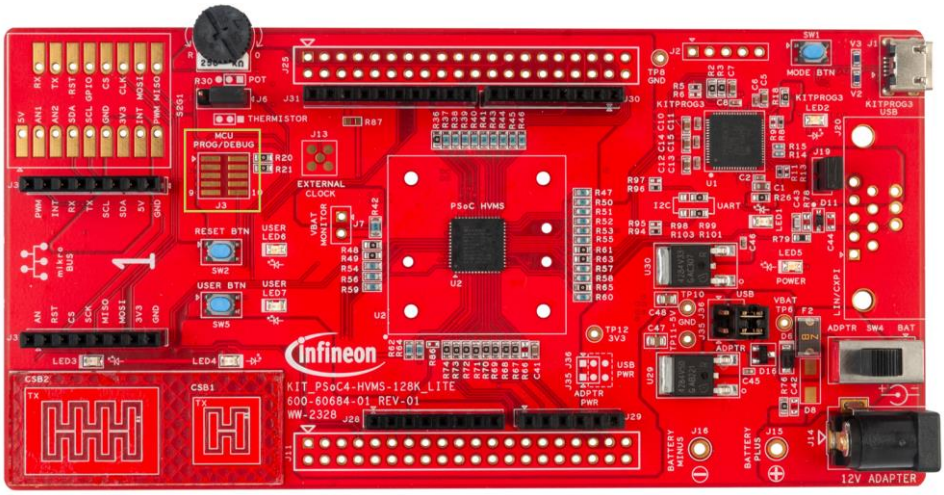

Figure 15 Third-party debugger connector on lite kit

3.8 Extension headers

The KIT_PSoC4-HVMS-128K_LITE kit provides a variety of header expansions to be compatible with the most popular interfaces. The kit is designed to have an Arduino-compatible connection header, Infineon standard connector interface, mikroBUS header, and XENSIV™ bus.

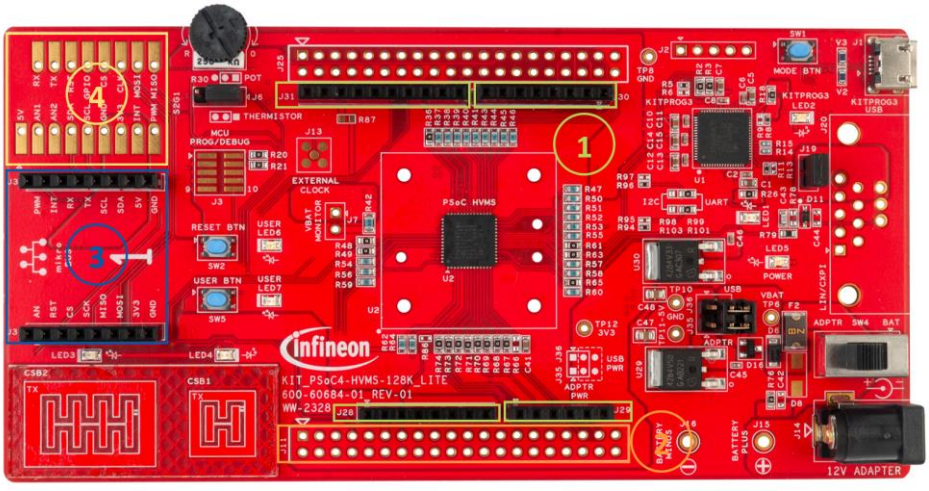

Figure 16 Extension headers on lite kit

3.8.1 Arduino-compatible header

Table 8 Pin assignment of Arduino-compatible connections

Connector	Pin number	Pin name	KIT_PSoC4-HVMS-128K_LITE connections
J28	1	NC	-
J28	2	IOREF	VDDIO
J28	3	RESET	XRES
J28	4	3V3	3P3V_LDO
J28	5	5V	5V_LDO
J28	6	GND	DGND
J28	7	GND	DGND
J28	8	VIN	VBAT
J29	1	A0	P5_2
J29	2	A1	P5_3
J29	3	A2	P5_4
J29	4	A3	P5_5
J29	5	A4/SDA	P5_0
J29	6	A5/SCL	P5_1
J30	1	D0/RX	P0_1
J30	2	D1/TX	P0_1
J30	3	D2	P0_5
J30	4	D3	P0_2
J30	5	D4	P0_3
J30	6	D5	P0_4
J30	7	D6	P3_3
J30	8	D7	P3_2
J31	1	D8	P3_0
J31	2	D9	P3_1
J31	3	D10/SS	P1_3
J31	4	D11/MOSI	P5_1
J31	5	D12/MISO	P5_0
J31	6	D13/SCK	P1_1
J31	7	GND	DGND
J31	8	AREF	VDDA
J31	9	SDA	P5_0
J31	10	SCL	P5_1

3.8.2 Infineon standard header

Table 9 Pin assignment of Infineon standard connections

Connector	Pin number	Pin name	KIT_PSoC4-HVMS-128K_LITE connections
J11	1	3V3	3P3V_LDO
J11	2	GND	DGND
J11	39	GND	DGND
J11	40	5V	5V_LDO
J25	1	3V3	3P3V_LDO
J25	2	GND	DGND
J25	39	GND	DGND
J25	40	5V	5V_LDO

3.8.3 mikroBUS-compatible header

Table 10 Pin assignment of mikroBUS-compatible connections

Connector	Pin number	Pin name	KIT_PSoC4-HVMS-128K_LITE connections
J32	1	AN	P5_6
J32	2	RST	P0_5
J32	3	CS	P1_2
J32	4	SCK	P1_1
J32	5	MISO	P5_0
J32	6	MOSI	P5_1
J32	7	3V3	3P3V_LDO
J32	8	GND	DGND
J33	1	GND	DGND
J33	2	5V	5V_LDO
J33	3	SDA	P0_1
J33	4	SCL	P0_0
J33	5	TX	P0_1
J33	6	RX	P0_0
J33	7	INT	P0_6
J33	8	PWM	P0_4

3.8.4 XENSIV™ header

Table 11 Pin assignment of XENSIV™ bus connections

Connector	Pin number	Pin name	KIT_PSoC4-HVMS-128K_LITE connections
S2G1	1	5V	5V_LDO
S2G1	2	AN1	P5_6
S2G1	3	AN2	P5_7
S2G1	4	SDA	P0_1
S2G1	5	SCL	P0_0
S2G1	6	GND	DGND
S2G1	7	3V3	3P3V_LDO
S2G1	8	INT	P3_2
S2G1	9	PWM	P0_2
S2G1	10	MISO	P5_0
S2G1	11	MOSI	P5_1
S2G1	12	CLK	P1_1
S2G1	13	CS	P1_6
S2G1	14	GPIO	P3_1
S2G1	15	RST	P3_0
S2G1	16	TX	P0_1
S2G1	17	RX	P0_0

3.8.5 Groove header

Table 12 Pin assignment of Groove bus connections

Connector	Pin number	Pin name	KIT_PSoC4-HVMS-128K_LITE connections
J26	1	SCL	P5_1
J26	2	SDA	P5_0
J26	3	3V3	3P3V_LDO
J26	4	GND	DGND

3.9 Other peripherals

The GPIO pins are grouped into ports; a port can have up to eight GPIOs. See Table 13 for GPIO pin assignments of the KIT_PSoC4-HVMS-128K_LITE board. Table 13 shows the connection to other peripherals.

Table 13 GPIO pins used by peripherals

GPIO pin assignment	Description
XRES pin	Connected to an external reset switch (SW2) with a 0.1-µF capacitor
User switch	SW5 (GPIO P5.5)
User LEDs	LED7 (GPIO P0.6 - green), LED6 (GPIO P0.7 - red)
External clock input	J13 (GPIO P0.1)
CTBm shunt resistor	100 mΩ shunt resistor R107 (connected across GPIO P7.0 and GPIO P7.1)

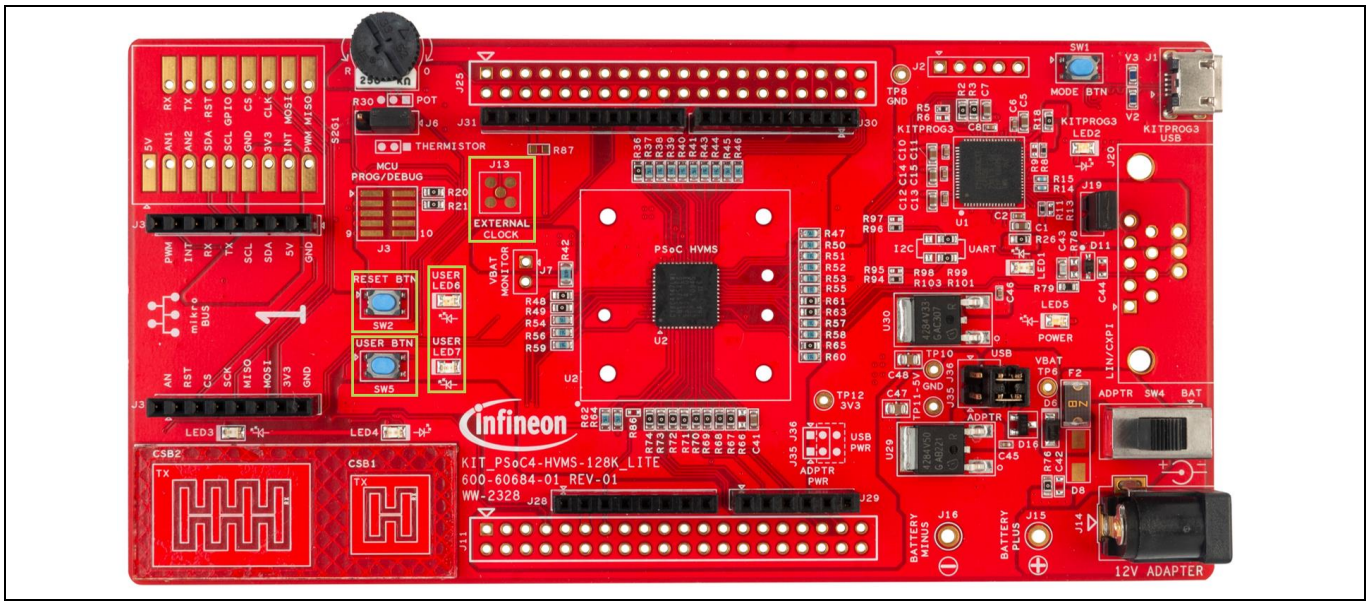

Figure 17 On-board peripherals

4 Programming and debugging

4.1 Program using AutoFlash utility

Download and install the AutoFlash utility (contact Technical support to obtain the program tool).

