KIT_CSK_BGT60UTR11AIP

XENSIV™ BGT60UTR11AIP Connected Sensor Kit

About this document

Scope and purpose

This user guide describes the function, circuitry, and performance of the XENSIV™ BGT60UTR11AIP Wing board, part of Infineon's XENSIV™ BGT60UTR11AIP Connected Sensor Kit (KIT_CSK_BGT60UTR11AIP).

Intended audience

The intended audience for this document is design engineers, technicians, and developers of electronic systems, working with Infineon's XENSIV™ 60 GHz radar sensors.

Reference Board/Kit

Product(s) embedded on a PCB with a focus on specific applications and defined use cases that may include software. PCB and auxiliary circuits are optimized for the requirements of the target application.

Note: Boards do not necessarily meet safety, EMI, quality standards (for example UL, CE) requirements.

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“Evaluation Boards and Reference Boards” shall mean products embedded on a printed circuit board (PCB) for demonstration and/or evaluation purposes, which include, without limitation, demonstration, reference and evaluation boards, kits and design (collectively referred to as “Reference Board”).

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Safety precautions

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

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.*

Table of contents

1 The board at a glance

The XENSIV™ BGT60UTR11AIP Connected Sensor Kit supports customers in testing sensor-driven IoT products and radar use cases as well as in prototyping. It offers a real-time sensor evaluation with custom configurations and cloud- and radar-based solution output visualization. The KIT_CSK_BGT60UTR11AIP (Figure 1) comes with:

- Rapid IoT Connect Developer Kit (CYSBSYSKIT-DEV-01)
- XENSIV™ BGT60UTR11AIP Wing (EVAL_60UTR11_WING)

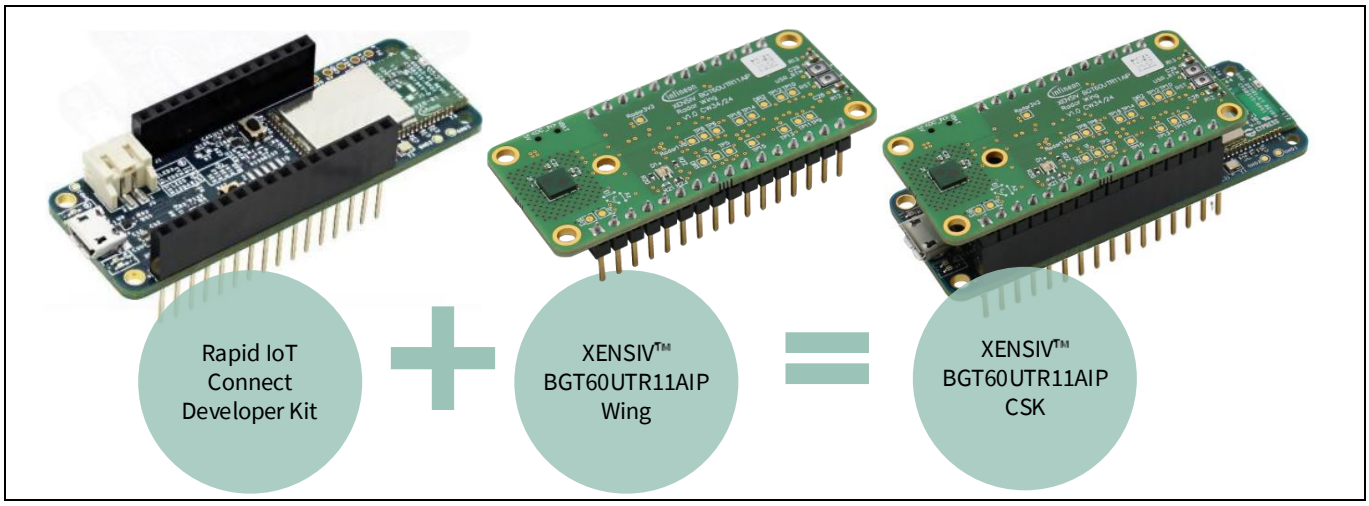

Figure 1 XENSIV™ BGT60UTR11AIP Connected Sensor Kit

The Rapid IoT Connect Developer Kit (CYSBSYSKIT-DEV-01) shown in Figure 2 allows the evaluation of the Rapid IoT Connect module (CYSBSYS-RP01) on a standard Feather form-factor. The CYSBSYS-RP01 Rapid IoT Connect module is a turnkey module that enables secure, scalable, and reliable compute and connect.

The Rapid IoT Connect Developer Kit carries a CYSBSYS-RP01 Rapid IoT connect system-on-module (SoM), which includes a PSOC™ 6 MCU, an AIROC™ CYW43012 single-chip radio, onboard crystals, oscillators, chip antenna, and passive components.

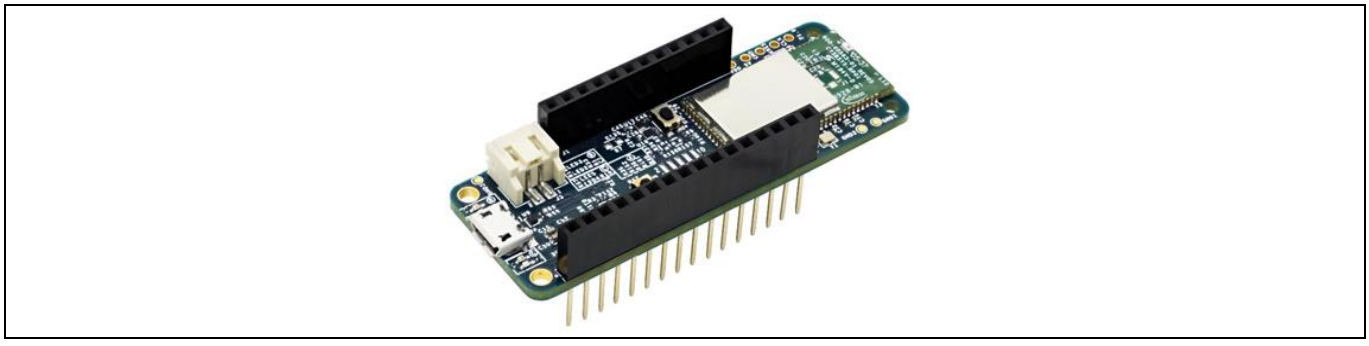

Figure 2 Rapid IoT Connect Developer Kit

1 The board at a glance

The XENSIV™ BGT60UTR11AIP Wing board shown in Figure 3 is based on the XENSIV™ BGT60UTR11AIP 60 GHz radar sensor MMIC with one transmitting and one receiving antenna integrated. The XENSIV™ BGT60UTR11AIP MMIC enables ultra-wide bandwidth FMCW operation. It is equipped with an integrated finite state machine (FSM). With the aid of the FSM, the XENSIV™ BGT60UTR11AIP can perform frequency modulated continuous wave (FMCW) frequency sweeps (chirps), acquire data, and store samples into the internal first-in, first-out (FIFO) memory autonomously.

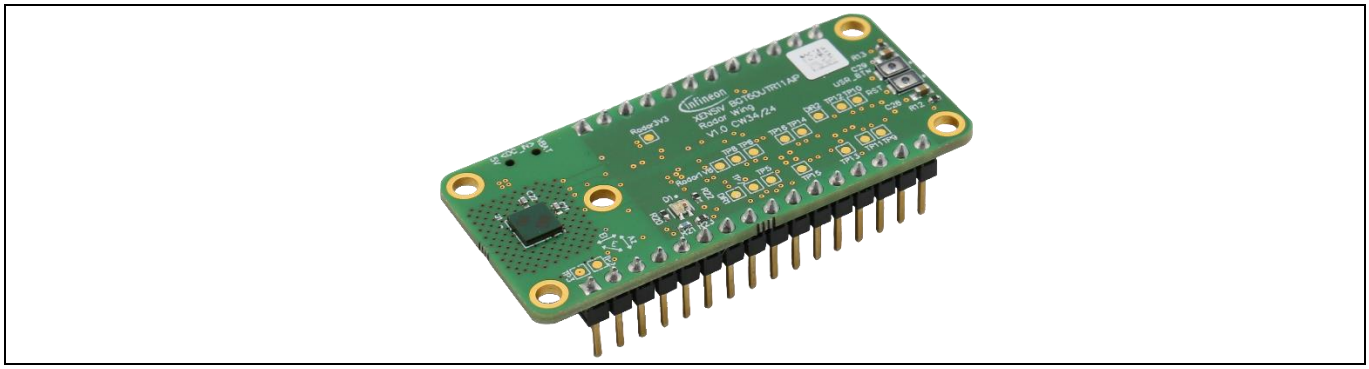

Figure 3 XENSIV™ BGT60UTR11AIP Wing board

1.1 Scope of supply

The kit can be powered from a 3.7 V LiPo battery or via a USB cable from an external 5 V power supply. The battery is automatically charged when the system is connected to an external power supply.

Note: The radar wing board must be manually switched to either battery or external 5 V supply (switch S3 in Figure 24).

1.2 Block diagram

A block diagram of the wing board is shown in Figure 4. The wing board comprises the XENSIV™ BGT60UTR11AIP radar sensor and the required power supply components. Power lines are highlighted in red. It is also equipped with push buttons and LEDs.

