Shield2Go boards and My IoT adapter

Fast, flexible, and easy prototyping for IoT applications

Abstract

Rapid and efficient prototyping was never as important as today. Infineon's Shield2Go and My IoT evaluation environment makes it the ever easiest to evaluate new hardware solutions in an easy and efficient way. This is not only important for big industry players, but also for the growing maker and startup communities. Makers want to implement their ideas quickly and without inconvenient barriers.

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1 Shield2Go boards

Infineon's Shield2Go boards are equipped with one featured Infineon IC and provide a standardized form factor and pin layout for fast orientation. All boards come with solderless connectors allowing designers to stack the boards instead of soldering them. This makes the Shield2Go boards simple, reusable and flexible.

In addition, each Shield2Go comes with a dedicated and free software library for Arduino. The Shield2Go boards are compatible with Arduino Uno with Infineon's My IoT adapter. This combination of flexible hardware components and accompanying software speeds up the prototyping process.

1.1 A "plug and play" solution

Shield2Go boards can be selected and combined in multiple ways to best fit the development needs of designers, making prototyping as easy as "plug and play". The boards provide a standardized form factor (Figure 1), and have solderless connectors that allow stacking the boards instead of soldering. The standardized pin layout (Figure 2) concept allows fast and convenient combination and interchanging of Shield2Go boards and My IoT adapter. All essential buses are led out, including SPI, I²C and UART. Individual chip-dependent pins on the upper part of the Shield2Go board provide additional flexibility. The My IoT adapter boards enable designers to easily connect to external systems as they can be combined with other external hardware platform such as Arduino and Raspberry Pi.

The "plug and play" approach from Infineon supports customized prototyping and provide the following benefits:
› Faster prototyping and shorter time to market
› Customized prototyping
› Easy to connect to external systems
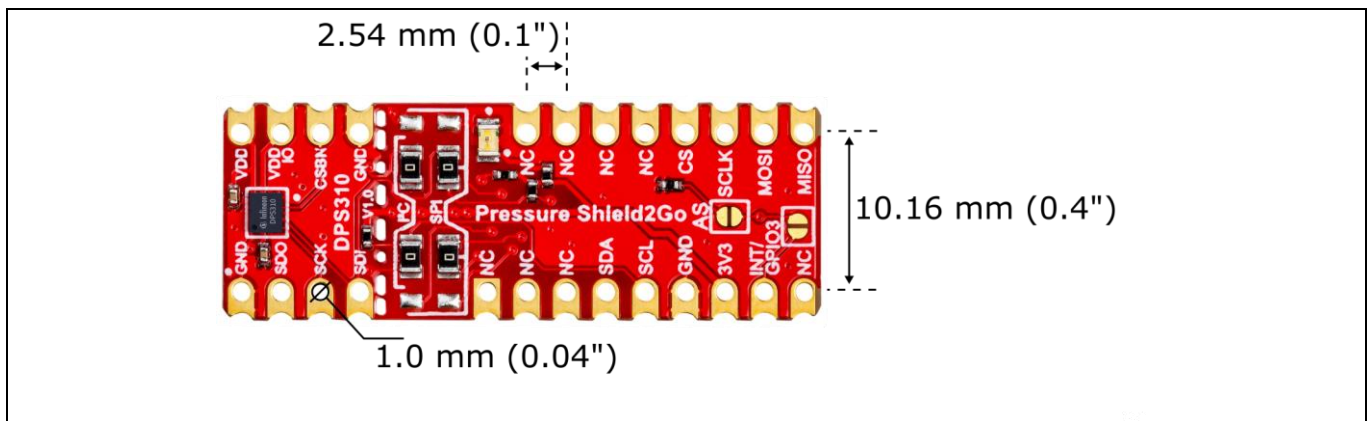› Flexible use
› Cost savings – Arduino-ready at an attractive price