The AutoFlash utility is a flexible, cross-platform, integrated application to allow programming Infineon devices. It can perform program, erase, verify, and read operations on the flash of the target device. It can target an entire device, a specific region, a sector, and even a byte in a device.

To program the PSoC™ HVMS device (CPU) using the AutoFlash utility, connect the Micro-USB cable to the board. The board gets the power supply from the USB bus power and the same will be used for programming.

The MCU flash data is programmed via the PSoC™ 5 LP device in KitProg3, which is the Infineon low-level communication firmware for programming and debugging. See the PSoC™ programmer user guide and KitProg3 user guide [3] for more information.

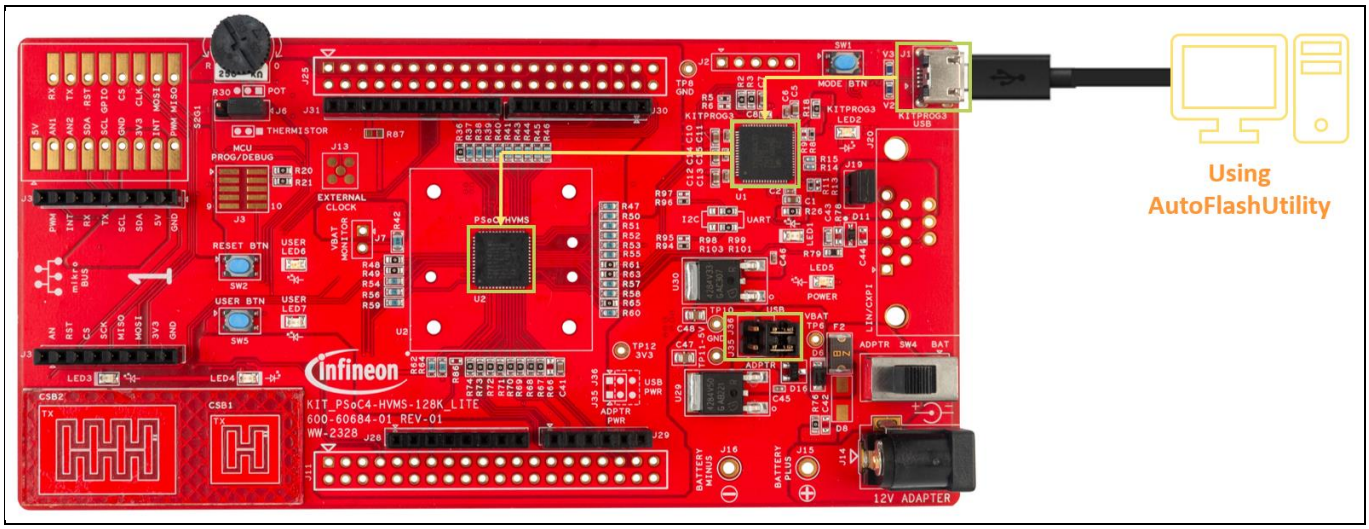

Figure 18 Program via KitProg3

1. Connect the Micro-USB cable from the host system to the lite kit.
2. Open a command prompt and navigate to the *AutoFlashUtility* installation path:
   cd C:\Program Files (x86)\Infineon\Auto Flash Utility 1.x\bin
3. Copy and paste the executable file *cm0plus.hex or cm0plus.out* into the *bin* folder.
4. Enter the following command in the command prompt on your PC.

   openocd -s ../scripts -f interface/kitprog3.cfg -c “transport select swd” -f target/psoc4hv_a0.cfg -c "program cm0plus.hex verify exit"

5. Wait for the “*program completed*” message to appear on the command prompt.
6. Reset the lite kit using the reset button SW2.

4.2 Program and debug using an IAR Embedded Workbench

Download and install the latest AutoPDL for the PSoC™ HV devices on the target system. Install the AutoPDL outside the default program files to allow the IAR to access and create temporary files.

Follow the installation steps given *in "PSoC4HV_AutoPDL-MW_InstallationManual.pdf"* inside the "*Product*" folder. Install the below executables:

Table 14 Executables

File	Description
Product\PSoC4HV_AutoPDL-MW_V1.4.0.exe	AutoPDL Driver and Middleware package
Sample\PSoC4HV_DeviceHeaderFiles_V1.4.0.exe	PSoC™ HV Device Headers
Sample\PSoC4HV_AutoPDL_CodeExample_V1.0.1.exe	PSoC™ HV Device Specific Examples

*Note: The code example package "PSoC4HV_AutoPDL_CodeExample_V1.0.*1*.exe" is specifically released for the KIT_PSOC4-HVMS-128K_LITE kit.*

Open the "*PSoC4HV_AutoPDL-MW_V1.4.0_DeliveryNotes.pdf*" from the installation folder of the AutoPDL and download the same version of IAR EWARM supported by the AutoPDL as mentioned in the document.

Download the software and run the installation (note that the installation might take some time). When you open the IAR EWARM for the first time, select the license in the license wizard. If you do not have the license, it is strongly recommended to register for a 'code size limited' license type.

The PSoC™ HVMS lite kit is now ready to use after a successful environment setup (USB driver installation, AutoPDL installation and IAR installation).

The IAR EWARM supports the debugging and programming using the Flash Program mode only.

The PSoC™ HV devices have a CM0+ core and the AutoPDL workspace details for the same are listed in Table 15.

Table 15 IAR flash workspaces and functions

Workspace	Application core	Number of cores supported	Details
Single-core CM0+ workspace "psoc4hvms128k_flash_cm0plus_template"	Yes	Single	Single-core download and debug for CM0+ core.

Do the following to download and debug using the CM0+ core workspace:

1. Start IAR EWARM and open the AutoPDL template workspace file from:
   AutoPDL_Installation_Directory \examples\Tools\psoc4hvms128\psoc4hvms128k_flash_cm0plus_template