1 The board at a glance

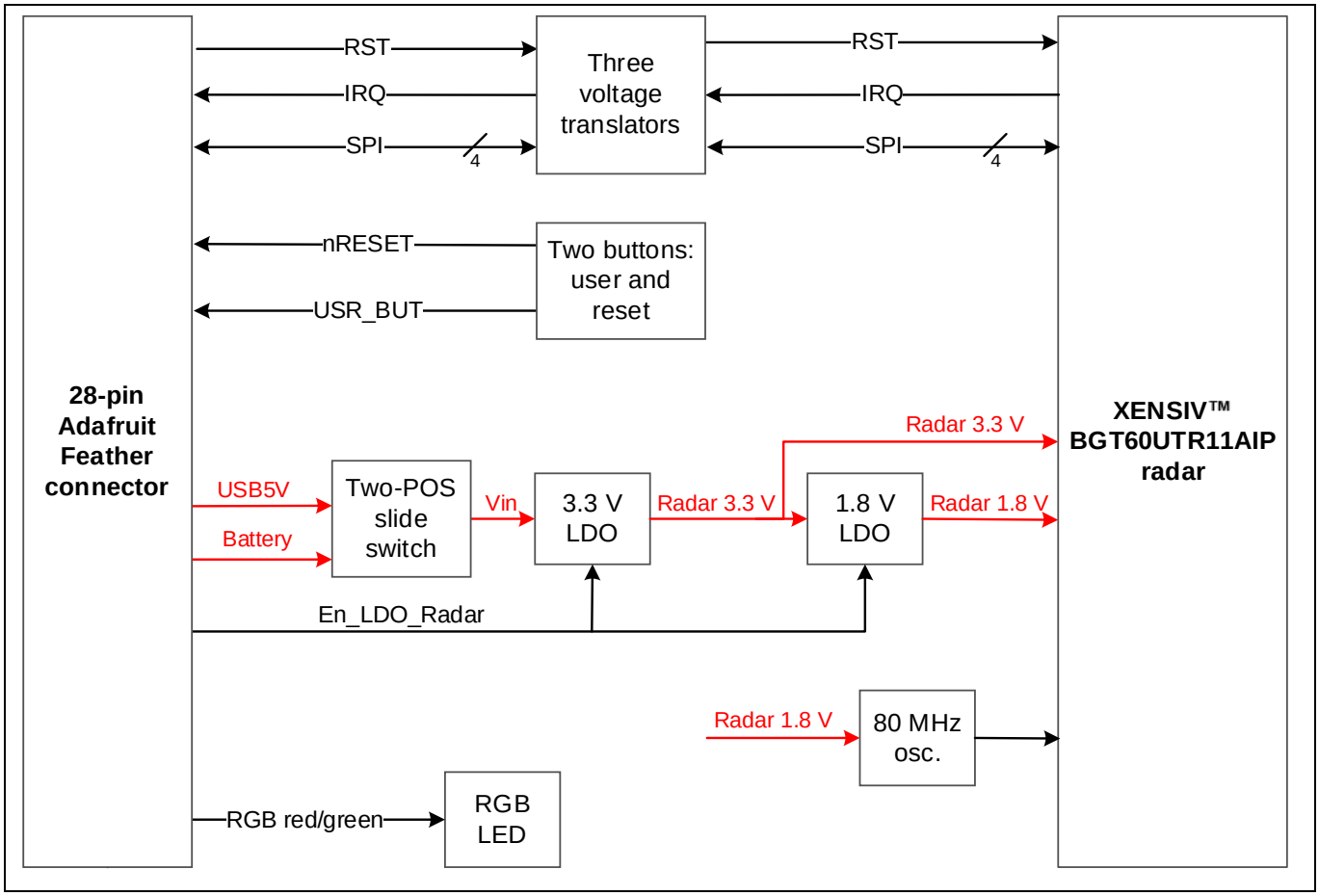

Figure 4 XENSIV™ BGT60UTR11AIP Wing board block diagram

A system block diagram showing the shield connected to the CSK rapid IoT baseboard is shown in Figure 4. The interface from the shield to the rapid IoT baseboard includes I2C, digital signals, analog signals and power lines. The baseboard can interact with the outside world using Wi-Fi, Bluetooth®, USB, or a combination of them depending on the firmware/software (FW/SW) installed on the baseboard. The kit can be powered from an external power supply or from a LiPo battery.

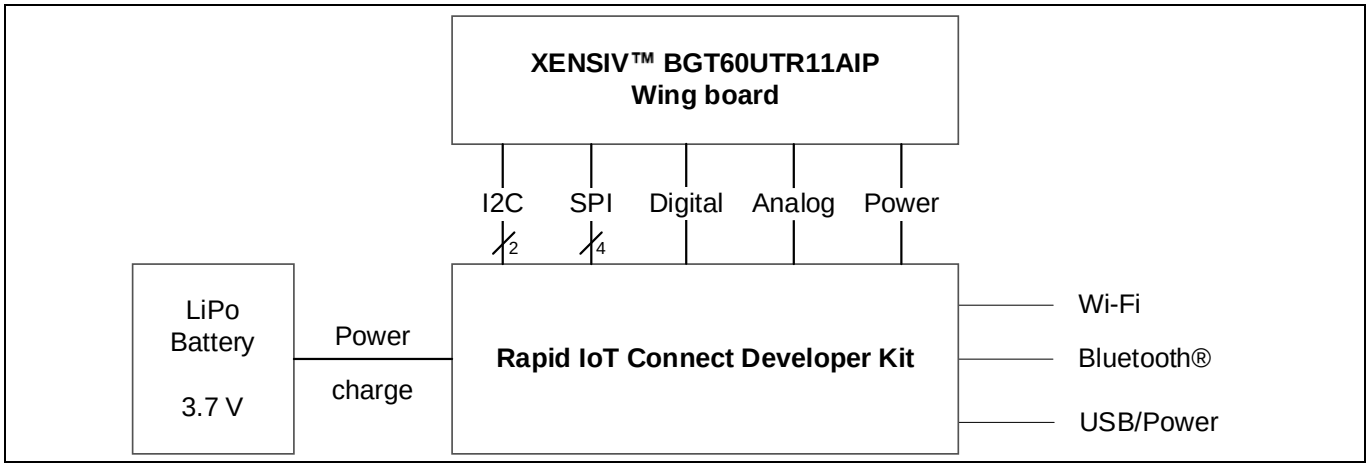

Figure 5 CSK system block diagram

1.3 Main features

- XENSIV™ BGT60UTR11AIP MMIC
  - 4.05 mm x 4.05 mm x 0.86 mm package size
  - 1Tx 1Rx Antennas in Package (AIP) with 90°x120° field of view (FoV) of 3 dB HPBW)
  - Real time data acquisition without interaction with the processor
  - Three different power modes provide the user full flexibility between performance and power consumption optimizations
- XENSIV™ BGT60UTR11AIP Wing board
  - 50.8 mm x 22.9 mm size on standard FR4 laminate
  - 1 RGB LED and 2 configurable user buttons
  - Form-factor compatibility with Adafruit
  - Electromagnetic Band-Gap (EBG) structure [4], to reduce the impact of neighboring components, resulting in a homogeneous FoV.
- CYSBSYSKIT-DEV-01 Rapid IoT Connect Developer Kit (MCU board)
  - Operates with ModusToolbox™ and Infineon Rapid IoT Connect cloud platform

1.4 Board parameters and technical data

Table 2 Parameters

Parameter	Symbol	Conditions	Value	Unit
Supply voltage	–	–	3.3 (wing board) 1.8 (MMIC)	V
MMIC power consumption	–	10 Hz duty cycle	1	mW
Operating frequency	–	–	57.4 to 63	GHz
EIRP	–	–	+9	dBm
Antenna in Package FoV	–	–	90° x 120° (3 dB HPBW)	degree

2 System and functional description

2.1 Getting started

The Connected Sensor Kit is a cutting-edge IoT development platform that empowers engineers to swiftly design, test, and refine innovative IoT devices. By providing pre-configured sensor scenarios and real-time data visualization, this kit enables developers to achieve the 10-minute IoT experience, allowing them to rapidly evaluate and validate their ideas.

To further accelerate development, a comprehensive suite of code examples is available within ModusToolbox™, see Section 2.3, offering a one-stop-shop for developers to kick-start their IoT projects with ease.

2.2 Quick IoT experience

2.2.1 Signup and login

1. Create an account with the Infineon Rapid IoT Connect Platform by signing up with your email address and other required details as shown Figure 6

Figure 6 Rapid IoT Connect Platform signup

2. You will receive a password via email, which you will be prompted to change upon your first login to one of your choosing
3. Enter the credentials to login as shown in Figure 7

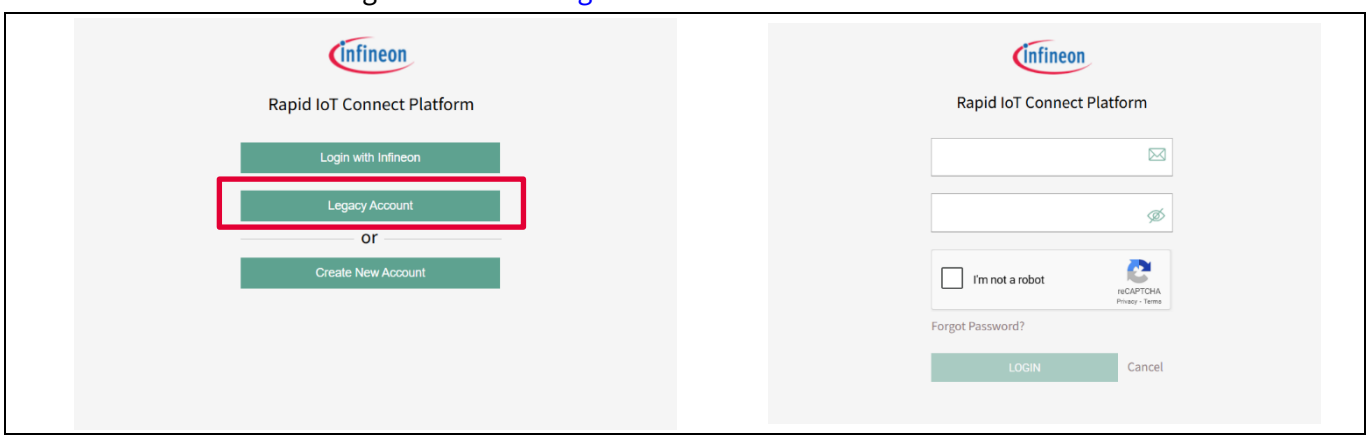

Figure 7 Rapid IoT Connect Cloud Platform login

2.2.2 Add your device

1. Click on the **Add device** button to start the process of adding your new KIT CSK BGT60UTR11AIP device. A pop-up wizard appears to guide you through the process

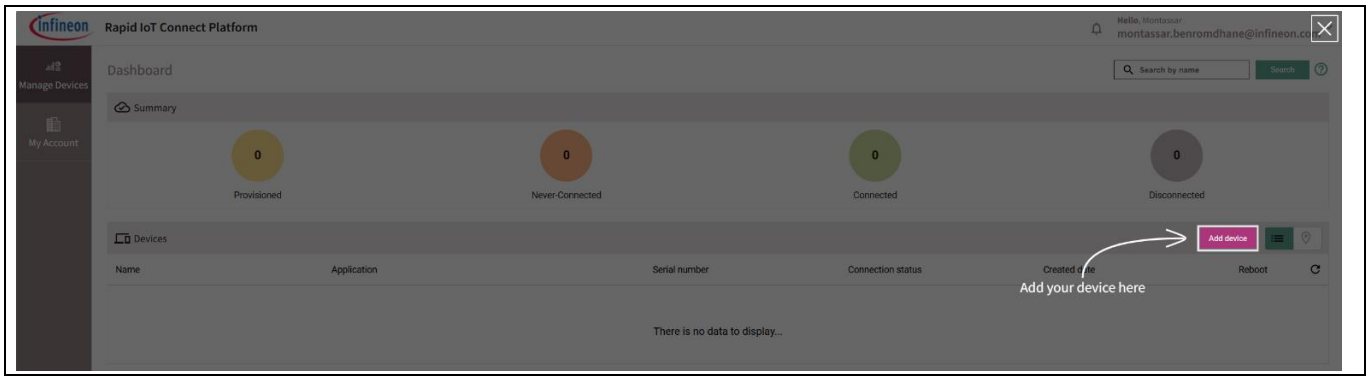

Figure 8 Add your device

2. On the **Device Details**, provide a name for your device, and enter the development kit serial number as shown Figure 9. Click the **Next** button to proceed further