Figure 1   Dimensions of the Shield2Go board
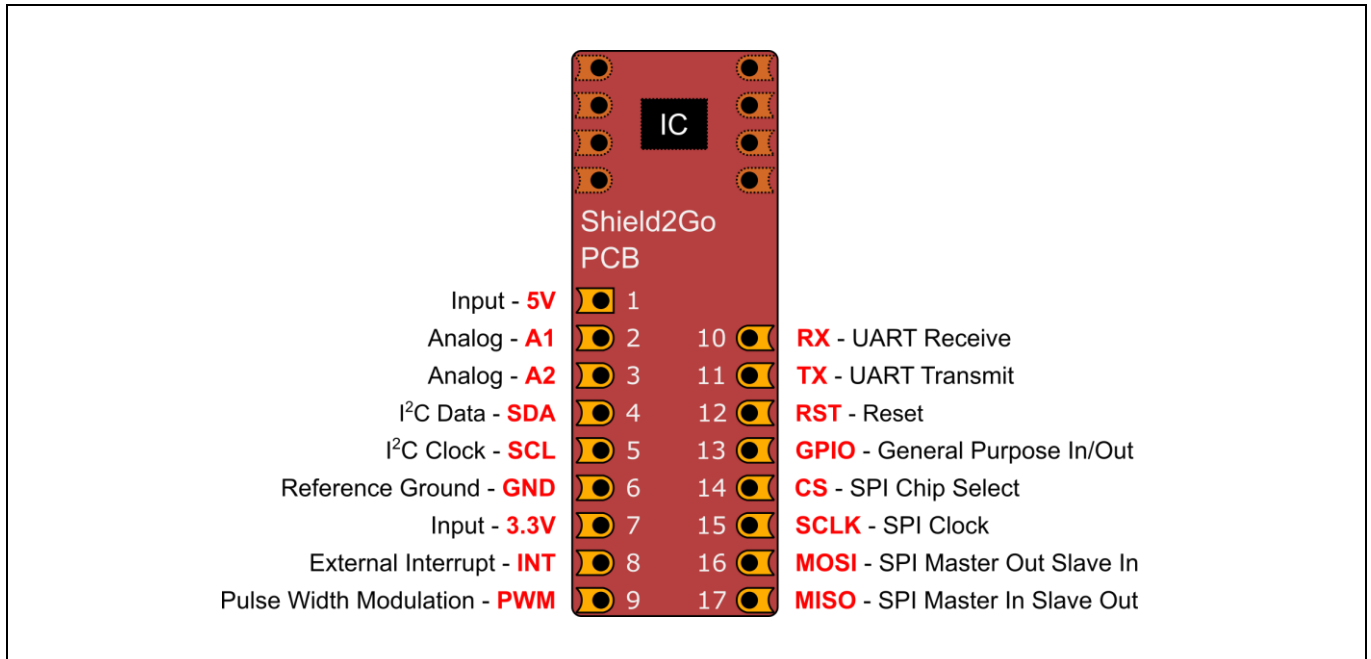
Figure 2   Pin layout of the Shield2Go board

2 Shield2Go portfolio overview

2.1 Shield2Go boards

The Shield2Go product portfolio includes varying boards and an XMC™ 2Go board for cross-application control. The boards feature varying sensors and ICs from Infineon – such as pressure, 3D and current sensors, MEMS microphone, and security solutions - and come with a dedicated and ready-to-use software library for Arduino to help the evaluation of intended designs and capabilities (for more details and example, please see section 3).