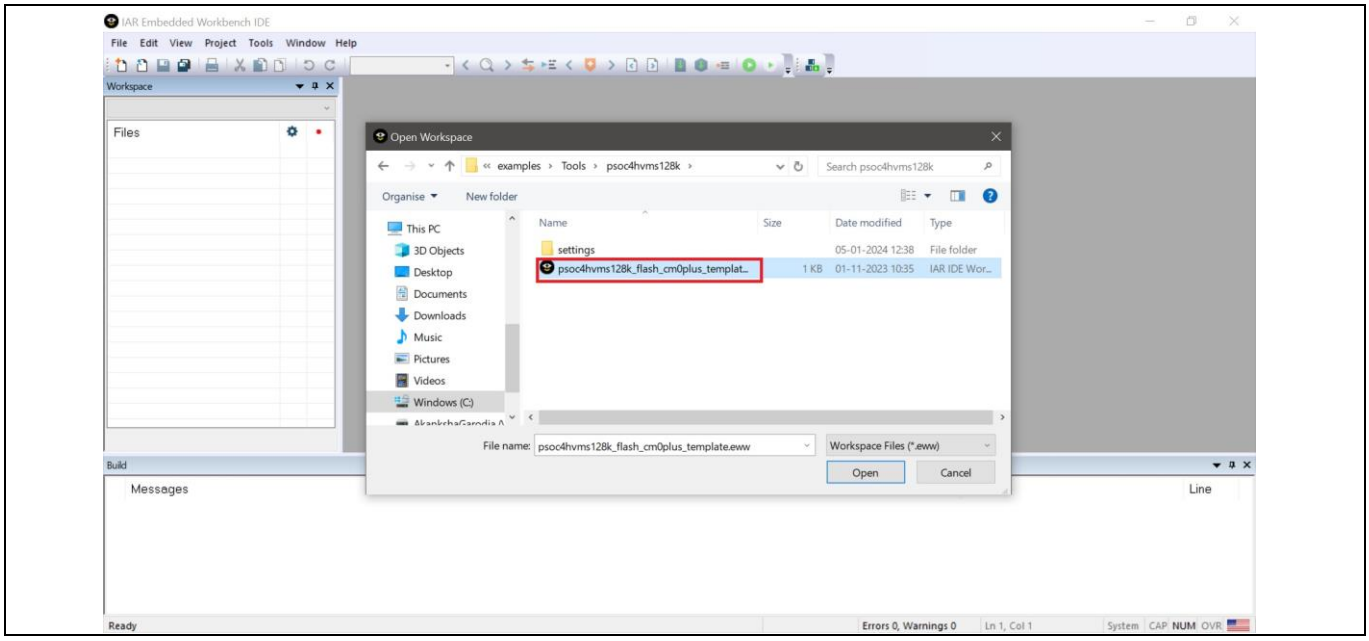

Figure 19 Selecting CM0+ single-core template

2. Select the workspace revision **Debug** from the drop-down list under **Workspace**, as shown in Figure 20.

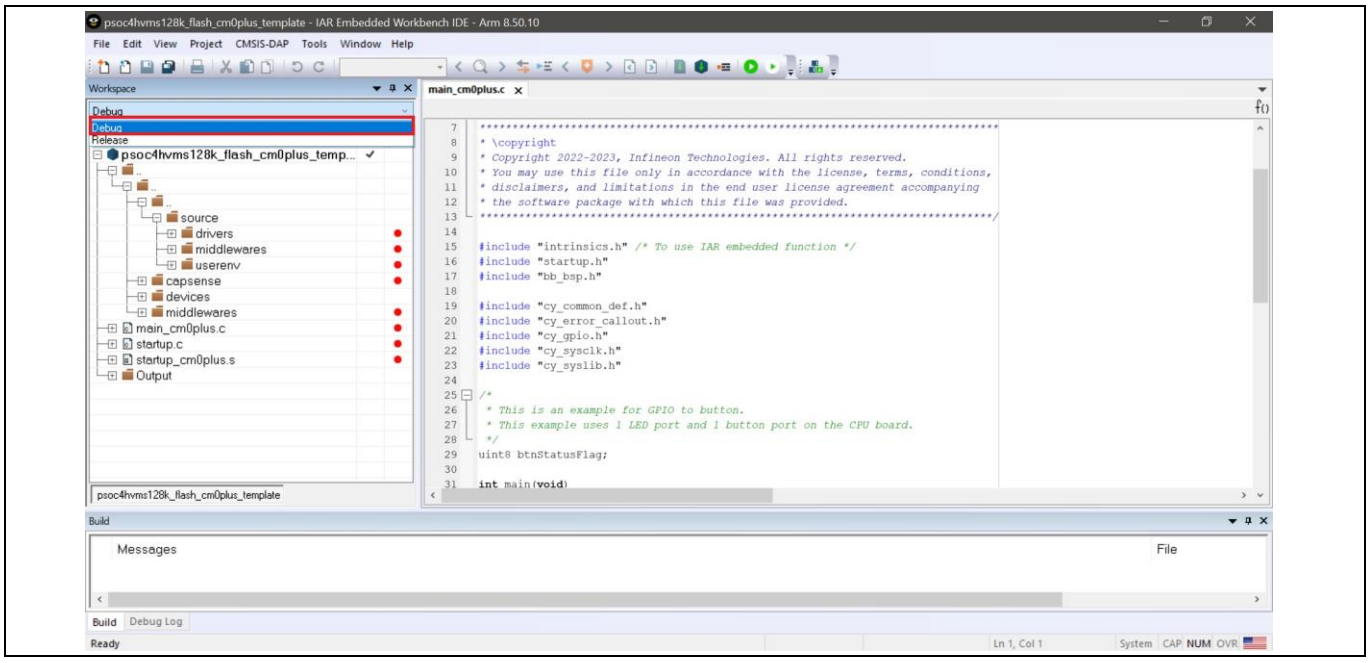

Figure 20 Selecting workspace revision

Programming and debugging

3. Open "*cy_pdl_config.h*" present under "*userenv*" folder and select device for HVMS128K, as shown in Figure 21.

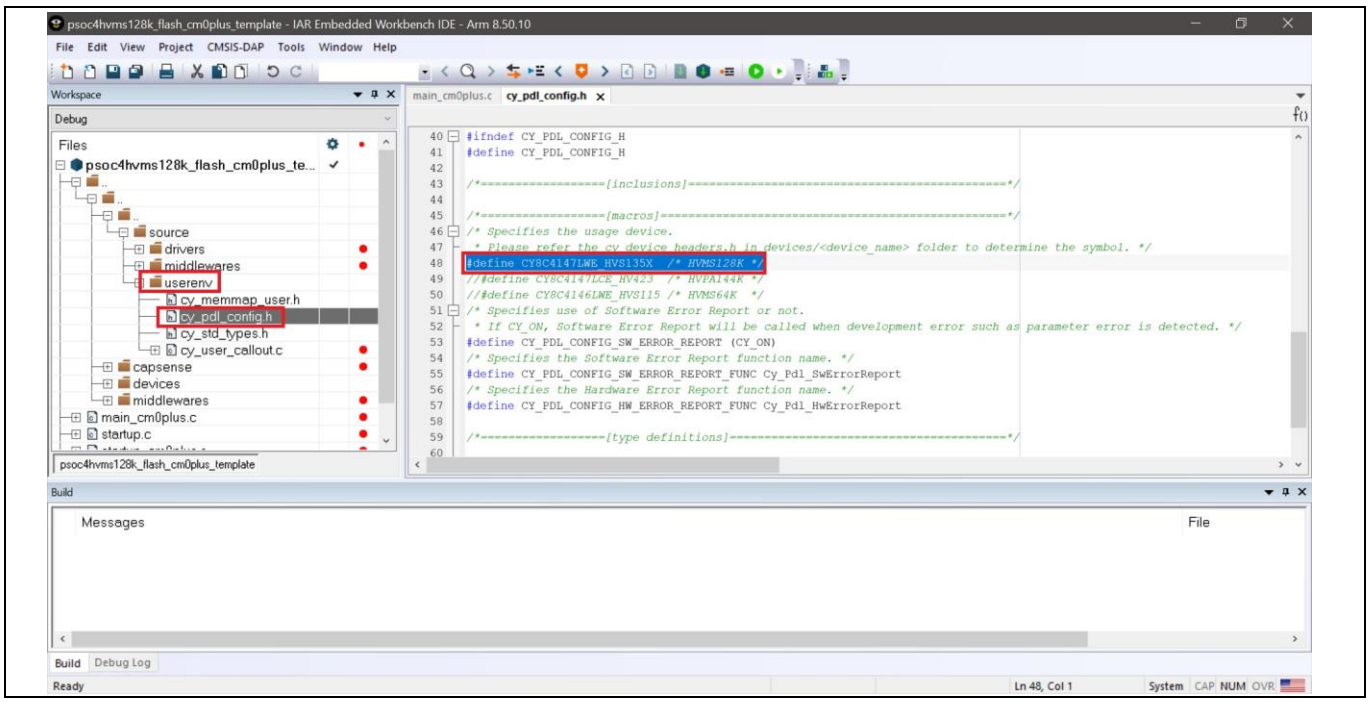

Figure 21 Selecting target device

4. Right-click **psoc4hvms128k_flash_cm0plus_template - Debug** and select **Rebuild All**.

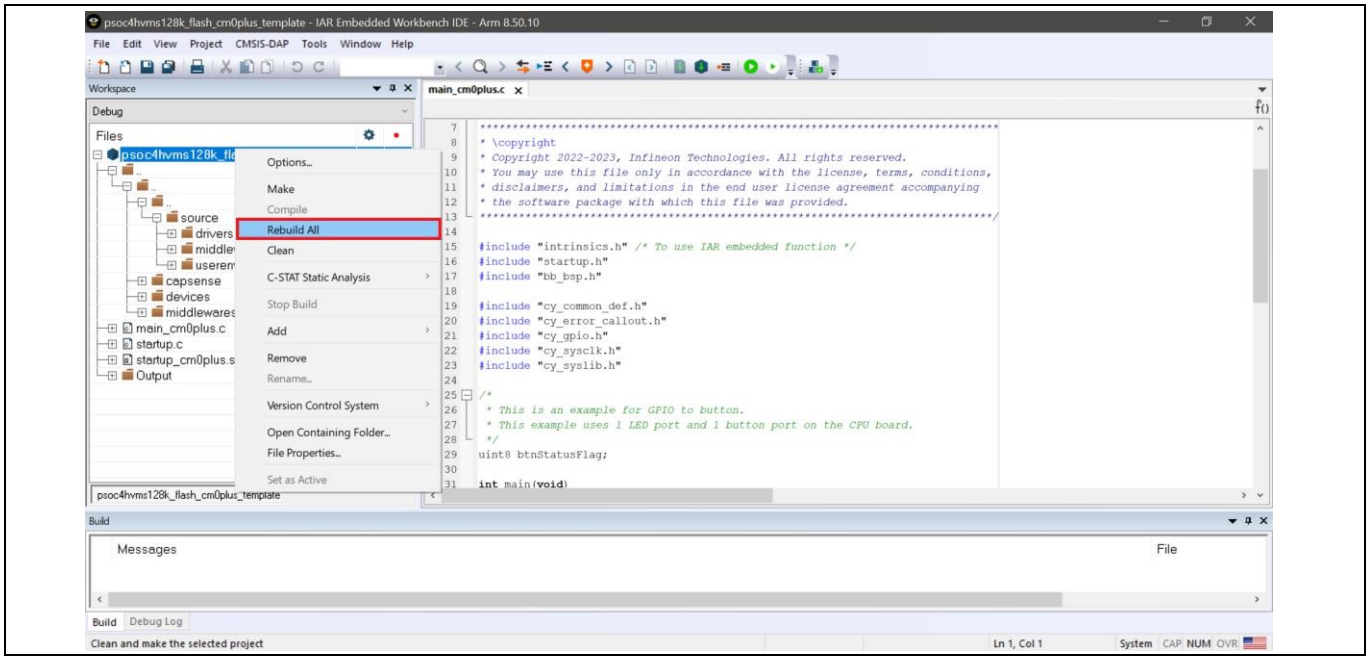