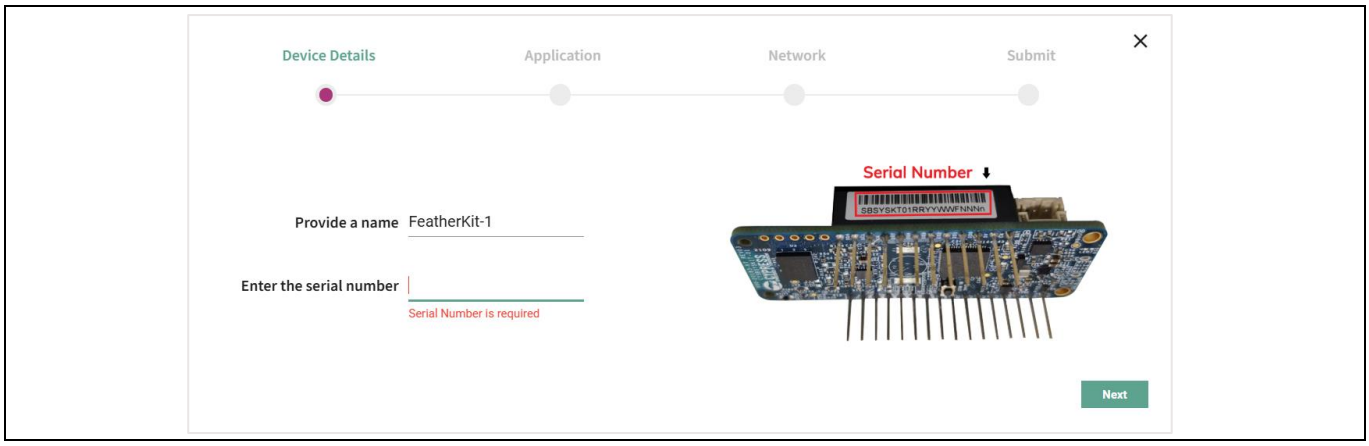

Figure 9 Add device wizard

2.2.3 Application

- With the Quick IoT Experience in **Application**, you can complete an IoT sensor experience that includes telemetry and fleet monitoring, in less than ten minutes
- After you complete the setup wizard, download and program your development kit with a built-in *hex* file. This *hex* file prepares and configures your development kit with the latest Wi-Fi firmware, an example application, and all the credentials required to securely connect to the cloud
- Note that the example application automatically uses the integrated temperature sensor. Ensure to select your desired application based on the XENSIV™ wing board you have, in this case it is XENSIV™ BGT60UTR11AIP wing

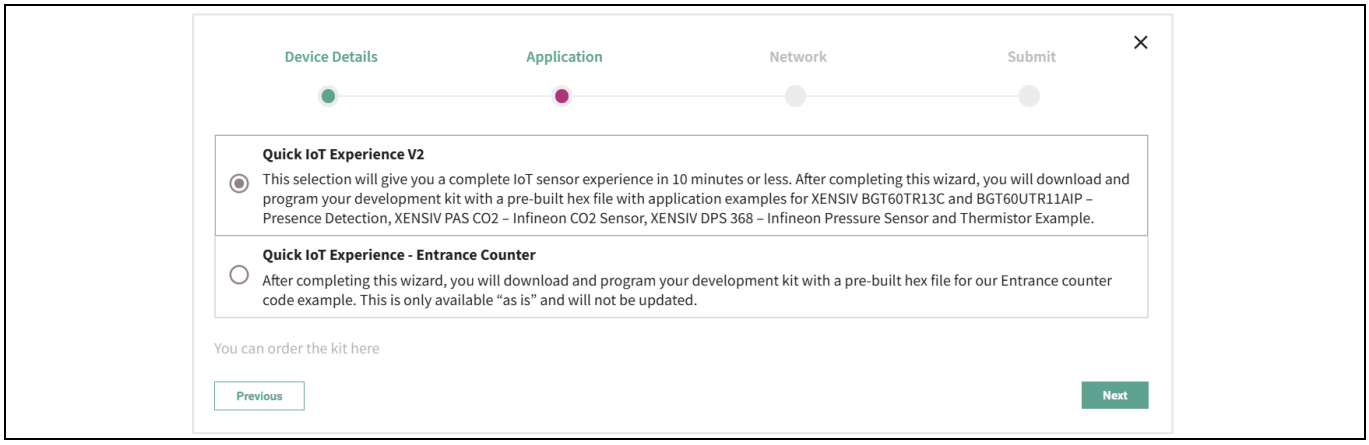

Figure 10 Select application

2.2.4 Configure Wi-Fi network

You can connect to your preferred WPA2 network by providing the Wi-Fi SSID and password by selecting **Create New Network**, or set up an access point/hotspot with WPA2-PSK security by using the following credentials:

- SSID: IFX_Sensor
- Security: WPA2-PSK
- Password: S66M14022021

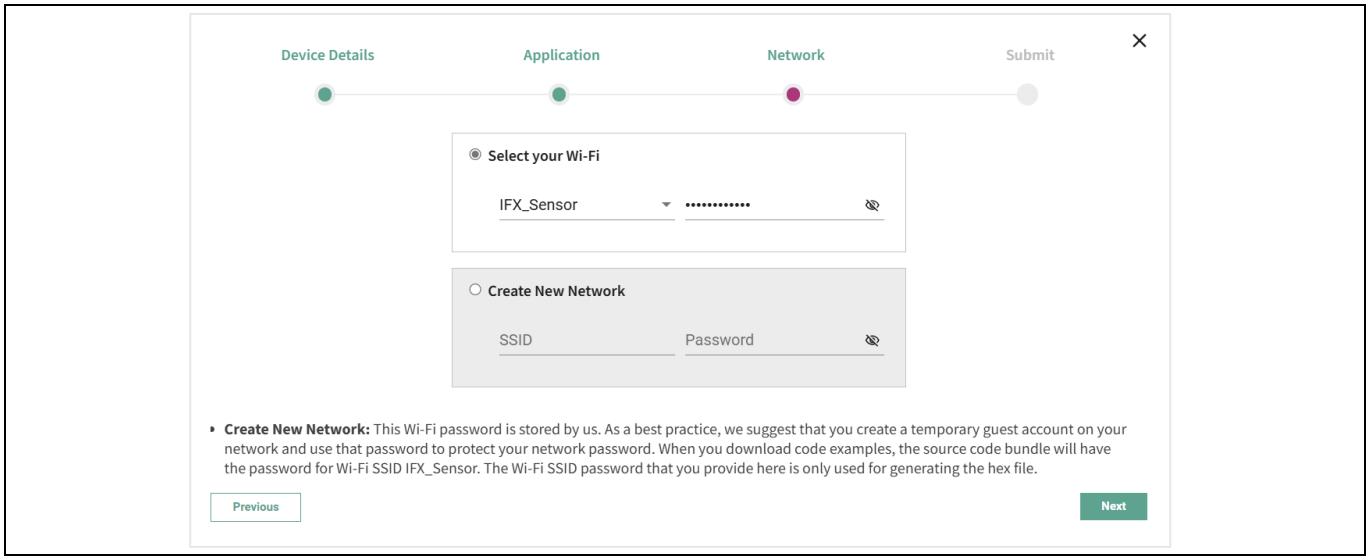

Figure 11 Configure and select network

2.2.5 Submit your device configurations

- Ensure all the information that you have entered is accurate before clicking the **Submit** button
- If you need to make changes, you can go back to earlier screens by pressing the **Previous** button
- After you click **Submit**, a custom *hex* file will be built for your device, and a software bundle will be generated for programming your development kit, as shown in Figure 13

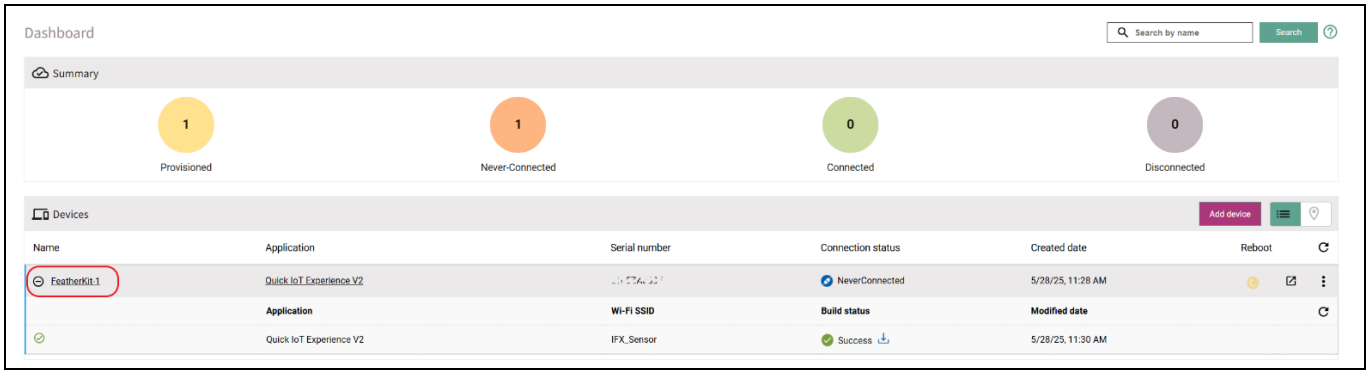

Figure 12 Device management dashboard

Note: You can add/register a maximum of five devices with the Rapid IoT Connect Cloud Platform account.

2.2.6 Download the zip package

Depending on your laptop or PC's operating system (Windows/Linux/Mac), you will receive a downloadable package that includes a *hex* file firmware image and a programming tool for your KIT_CSK_BGT60UTR11AIP kit. The package will be in the form of a zip file. To view the detailed device status, click on the ⊕ (expand) button. To download the zip package, click (download) next to **Success** on the application as shown in Figure 13.