Table 1   Overview of Shield2Go product features and interfaces

	Board	Features	Interfaces
Advanced sensing capabilities for edge devices	**DPS310 Pressure Shield2Go** The barometric pressure sensors DPS310 offers excellent pressure noise performance and high stability with temperature.	› Ultra-high ±0.005 hPa resolution (equating to ±5 cm) › Very good temperature stability due to a linear temperature dependency. Relative accuracy ±0.06 hPa › Integrated FIFO can store up to 32 pressure/temperature measurements, which enables energy savings on system level › Optimized energy usage (fully configurable precision and measurement rate) › Wide pressure operation range 300 hPa – 1200 hPa › 3 µA current consumption in low power mode › Temperature accuracy ±0.5°	SPI INT I²C
	TLV493D 3DSense Shield2Go The 3D magnetic sensor TLV493D-A1B6 offers accurate three dimensional sensing with extremely low power consumption.	› Low current consumption of 0.007 µA in power down mode › 2.7 to 3.5 V operating supply voltage › Bx, By and Bz linear field measurement up to ±130 mT › 12-bit data resolution for each measurement direction › Operating temperature range from -40 °C to 125 °C TSOP6 package	I²C
	TLI4970 Current Sense Shield2Go TLI4970 is a high-precision current sensor based on Infineon´s proven Hall technology. It is an easy-to-use, fully digital solution that does not require external calibration or additional parts.	› AC and DC measurement range up to ±50 A › Highly accurate over temperature range and lifetime (max. 1 % (0 h)) › 1.6 % (over lifetime of indicated value) › Low offset error (max. 25 mA) › Fast overcurrent detection with configurable threshold › Galvanic isolation up to 2.5 kV max. rated isolation voltage (UL1577) › 16 bit digital SPI output (13 bit current value) › Small 7 x 7 mm SMD package	SPI INT
	IM69D Microphone Shield2Go The high performance MEMS microphone IM69D130 is designed for applications where low self-noise (high SNR), wide dynamic range, low distortion and a high	› 2x IM69D130 digital MEMS microphone in stereo mode configuration › Dynamic range of 105 dB › Signal to noise ratio of 69 dB(A) SNR › <1% total harmonic distortions up to 128 dBSPL › Acoustic overload point at 130 dBSPL › Sensitivity (±1 dB) and phase (±2° @ 1 kHz) matched › Flat frequency response with low-frequency roll-off at 28 Hz › Very fast analog to digital conversion speed (6 µs latency @ 1 kHz)	I²S

	Board	Features	Interfaces
	acoustic overload point is required.	› Power optimized modes determined by PDM clock frequency › Omnidirectional pickup pattern › PDM and I2S output configuration	
Trusted security solutions	**OPTIGA™ Trust E Security Shield2Go** OPTIGA™ Trust E is a high-security solution for industrial automation systems, smart homes, consumer or medical devices. Based on its 1-way authentication mechanism, it uniquely identifies objects and protects PKI networks.	› High-end security controller with advanced cryptographic algorithms implemented in hardware (ECC256) › Turnkey solution with OS, Applet and complete host-side integration support › Full system integration support › up to 3kBytes user memory › ECC 256 bit, SHA-256 › Standard and extended temperature range (-40°C to +85°C)	I²C
	OPTIGA™ Trust X Security Shield2Go The best-fit security solution for IoT devices, to protect your business as well as your customers' data and IP.	› High-end security controller with advanced cryptographic algorithms implemented in hardware (ECC256) › Turnkey solution with OS, Applet and complete host-side integration support › up to 10 kBytes user memory › ECC256 bit, AES128, SHA-256 › Standard and extended temperature range (-40°C to +105°C) › PG-USON-10 package (3 x 3 mm)	I²C
Microcontrollers	**XMC™ 2Go** The XMC 2Go Kit with XMC1100 is maybe the world's smallest, fully featured Microcontroller Evaluation Kit	› XMC1100 (ARM® Cortex™-M0 based) › On-board J-Link Lite debugger › Realized with XMC4200 microcontroller › Power over USB (micro USB) › ESD and reverse current protection › 2 x user LED › Pin header 2x8 pins suitable for breadboard	I²C SPI INT I²S PWM UART Analog

For more details about featured products and the layout of the stackable, unified breakout boards, please download the Fast, flexible, and easy prototyping for IoT applications brochure.

2.2 My IoT adapter

The My IoT adapter board is also part of the evaluation environment that acts as the gateway to external hardware - such as the popular hardware platforms like Arduino, Raspberry Pi or Espressif Wi-Fi Chips -, making it possible to combine the Shield2Go boards into systems easily and flexibly.

The adapter offers multiple sockets which allow free and flexible combination of various Shield2Go boards. Thereby, users do not have to care about pin allocation, level shifting or system integration.

Shield2Go boards can also be stacked upon the individual sockets, making it possible to combine even more Shield2Go boards into a system. The My IoT adapter is then stacked onto a compatible hardware module like Infineon's Arduino compatible XMC1100 Boot Kit.