Figure 22 Rebuilding workspace revision

Programming and debugging

5. The rebuild process starts. Check for errors and warnings in the **Build** log.

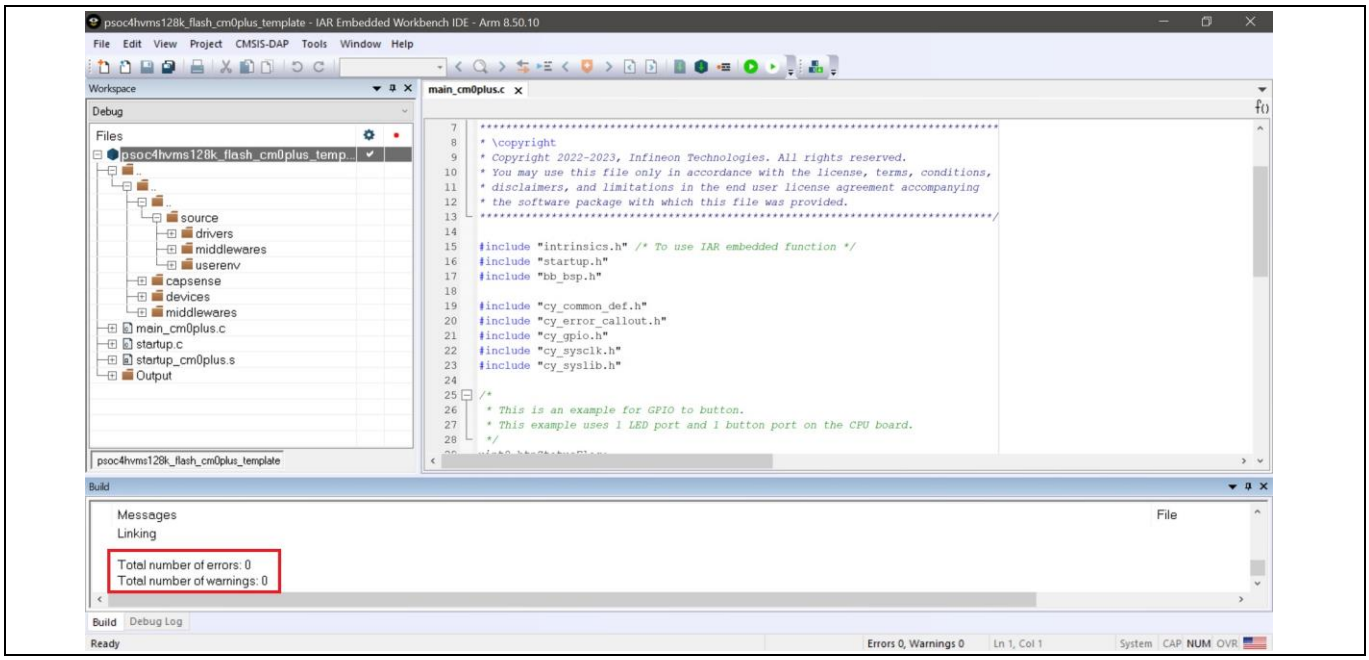

Figure 23 Checking build status in build log

6. To load the program to the flash region of the CM0+ core, click the green **Download and Debug** icon.

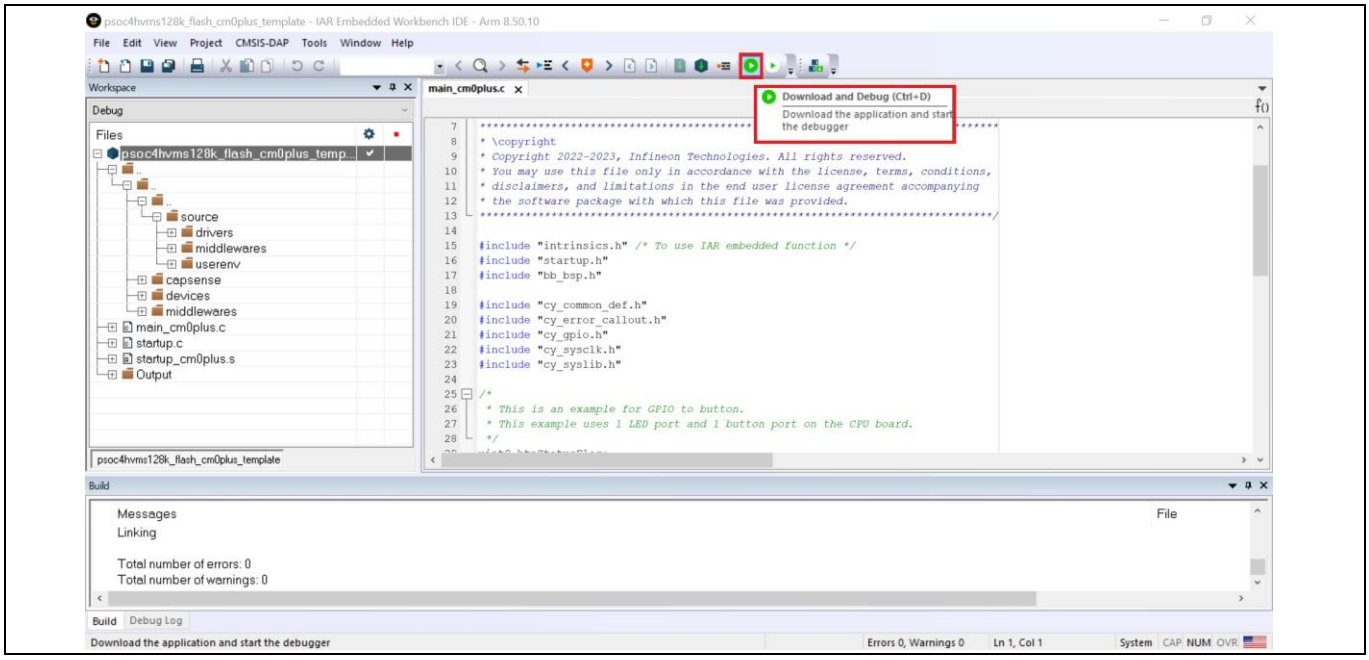

Figure 24 Downloading and debugging

Programming and debugging

7. Click the **Go** button to start executing the code from MCU.

Note: *You can also use the function keys in the Debug window: Go (F5), Step over (F10), Step into (F11), and Download and Debug (Ctrl+D).*