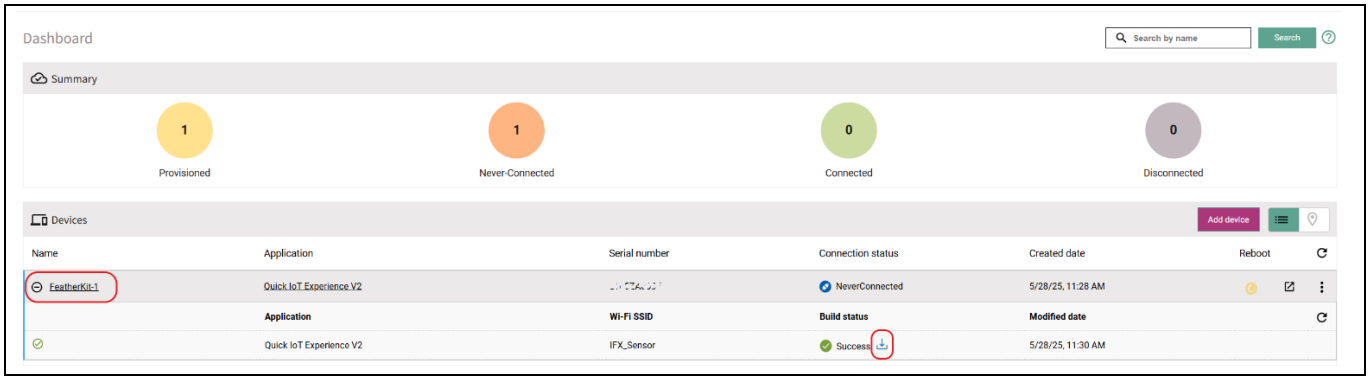

Figure 13 Device management dashboard

2.2.7 Program the KIT_CSK_BGT60UTR11AIP

- Use a Micro-USB cable to connect your development kit to your PC or laptop
- Extract the zip file and run the *program_kit* script

  For Windows users, the script will be a *.cmd* file, while Linux and Mac users will see a *.sh* and *.command* files, respectively. If you are using Linux or Mac, ensure to run the script from a terminal with the necessary permissions. For detailed instructions, see the README.md file as shown in Figure 14

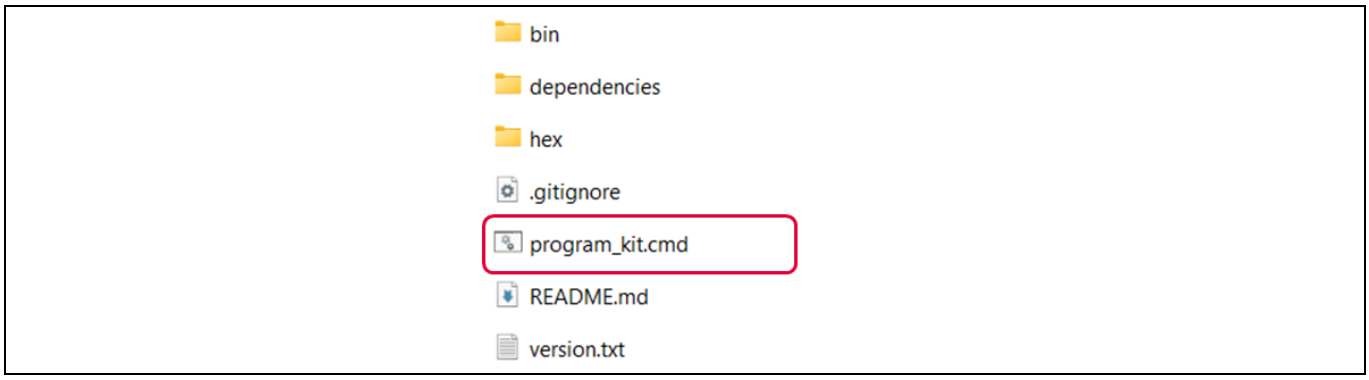

Figure 14 Package content

The successful kit programming command line logs are illustrated in Figure 15.

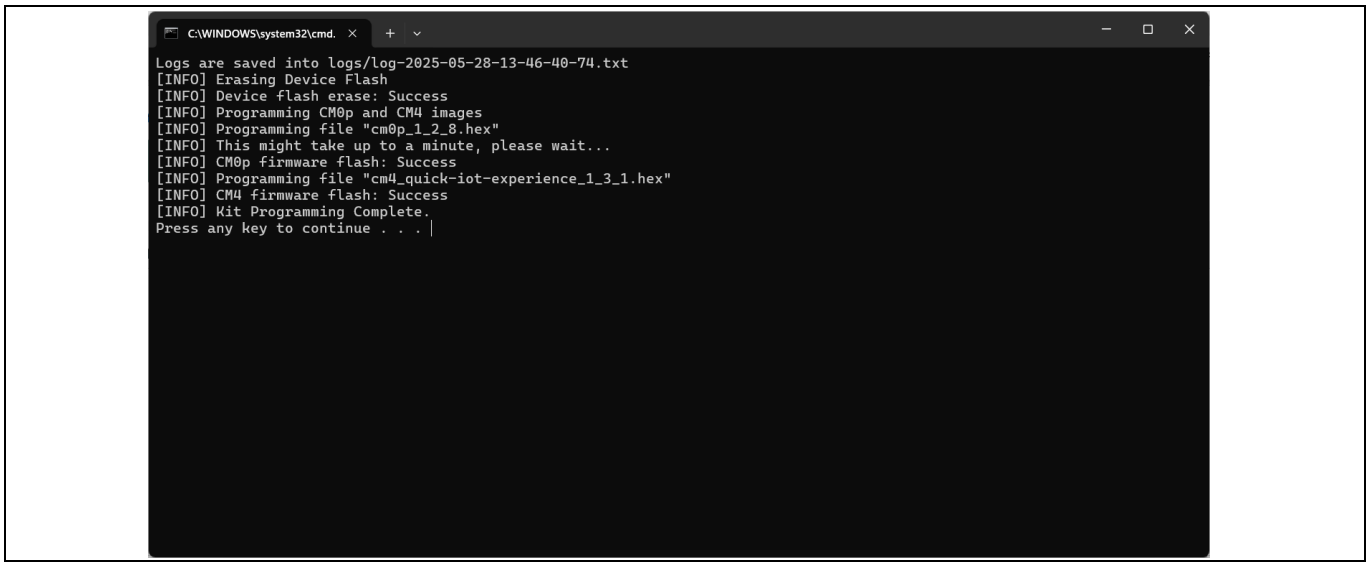

Figure 15 Kit programming complete

2.2.8 Device management

Manage your device (s) and their configurations in the device management tab. To view the details of a particular device, click on the expand icon next to the **Created date** to view the respective device details.

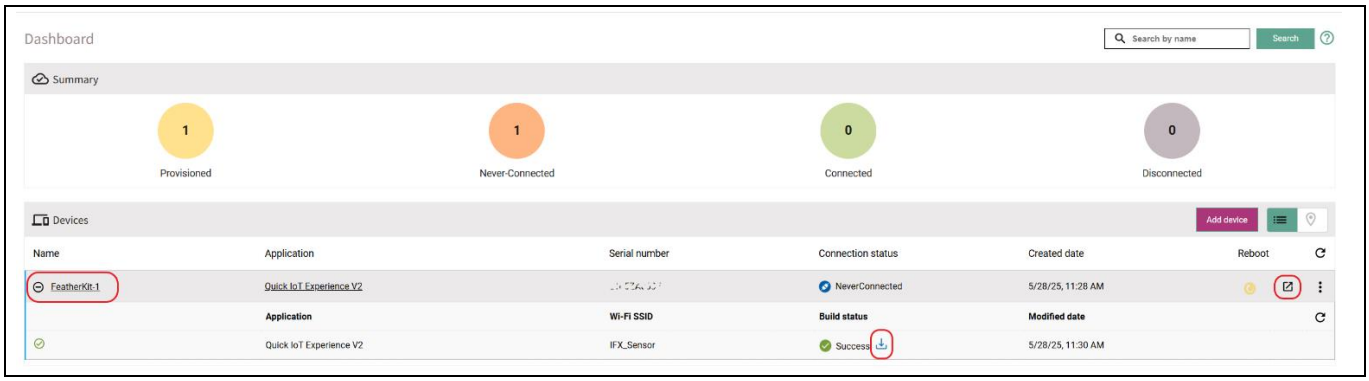

Figure 16 Device connection status

2.2.9 Select desired application

- To select the desired application for your connected Infineon sensor wing board (in this case, XENSIV™ BGT60UTR11AIP), go to the **Attributes** tab in the device details
- Click on the dropdown menu for **Sensors** and select "**XENSIV BGT60UTR11AIP**"
- After you select the application, the attributes will be pushed to the device, and it will reboot to the desired application