My IoT adapter features are the following:
› Provide power supply and connectivity for Shield2Go boards
› Handle level shifting between CMOS 3.3 V and TTL 5 V
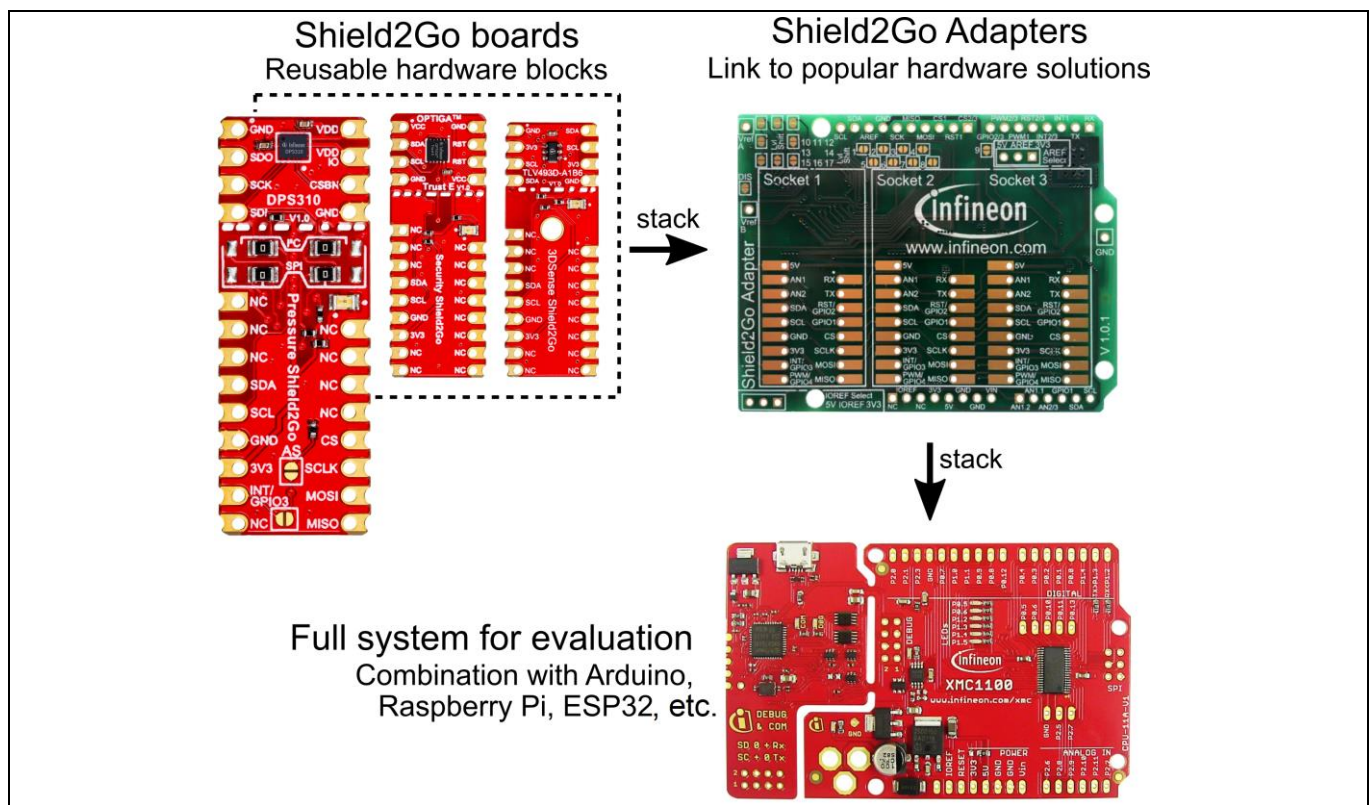› Combinable ("stackable") with other standard shields

Figure 3   Combining Shield2Go boards and My IoT adapter to a system

3 Arduino example

This application example in Figure 4 shows how fast and easy it is to use the Shield2Go boards with an Arduino compatible development board and the Arduino IDE.

The Shield2Go boards can be easily stacked onto the My IoT adapter for Arduino. The system can be programmed within minutes using the Arduino IDE and the Shield2Go Arduino libraries. The Arduino libraries for each Shield2Go are available on GitHub. Advanced setups can be built by using the Shield2Go board documentations on GitHub and the datasheets from the Infineon maker website.