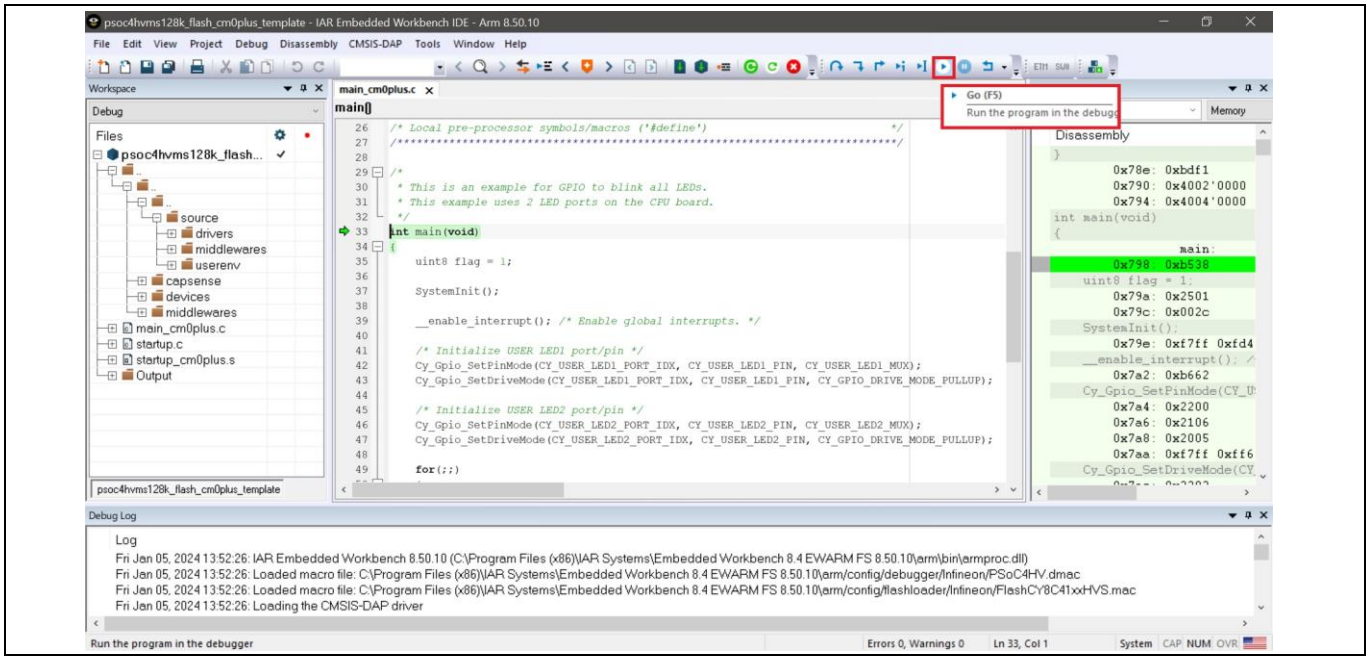

Figure 25 Debugging with CM0+ core

8. In free-running execution, user LED6 and user LED7 should start blinking on the board.

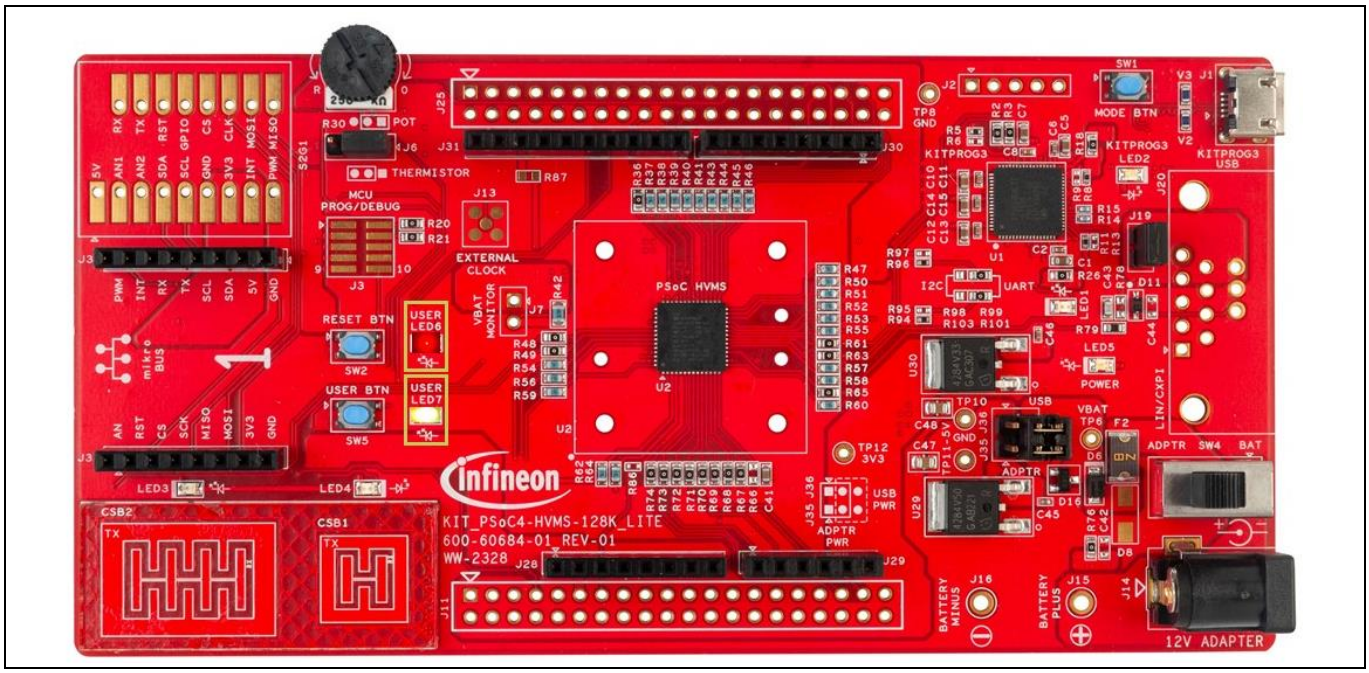

Figure 26 Blinking user LED6 and user LED7

5 Schematics and designs

5.1 KIT_PSoC4-HVMS-128K_LITE kit schematics

The section provides the KIT_PSoC4-HVMS-128K_LITE kit schematics.