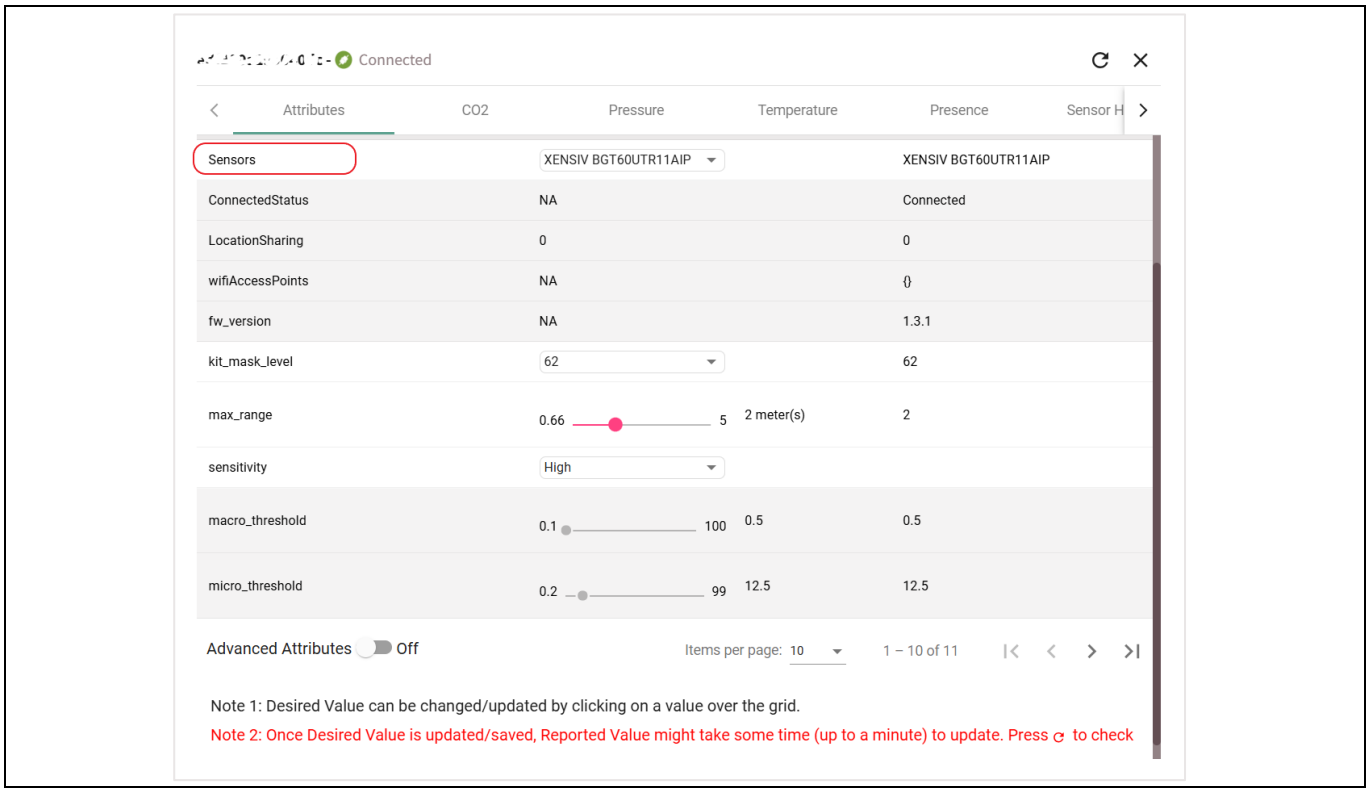

Figure 17 Attributes tab for connected device

Note: *Selecting a new application can cause the connectivity to temporarily disconnect and reconnect from the Rapid IoT Connect Cloud Platform.*

2.2.10 Selected application attributes

- To view all attributes on one page, click on the **Items per page** dropdown menu at the bottom of the **Attributes** tab and adjust the number of items accordingly
- For the Presence Detection use case, see the list of attributes as shown in Table 3

Table 3 Presence detection application attributes

Attribute	Description
kit_mask_level	Disable logs, enable minimal logs or full logs to cloud 60: WARN, MINOR, MAJOR, FATAL all to UART terminal 62: INFO, WARN, MINOR, MAJOR, FATAL all to UART terminal 124: WARN, MINOR, MAJOR, FATAL all to Cloud UI as well as UART terminal
max_range	0.66 – 5.0 Maximum detectable range for presence in meters Default is 2.0
sensitivity	High: • macro_threshold: 0.5, micro_threshold: 12.5 Medium: • macro_threshold: 1.0, micro_threshold: 25.0 Low: • macro_threshold: 2.0, micro_threshold: 50.0 Adjust the macro and micro threshold parameters to achieve different level of sensitivity. The higher the threshold, the lower the sensitivity Default is High
macro_threshold	0.1 – 100.0 Threshold value used in macro-movement detection. After changing this value, the sensitivity would be customized. The higher the threshold, the lower the sensitivity Default is 0.5
micro_threshold	0.2 – 99.0 Threshold value used in micro-movement detection. After changing this value, the sensitivity would be customized. The higher the threshold, the lower the sensitivity Default is 12.5

2.2.11 View sensor data

- To view your sensor data on the cloud, click on the desired tab at the top of the device details window
- By default, your application will be set to Thermistor. Click on the **Presence** tab to view the data represented as a graph for easy viewing. You can also download the raw data in .CSV format by clicking the **Download** button in the top-right corner

Note: *As a standard user, your data is retained for 14 days. After this period, the data will no longer be available for retrieval. If you require a longer data retention period, contact Infineon Support to discuss upgrading your account.*

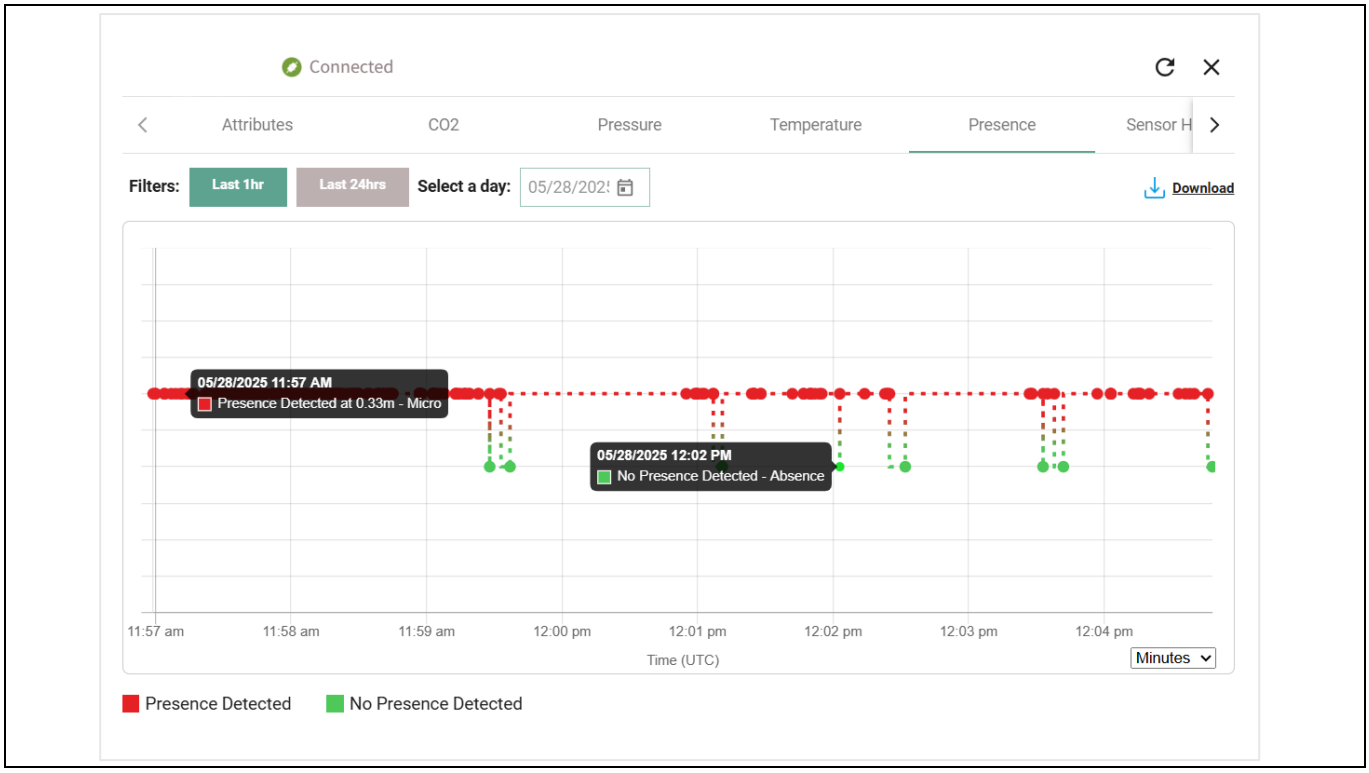

Figure 18 Presence detection data visualization

2.3 Code examples in ModusToolbox™

The XENSIV™ BGT60UTR11AIP CSK offers seamless integration with ModusToolbox™, with complete application code examples and sensor drivers for faster go-to-market.

2.3.1 PSOC™ 6 MCU: XENSIV™ 60 GHz radar presence detection

This code example (mtb-example-ce241611-xensiv-60ghz-radar-presence-detection) demonstrates Infineon's radar presence detection application to detect human presence within a configurable distance. Powered by the XENSIV™ 60 GHz radar, this application provides extremely high accuracy in detecting both micro and macro motions. The ability to detect micro motion offers unique benefits over conventional technologies deployed to detect human presence, therefore, making it an ideal for user interaction with devices.

This code example is based on the xensiv-radar-presence library source code, which provides APIs that enable to utilize existing radar applications, such as presence detection, or build applications on top. It detects both macro and micro movements in a configurable range using the data acquired by XENSIV™ FMCW radar sensor. It also uses:

- The sensor-dsp library that provides signal processing functions for sensor applications. It uses the ModusToolbox™ Hardware Abstraction Library (HAL) interface
- The sensor-xensiv-bgt60trxx driver library to interface with the XENSIV™ BGT60TRxx 60 GHz FMCW radar sensors

2.3.2 PSOC™ 6 MCU: XENSIV™ 60 GHz radar static distance measurement

This code example (mtb-example-ce241721-xensiv-60ghz-static-distance) provides a ModusToolbox™ application for static distance measurement using Infineon's XENSIV™ 60 GHz radar. The application processes radar raw data to calculate the distance to a static target, leveraging zero-padding, range FFT, and coherent integration for high accuracy. The algorithm returns static distance to the strongest reflected target, i.e., the target with the highest radar cross-section (RCS) within the set range and field of view (FoV).

3 System design

This section introduces you to the various features of the XENSIV™ BGT60UTR11AIP Radar Wing board. Apart from the headers, all components are mounted on the top side of the Wing board, which has male headers facing downwards to either plug the board directly on the Rapid IoT baseboard or on top of another Wing board such as the Infineon XENSIV™ PAS CO2 Wing board.

Figure 19 and Table 4 provide a description of the components mounted on the XENSIV™ BGT60UTR11AIP Radar Wing board.