 Note: Do not connect the Shield2Go boards directly to an Arduino board without the My IoT adapter. The My IoT adapter handles level shifting between 3.3 V and 5 V.
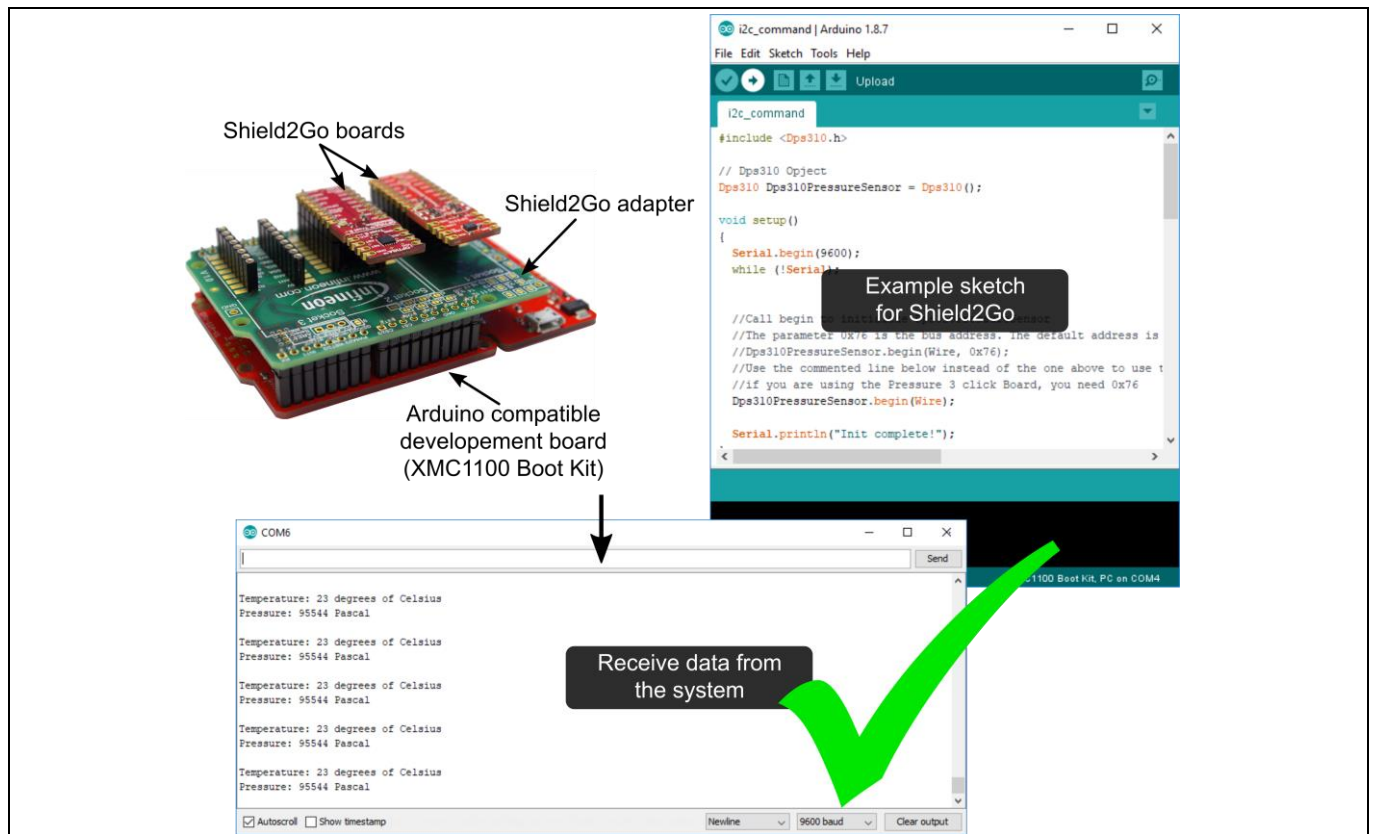

Figure 4   Application example of the Shield2Go concept

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