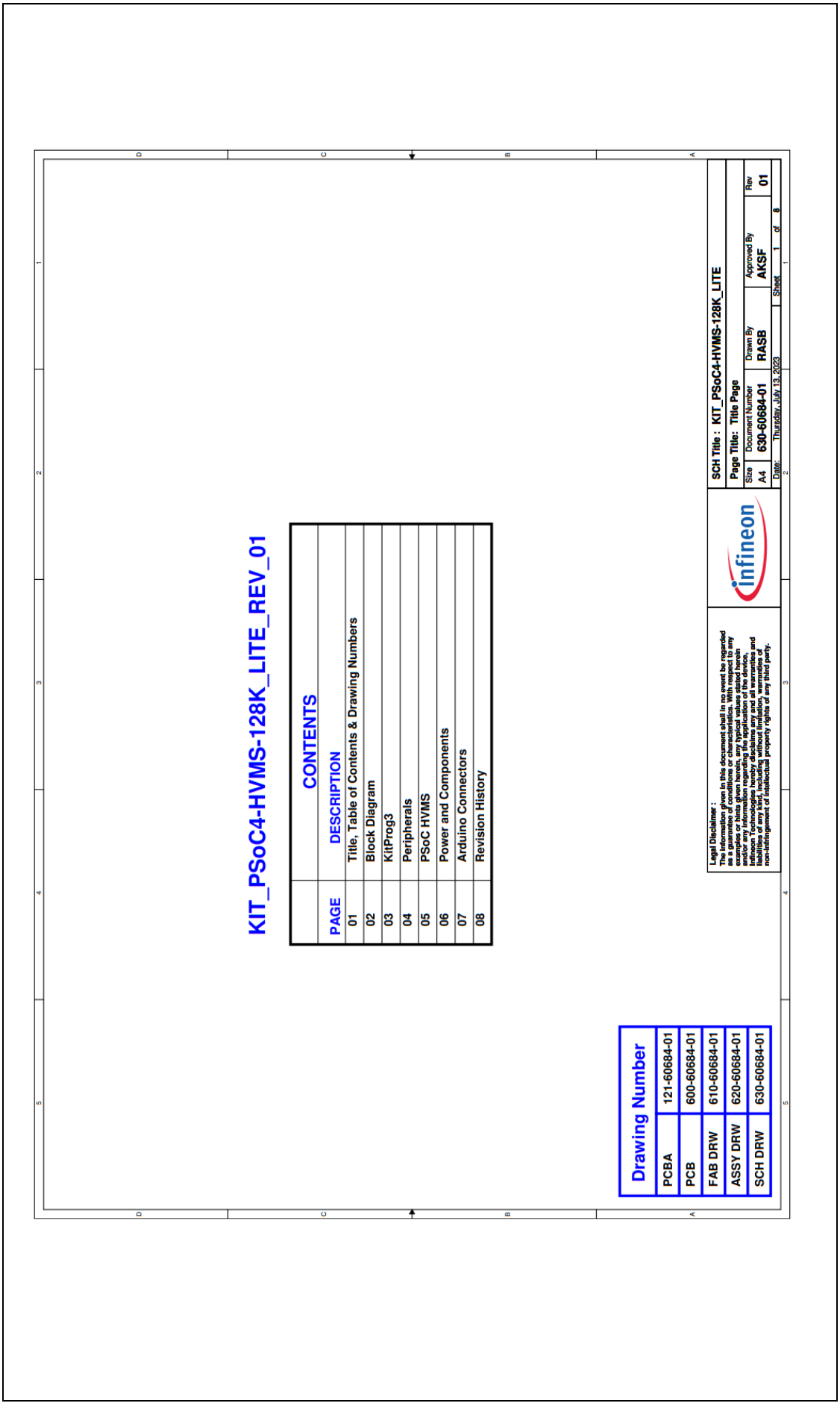

Figure 27 KIT_PSoC4-HVMS-128K_LITE kit schematic

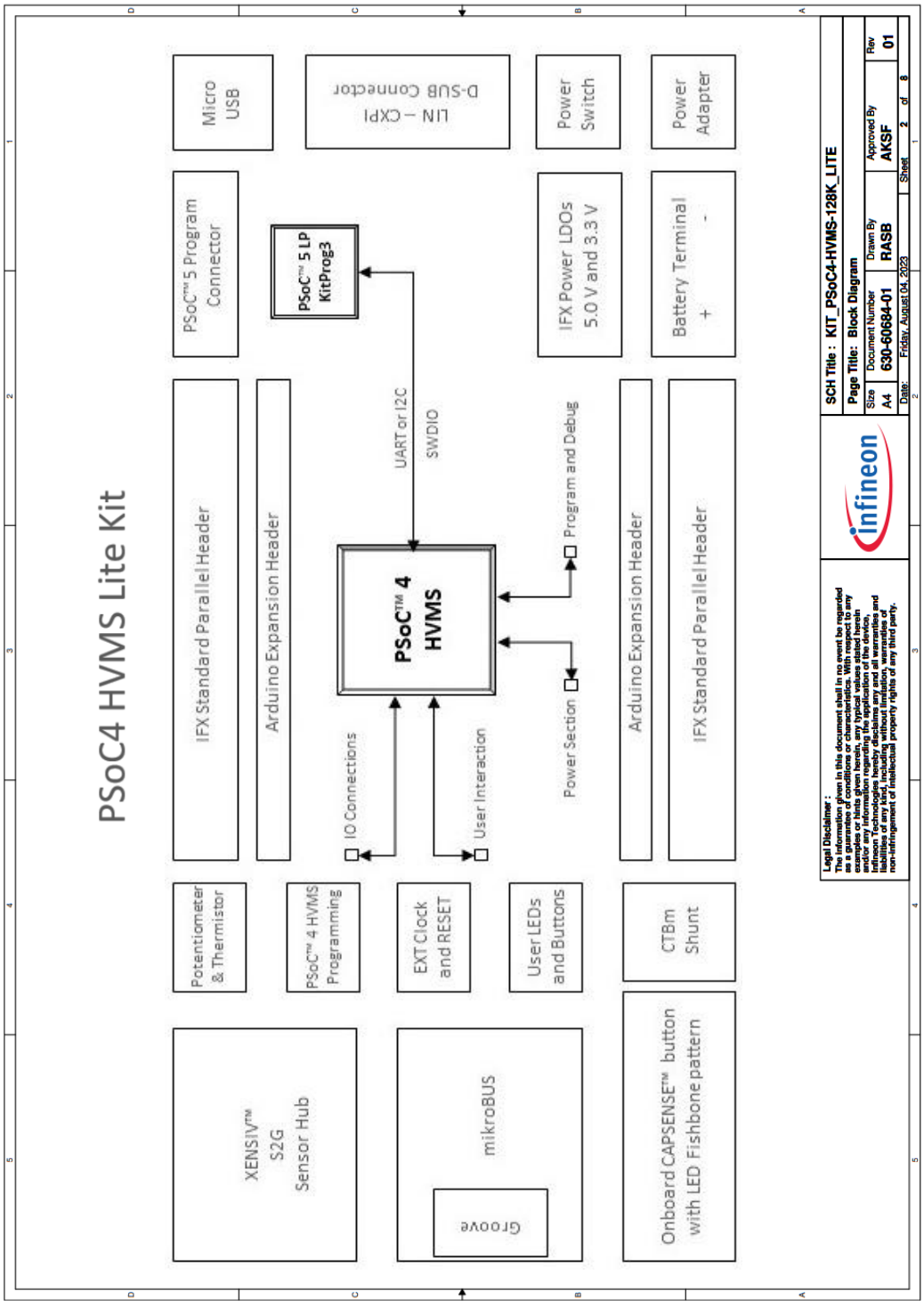

Figure 28 KIT_PSoC4-HVMS-128K_LITE kit block diagram

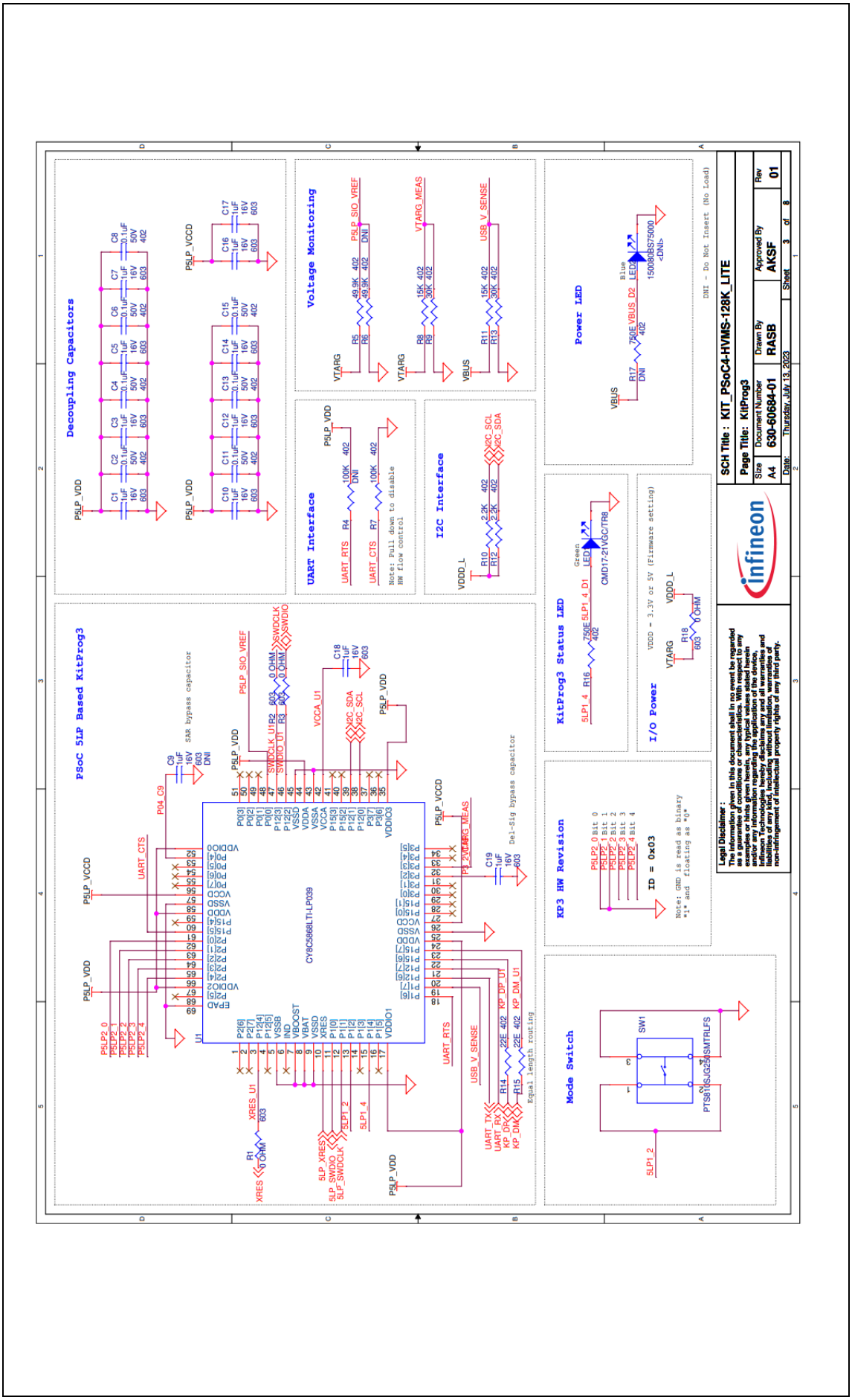

Figure 29 PSoC™ 5 LP-based Kit Prog3 schematics

Schematics and designs

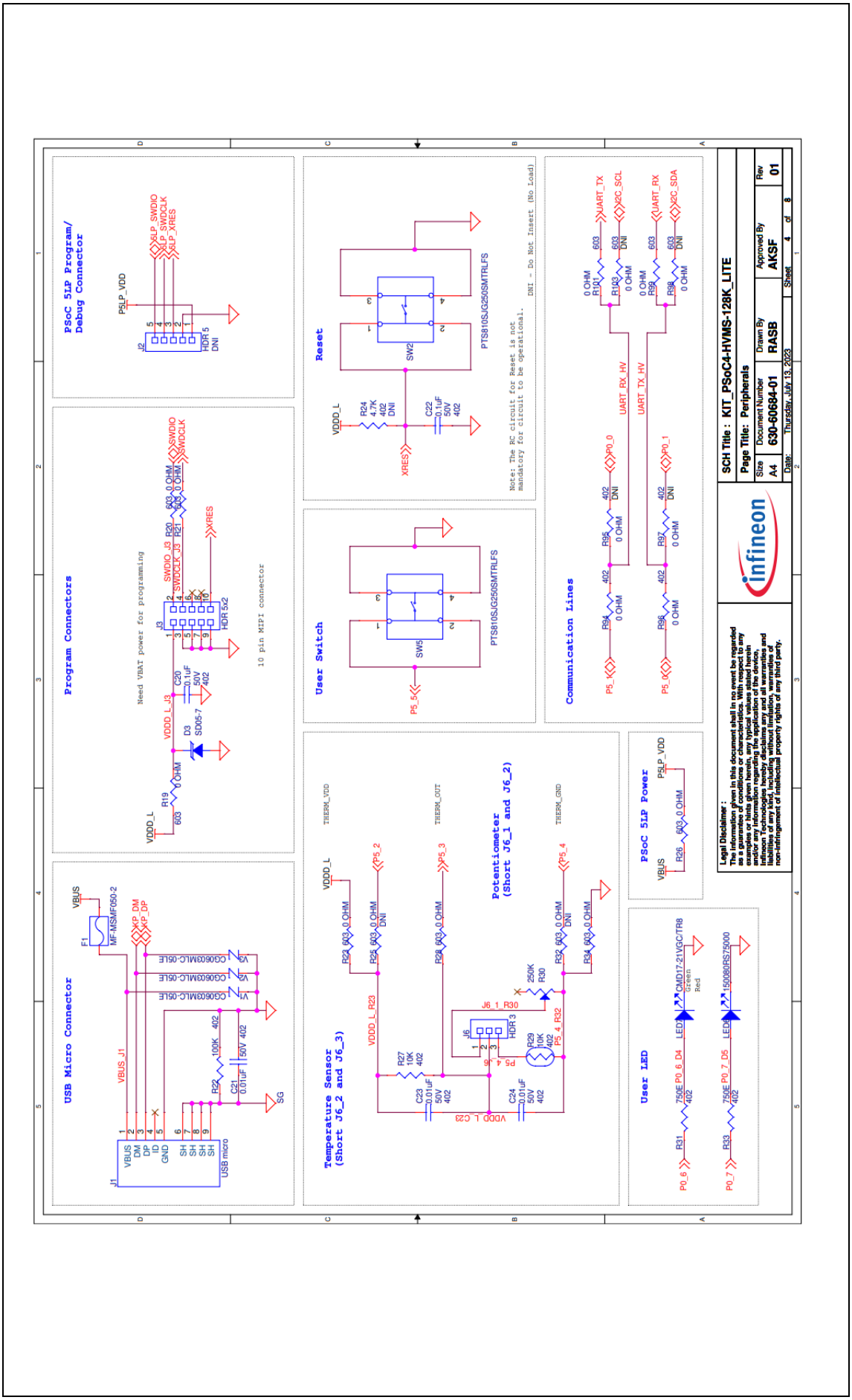

Figure 30 PSoC™ 4 HVMS Lite Kit peripherals

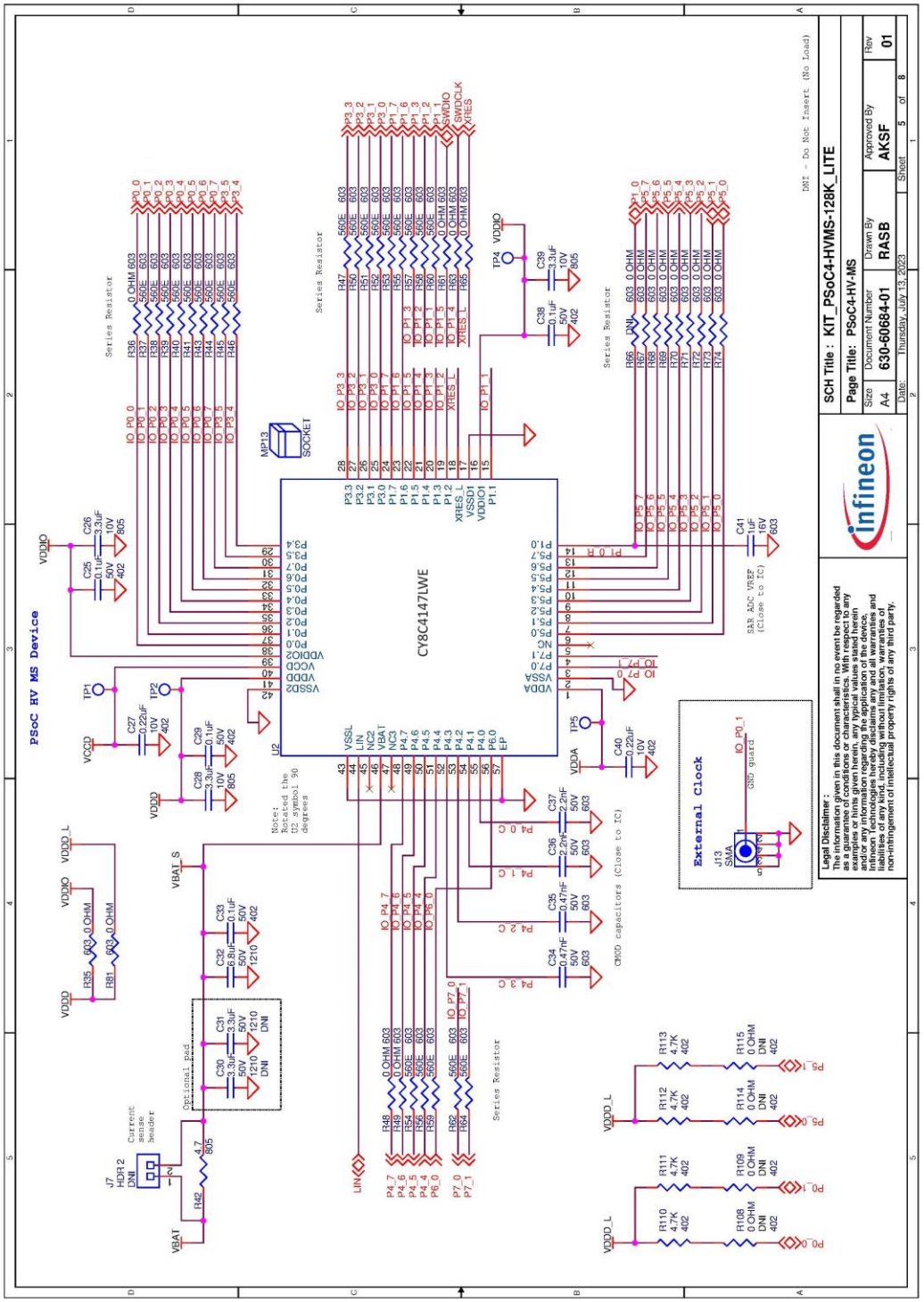

Figure 31 PSoC™ 4 HVMS Lite Kit schematics

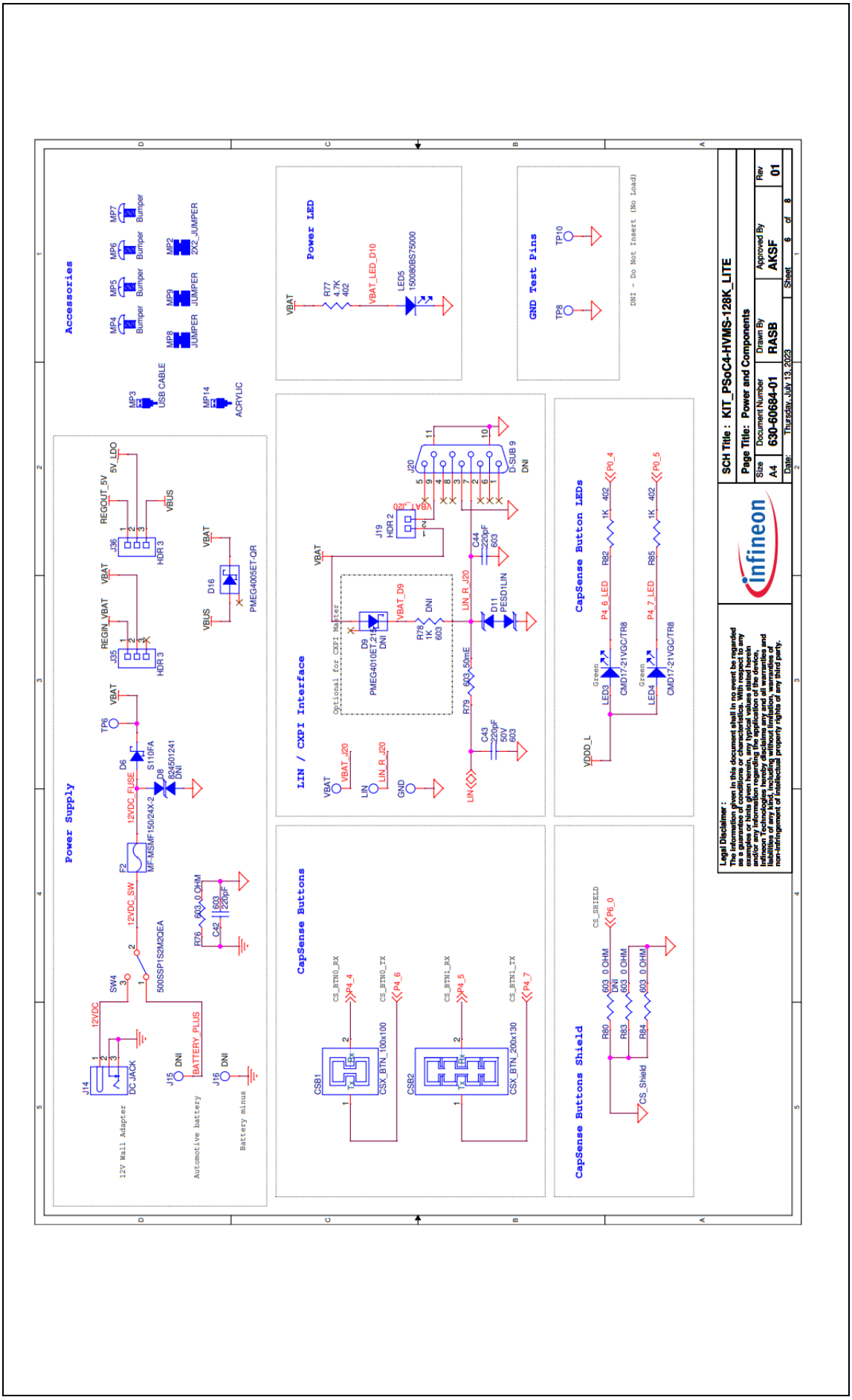

Figure 32 PSOC™ 4 HVMS Lite Kit power and components schematics

Schematics and designs

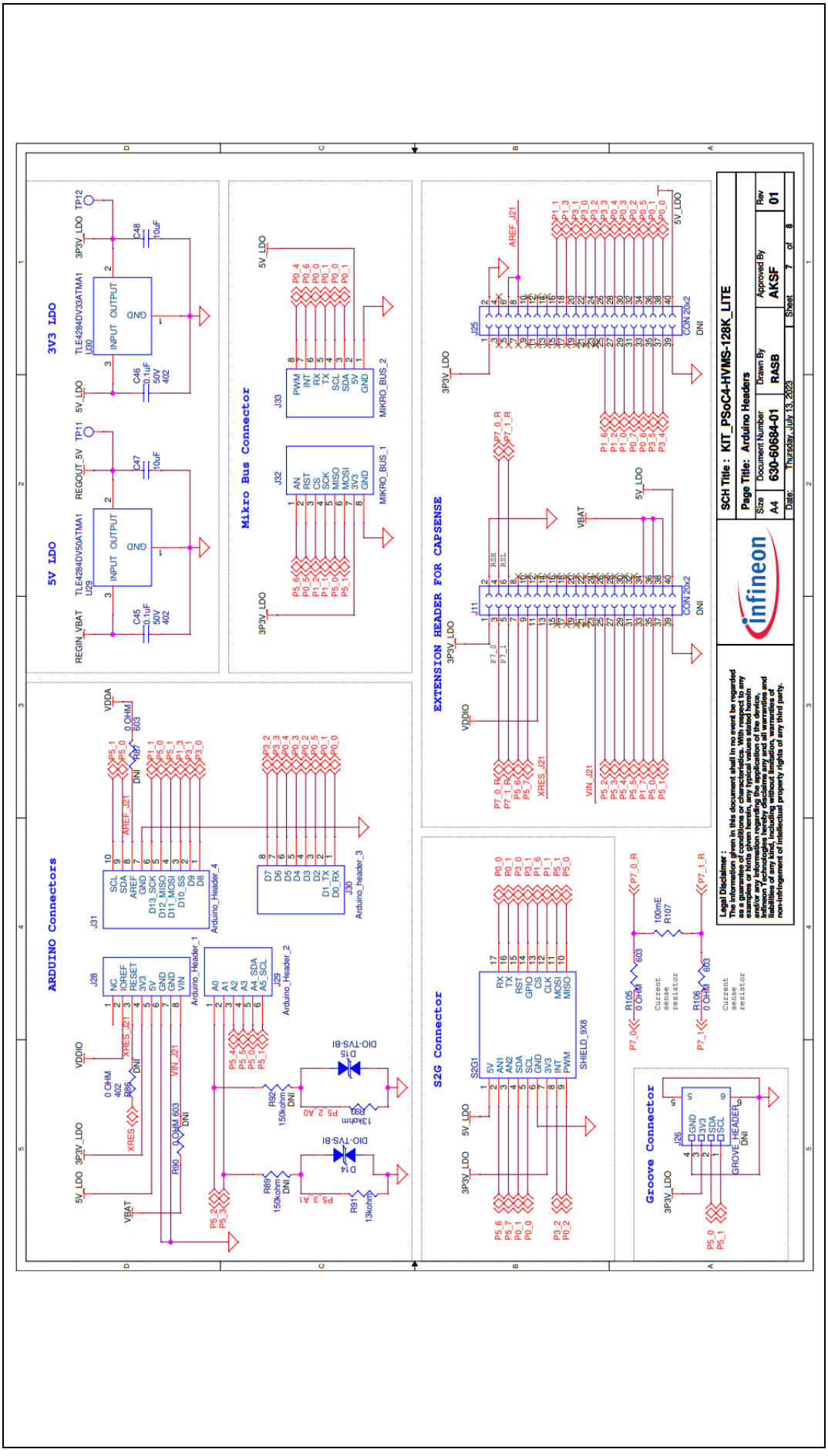

Figure 33 PSOC™ HVMS Lite Kit Arduino-compatible header schematics