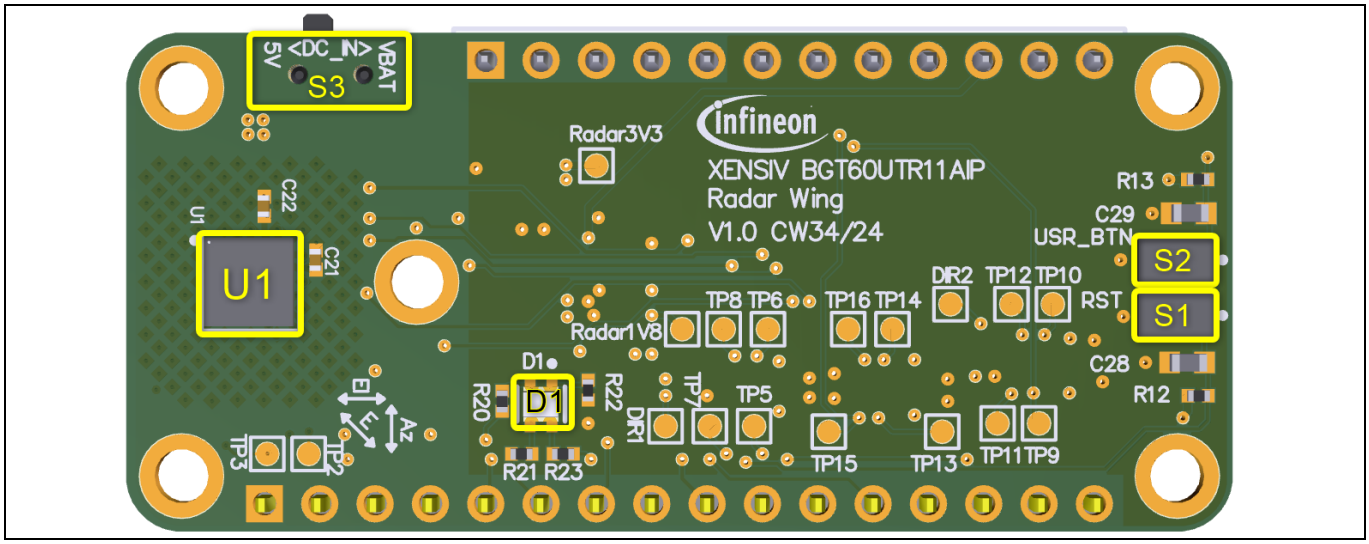

Figure 19 Front view of the XENSIV™ BGT60UTR11AIP Radar Wing board

Table 4 Onboard hardware

Ref designator	Function
U1	XENSIV™ BGT60UTR11AIP device
X1	80 MHz CMOS oscillator
D1	Tri-color LED
S1	System reset button; active LOW
S2	User button; active LOW
S3	To select the board power supply from CYCBSYSKIT-DEV-01 Rapid IoT baseboard: USB5V or from LiPo battery supply of the kit
J1, J2	Adafruit headers

3.1 Schematics

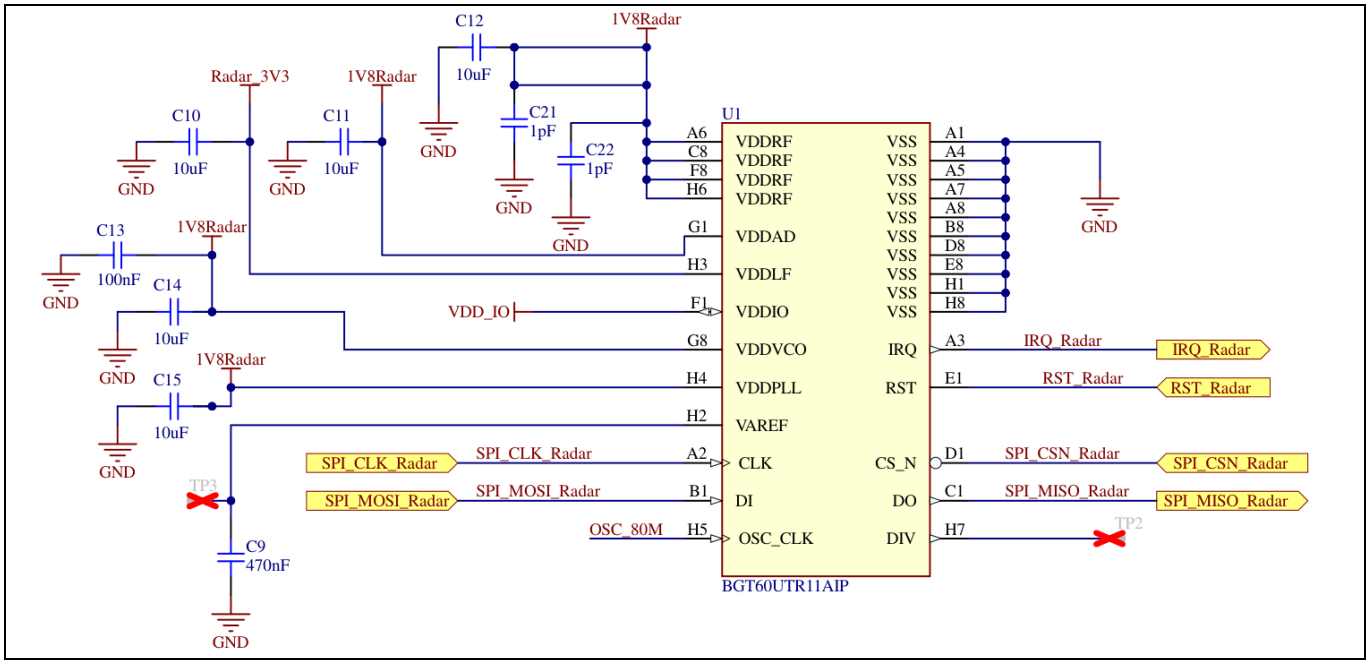

Figure 20 XENSIV™ BGT60UTR11AIP Radar MMIC schematic

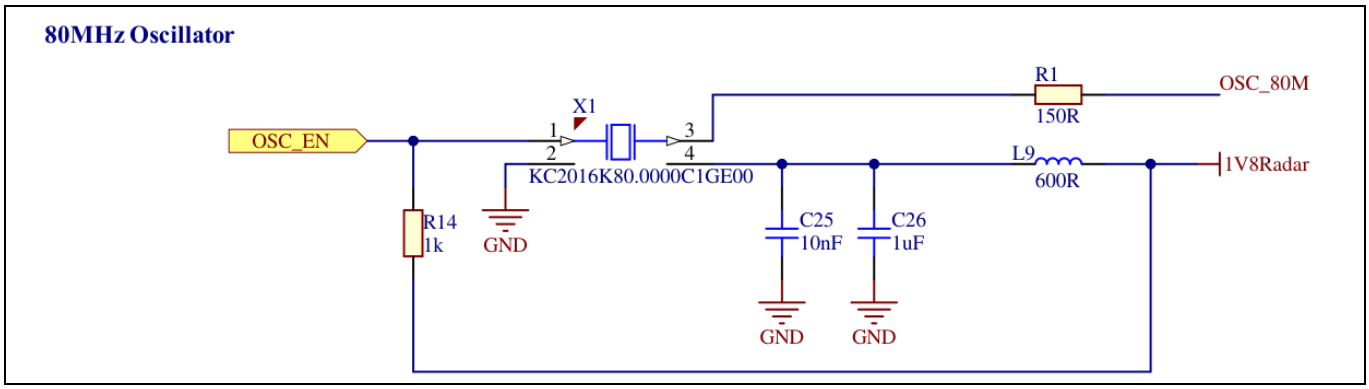

Figure 21 Oscillator circuit on the XENSIV™ BGT60UTR11AIP Wing board

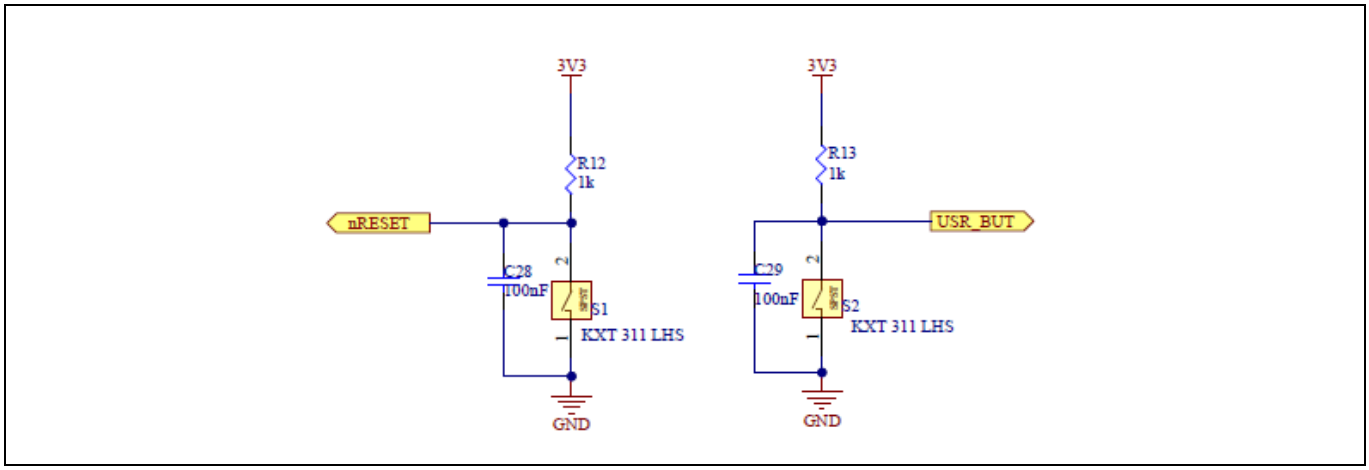

Figure 22 Reset (S1) and user button (S2) schematic

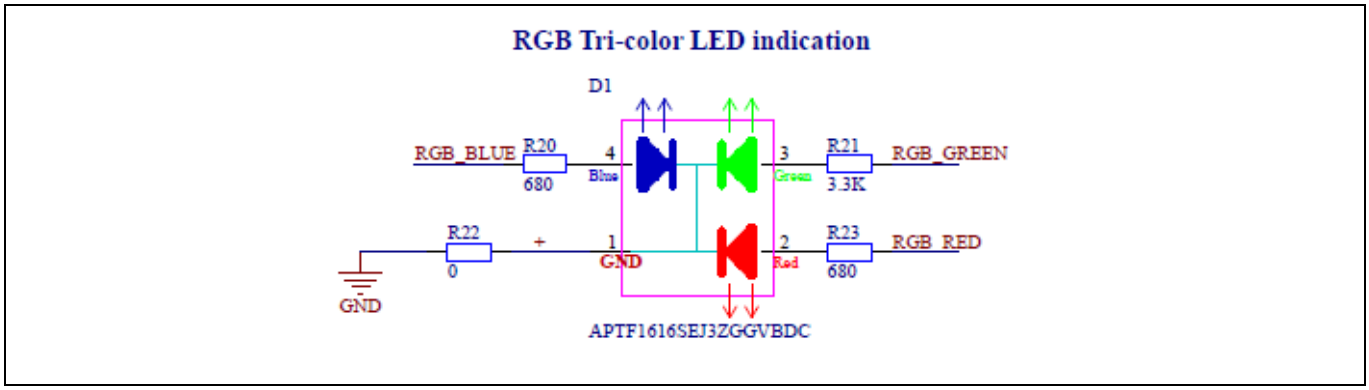

Figure 23 LED schematic

Figure 24 shows the board power selection schematic.

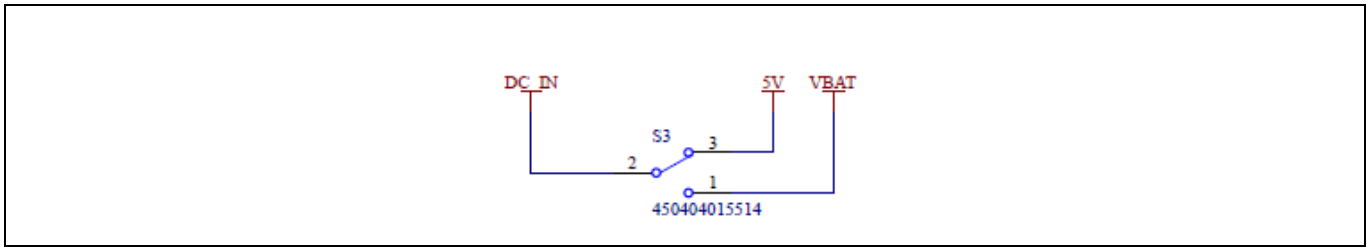

Figure 24 Board power selection (S3) schematic

Figure 25 shows the voltage regulator circuit to provide stable power supply to the radar sensor.

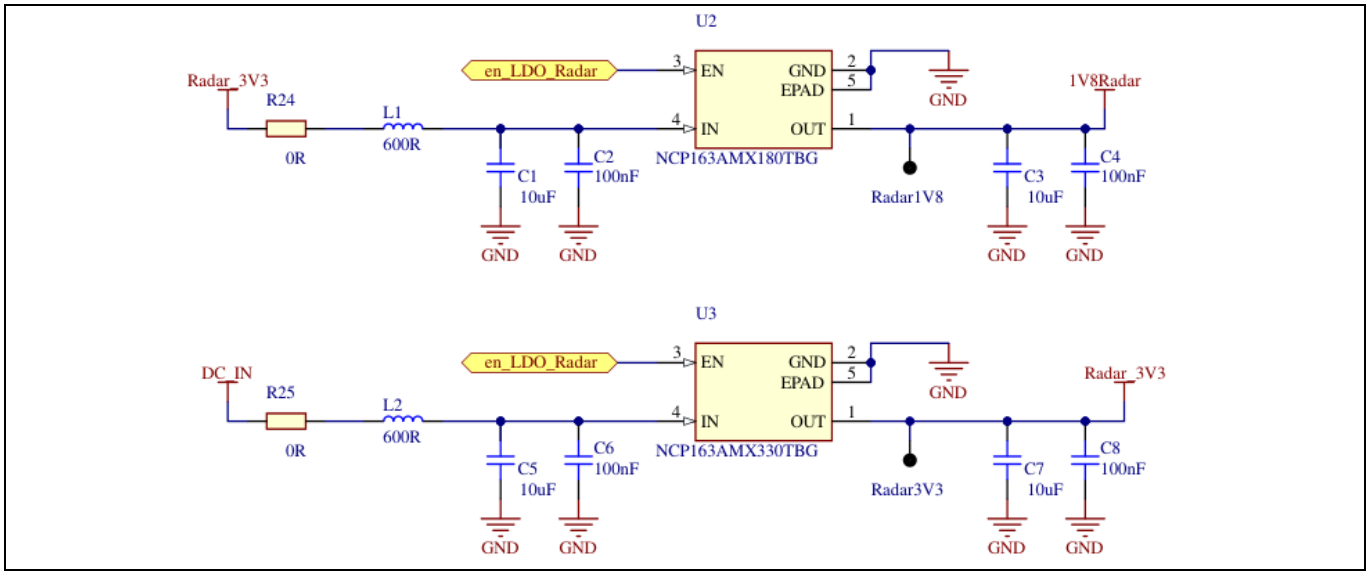

Figure 25 Voltage supply for radar sensor schematic

Figure 26 shows the pin assignment of J1 and J2 on the XENSIV™ BGT60UTR11AIP Radar Wing board. The Adafruit feather-compatible header is used to plug into the CYCBSYSKIT-DEV-01 Rapid IoT Connect Developer Kit.

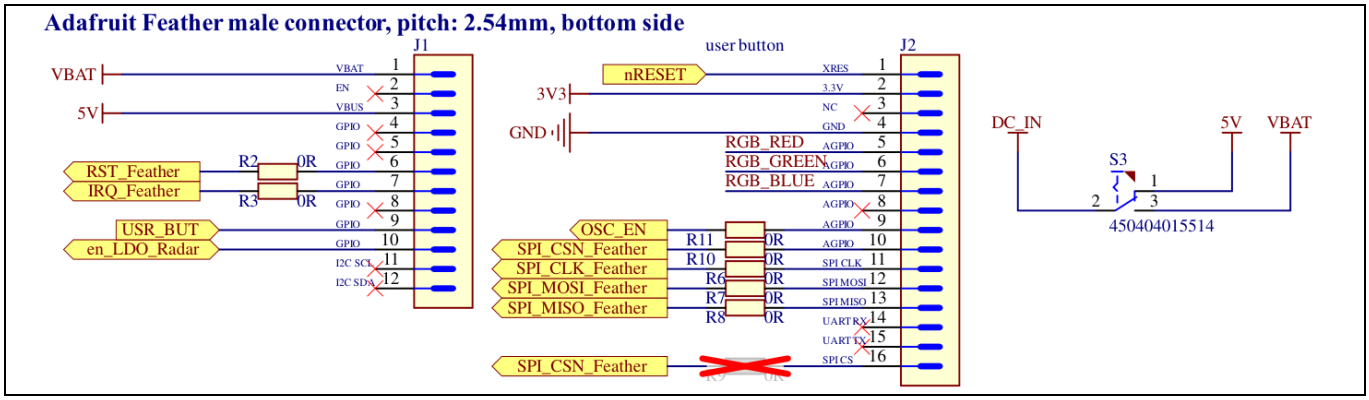

Figure 26 Adafruit headers schematic

3.2 Layout

The size of the XENSIV™ BGT60UTR11AIP Radar Wing board is 43 mm (L) x 23 mm (W), as shown in Figure 27.

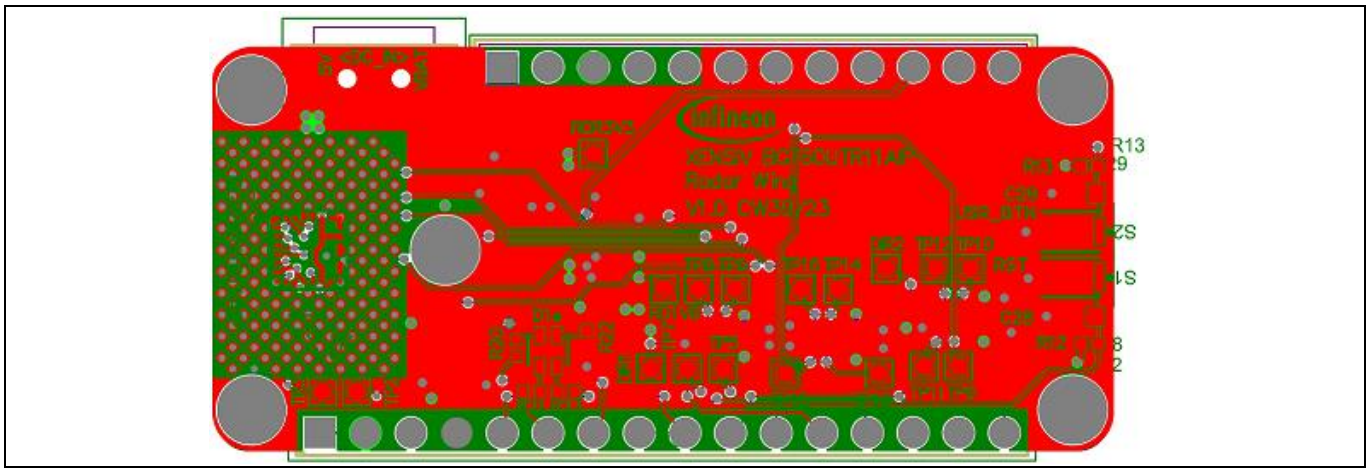

Figure 27 PCB layout of XENSIV™ BGT60UTR11AIP Radar Wing board

3.3 Bill of materials

Table 5 lists the bill of materials (BOM) of the XENSIV™ BGT60UTR11AIP Radar Wing board.

Table 5 BOM of the most important/critical parts of the evaluation

Ref designator	Description	Manufacturer	Manufacturer P/N	Footprint	Qty
C1, C3, C5, C7, C10, C11, C12, C14, C15	10 µF ±20% 6.3 V Ceramic Capacitor X6S 0402 (1005 Metric)	Murata	GRM155C80J106 ME11D	CAPC1005X70 N	9
C2, C4, C6, C8, C13, C30, C31, C32, C33, C34, C35	0.1 µF ±20% 10 V Ceramic Capacitor X5R 0201 (0603 Metric) 0.1 µF 10 V Ceramic Capacitor X7R 0201	Murata	GRM033R61A104 ME15D, GRM033Z71A104 KE14D	CAPC0603X33 N	11
C9	0.47 µF 10 V Ceramic Capacitor X6S 0201	Taiyo Yuden	LMK063BC6474K PLF	CAPC0603X39 N	1