5.2 KIT_PSoC4-HVMS-128K_LITE kit assembly drawings

This section shows the KIT_PSoC4-HVMS-128K_LITE kit assembly drawings.

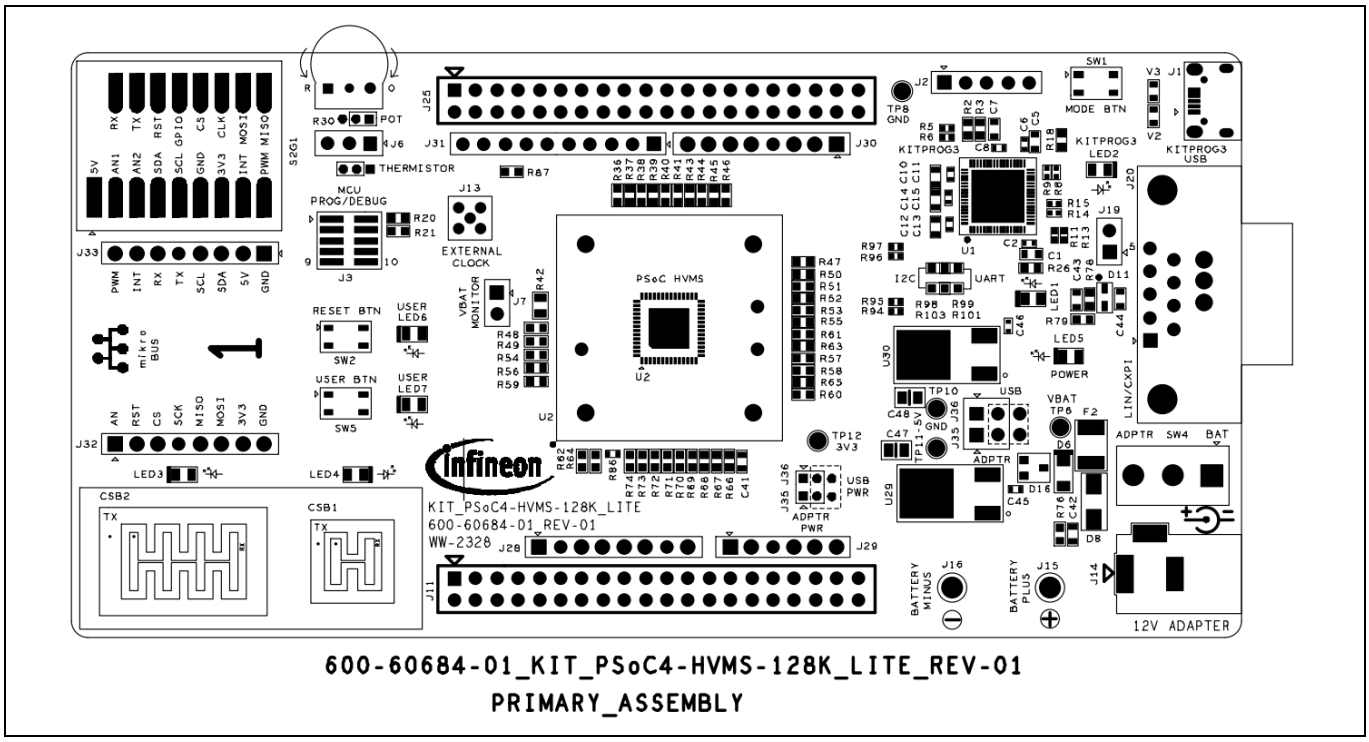

Figure 34 KIT_PSoC4-HVMS-128K_LITE kit assembly drawing – top view

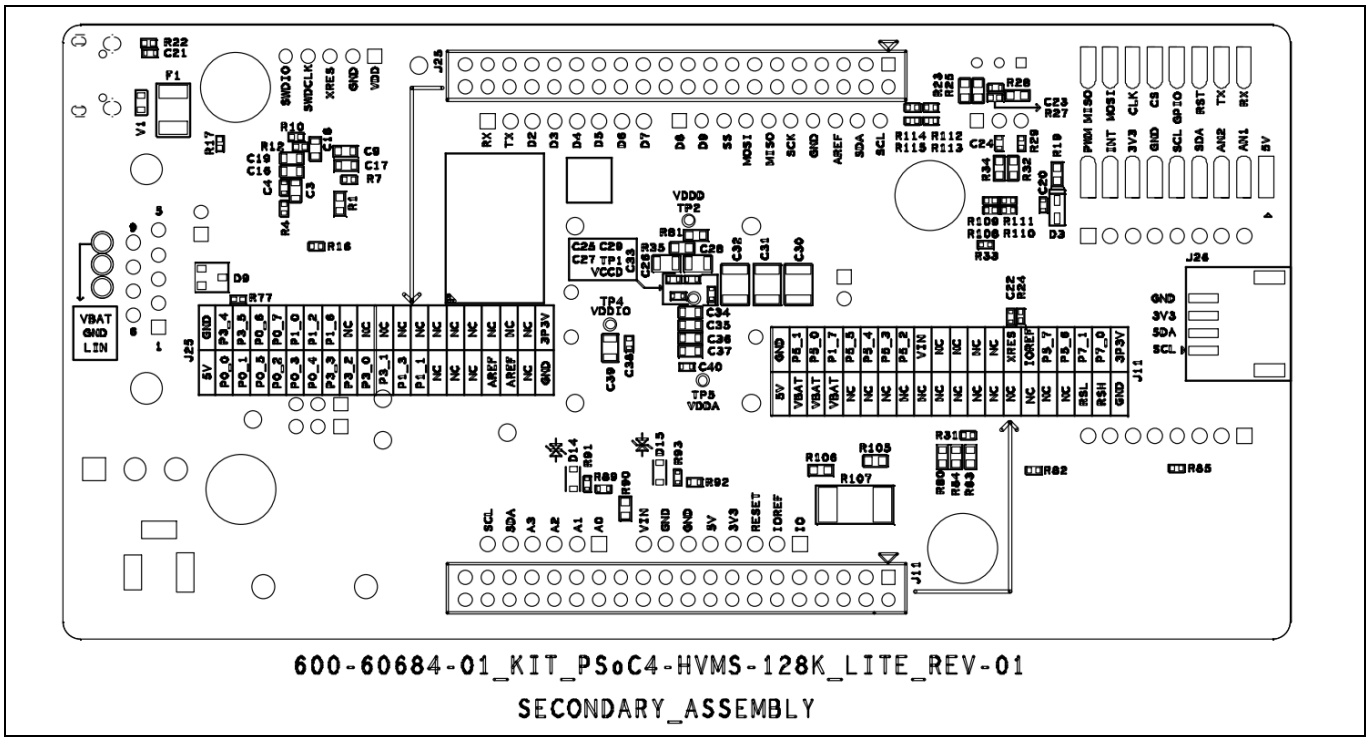

Figure 35 KIT_PSoC4-HVMS-128K_LITE kit assembly drawing – bottom view

References

Datasheet

Contact Infineon Support to obtain this document.

[1] CY8C41x7, PSoC™ 4 High Voltage (HV) Mixed Signal (MS) Automotive MCU Based on 32-bit Arm® Cortex®-M0+

Guides

[2] KitProg user guide

[3] KitProg3 user guide

Glossary

CSD
capacitive sigma-delta

CSX
CAPSENSE™ mutual sensing

CXPI
clock extension peripheral interface

HMI
human machine interface

HVMS
high-voltage mixed signal

LED
light emitting diode

LIN
local interconnect network

MCU
microcontroller

MSC
multi-sense converter

PCB
printed circuit board

PWM
pulse width modulation

SAR ADC
successive approximation resistor analog-to-digital converter

USB
Universal Serial Bus

Revision history

Document revision	Date	Description of changes
**	2023-08-22	Initial release.
*A	2023-09-22	Updated the document title. Updated About this document. Updated Table 2.
*B	2024-02-06	Updated pointer from 3P3V to 3V3 in section 2.2.1 and section 2.2.2. Updated AutoPDL in section 4.2.

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