Ref designator	Description	Manufacturer	Manufacturer P/N	Footprint	Qty
C16, C18, C26	1 µF ±20% 6.3 V Ceramic Capacitor X7T 0201 (0603 Metric)	Murata	CAPC0603X35N	GRM033D70J105ME01D	3
C25	10000 pF ±10% 10 V Ceramic Capacitor X7R 0201 (0603 Metric)	Murata	CAPC0603X33N	GCM033R71A103KA03D	1
C28, 29	0.1 µF 6.3 V Ceramic Capacitor X7R 0603	KEMET	CAPC1608X87N	C0603C104K5RACTU	2
–	Full-Color Surface Mount LED, 520nm, Green, Low power consumption	KINGBRIGHT	LED-SMD-APTF1616SEJ3ZGGVBDC	APTF1616SEJ3ZGGVBDC	1
DIR1, IR2, RD1V8, DR3V3, TP2, TP3, TP5, TP6, TP7, TP8, TP9, TP10, TP11, P12, TP13, P14, TP15, P16	Generic Surface Mount TP with 1 mm diameter	N.A	TP	TP SMD	18
J1	Header, 12-pin, pitch 2.54 mm, vertical, single row	Molex	HDRV12W64P254_1X12_3048X254X898B	TSW-112-07-L-S	1
J2	Header, 16-pin, pitch 2.54 mm, vertical, single row	Molex	HDRV16W64P254_1X16_4070X254X838B	TSW-116-07-L-S	1
L1, L2	Ferrite bead 600 Ω at 100 MHz ferrite bead 0201 (0603 metric) 250 mA 850 mΩ	Murata	INDC0603X33N	BLM03AX601SN1D	2
L9	Ferrite bead 600 Ω at 100 MHz signal line ferrite bead 0402 (1005 metric) 200 mA 850 mΩ	TDK	INDC1005X55N_MMZ1005	MMZ1005B601CT000	1
R1	Resistor SMD 150 Ω 1% 1/20 W 0201	Yageo	RESC0603X26N	AC0201FR-07150RL	1
R2, R3, R4, R6, R7, R8, R10, R11, R22, R24, R25	Resistor SMD 0 Ω jumper 1/16 W 0402	TE Connectivity Passive Product	RESC1005X03N	CRG0402ZR	11
R12, R13	Resistor SMD 1 kΩ 5% 1/10 W 0402	Panasonic Electronic Components	RESC1005X40N	ERJ-2GEJ102X	2
R14, R18, R19	Resistor SMD 1 kΩ 1% 1/20 W 0201	Panasonic Electronic Components	RESC0603X26N	ERJ-1GNF1001C	3

Ref designator	Description	Manufacturer	Manufacturer P/N	Footprint	Qty
R16	Resistor SMD 0 Ω jumper 1/20 W 0201	Vishay Dale	RESC1005X03N	CRCW02010000Z0ED	1
R20, R23	Resistor SMD 680 Ω 5% 1/16 W 0402	Yageo	RESC1005X40N	CRCW0402680RFK	2
R21	3.3 kΩ ±1% 0.1W, 1/10W Chip Resistor 0402 (1005 Metric)	Panasonic Electronic Components	RESC1005X40N	ERJ-2RKF3301X	1
S1, S2	KXT 311 LHS, tactile switch SPST-NO 0.02 A 15 V, KXT3 Series ultra-low profile top actuated, 100 g, SPST	C&K	SW-SMD-KXT311LHS	KXT311LHS	2
S3	Slide switch SPDT surface mount	Würth Elektronik	SW-SMD-450404015514	450404015514	1
U1	60 GHz Radar Sensor with Antennas in Package	Infineon	BGT60UTR11AIPXUMA1	BGT60UTR11AIP	1
U2	LDO Regulator, Ultra-Low Noise, High PSRR, RF and Analog Circuits	ON Semi	ONSEMI-SMD-CASE 711AJ	NCP163AMX180TBG	1
U3	LDO Regulator Ultra-Low Noise, High PSRR, RF and Analog Circuits	ON Semi	ONSEMI-SMD-CASE 711AJ	NCP163AMX330TBG	1
U4	LDO Regulator, Ultra-Low Noise, High PSRR, RF and Analog Circuits	ON Semi	ONSEMI-SMD-CASE 711AJ	NCP163AMX120TBG	1
U5, U6, U7	Dual Bit, Dual Supply Voltage Level Translator and Transceiver	Nexperia USA Inc.	NXP-SMD-SOT833-1-1-V	74AVCH2T45GT	3
X1	Clock Oscillator, 80 MHz	Kyocera International Inc.	XTAL-SMD-KC2016K	KC2016K80.0000C1GE00	1

3.4 Connector details

Figure 28 highlights the 28-pin Adafruit Feather-compatible headers. The function of the respective header pins is described in . The image also shows the test points which were used for testing the boards in the lab or production.

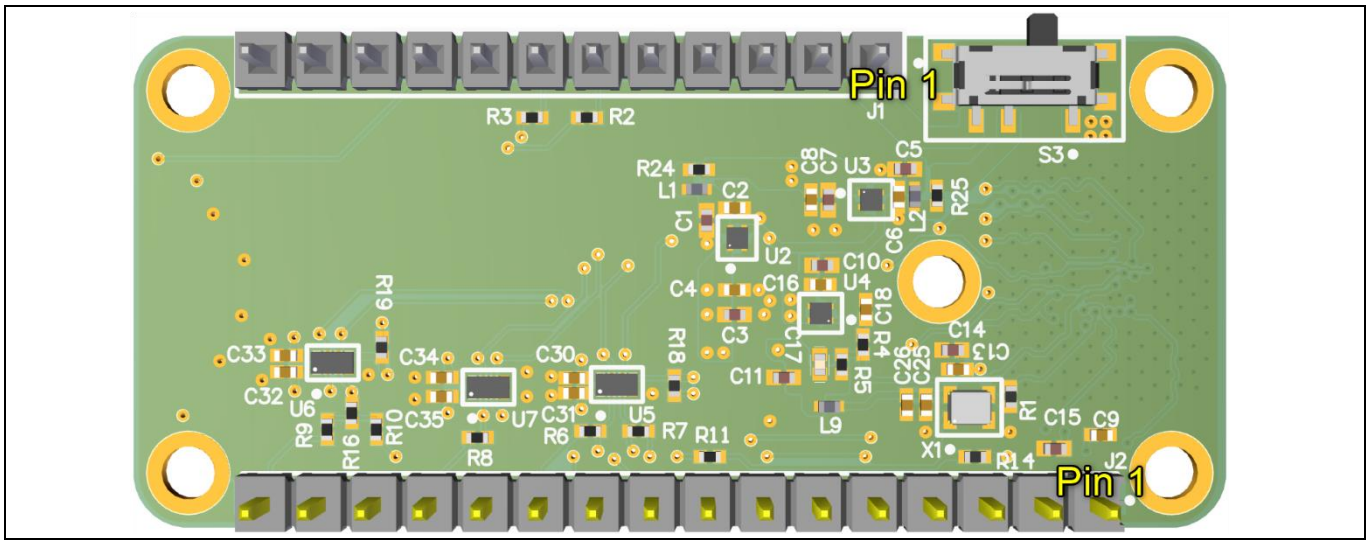

Figure 28 Adafruit headers and test points on bottom of the XENSIV™ BGT60UTR11AIP Radar Wing board

Table 6 Adafruit Feather-compatible pinout

Header mapping	Primary onboard function	PSOC™ 6 MCU pin (Rapid IoT baseboard)	Adafruit Feather-compatible mapping (Rapid IoT baseboard)	Adafruit Feather-compatible mapping (BGT60UTR11AIP Radar Wing board)	Details
J1.1	VBAT	–	–	VBAT	LiPo battery voltage
J1.2	EN	–	–	–	Not connected
J1.3	VBUS	–	–	5 V	USB power
J1.4	GPIO	P9_0	GPIO13	–	Not connected
J1.5	GPIO	P9_1	GPIO12	–	Not connected
J1.6	GPIO	P9_2	GPIO11	RST_Feather	RST
J1.7	GPIO	P9_3	GPIO10	IRQ_Feather	IRQ
J1.8	GPIO	P9_4	GPIO9	–	Not connected
J1.9	GPIO	P9_7	GPIO6	USR_BUT	User button
J1.10	GPIO	P8_4	GPIO5	en_LDO_Radar	Enable the LDOs (3.3 V and 1.8 V) on radar wing board for radar sensor
J1.11	I^2C SCL	P6_0	SCL	I2C_SCL_Feather	Connected to KitProg3. Note that this pin has a 4.7 kΩ pull-up for I^2C communication

Header mapping	Primary onboard function	PSOC™ 6 MCU pin (Rapid IoT baseboard)	Adafruit Feather-compatible mapping (Rapid IoT baseboard)	Adafruit Feather-compatible mapping (BGT60UTR11AIP Radar Wing board)	Details
J1.12	I^2C SDA	P6_1	SDA	I2C_SDA_Feather	Connected to KitProg3. Note that this pin has a 4.7 kΩ pull-up for I^2C communication
J2.1	XRES	XRES	XRES	nRESET	Reset button
J2.2	3.3 V	VDDA, VDDIO	VCC	3V3	Analog voltage for PSOC™ 6 MCU
J2.3	NC	–	NC	–	Not connected
J2.4	GND	–	GND	GND	Ground
J2.5	Analog GPIO	P10_0	A0	RGB_RED	RGB red color
J2.6	Analog GPIO	P10_1	A1	RGB_GREEN	RGB green color
J2.7	Analog GPIO	P10_2	A2	RGB_BLUE	RGB blue color
J2.8	Analog GPIO	P10_3	A3	–	Not connected
J2.9	Analog GPIO	P10_4	A4	–	Not connected
J2.10	Analog GPIO	P10_5	A5	SPI_CSN_Feather	SPI Chip Select
J2.11	SPI Clock	P5_2	SCK	SPI_CLK_Feather	SPI clock
J2.12	SPI MOSI	P5_0	MOSI	SPI_MOSI_Feather	SPI Master Out/Slave IN (MOSI)
J2.13	SPI MISO	P5_1	MISO	SPI_MISO_Feather	SPI Master In/Slave OUT (MISO)
J2.14	UART RX	P6_4	RX	–	Not connected
J2.15	UART TX	P6_5	TX	–	Not connected
J2.16	SPI CS	P5_3	GPIO	–	Not connected

References

[1] Infineon Technologies AG. *BGT60UTR11AIP MMIC datasheet*; Available online

[2] Infineon Technologies AG: *Getting started with PSOC™ 6 MCU on ModusToolbox™ application note*; Available online

[3] Infineon Technologies AG: *Code examples for ModusToolbox™*; Available online

[4] Infineon Technologies AG: *AN155366: Electromagnetic band gap (EBG) structure application note*; Available online

Glossary

BSP
board support package (BSP)

CSK
connected sensor kit (CSK)

FMCW
frequency modulated continuous wave (FMCW)

FSM
finite state machine (FSM)

GPIO
general-purpose input/output (GPIO)

HW
hardware (HW)

I^2C
inter-integrated circuit (I^2C)

IoT
internet of things (IoT)

LED
light-emitting diode (LED)

PAS
photoacoustic spectroscopy (PAS)

PCB
printed circuit board (PCB)

SPI
serial peripheral interface (SPI)

UART
Universal asynchronous receiver transmitter (UART)

Revision history

Document revision	Date	Description of changes
1.00	2025-03-18	Initial release
1.10	2025-06-17	Added System and function description section
1.20	2025-07-21	Added Code examples in ModusToolbox™ section Updated Figure 6 and Figure 7

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