

US082-OB1203EVZ

The US082-OB1203EVZ Board enables quick prototyping for a custom system design with the OB1203, a multi-channel light sensor (LS/CS), proximity sensor (PS), and photoplethysmography sensor (PPG). The board provides a standard Pmod™ Type 6A (Extended I<sup>2</sup>C) connection for the on-board sensor to plug into any MCU evaluation kit with a matching connector.

The US082-OB1203EVZ features Pmod connectors on both sides of the board allowing additional Type 6/6A boards to be connected in a daisy-chained solution with multiple sensors on the same MCU Pmod connector. Because of the standard connector and software support, the US082-OB1203EVZ is the best choice to rapidly create an IoT system with the Renesas Quick-Connect IoT.

**Features**

- OB1203 sensor sample mounted:
  - Fully integrated and trimmed module that includes two LEDs, 250mA maximum drive current, and photodetectors for SpO<sub>2</sub> measurements
  - High lux accuracy over different light sources, with absolute sensitivity of 0.06 lux to >150000 lux
  - Four parallel channels for measuring red, green, blue, and clear with accurate correlated color temperature (CCT) and CIE 1931 XYZ (RGB) color measurement
  - Object movement detection (in/out)
- Standardized Type 6A Pmod connector supports I<sup>2</sup>C Extended interface
- Dual connectors allow pass-through signals for daisy-chained solutions

**Board Contents**

- US082-OB1203EVZ Board

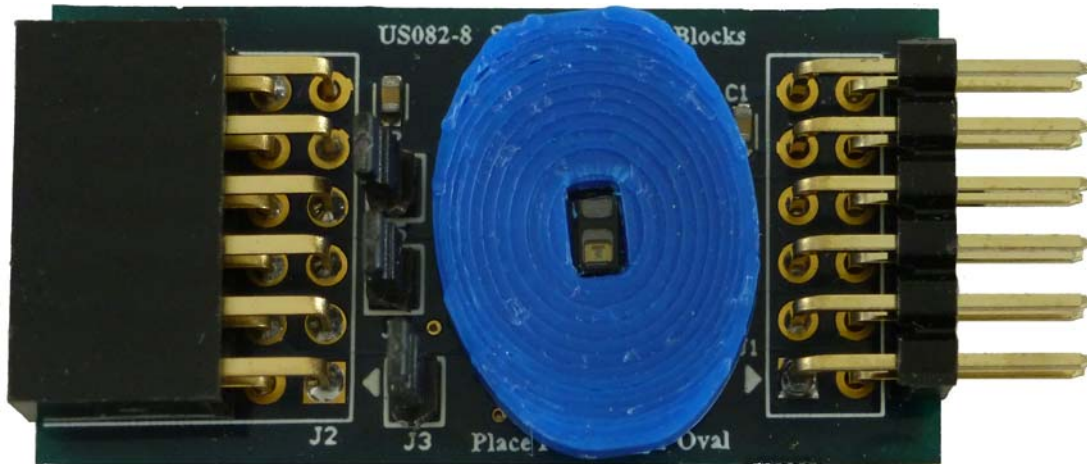


Figure 1. US082-OB1203EVZ Pmod Board

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# 1. Functional Description

The US082-OB1203EVZ functions as a sensor building block to create a custom system solution. Use the board individually or with a combination of other sensors by using the Pmod Type 6A interface. (See the [Renesas Quick-Connect IoT](#) web page for a list of available sensor Pmod boards.)

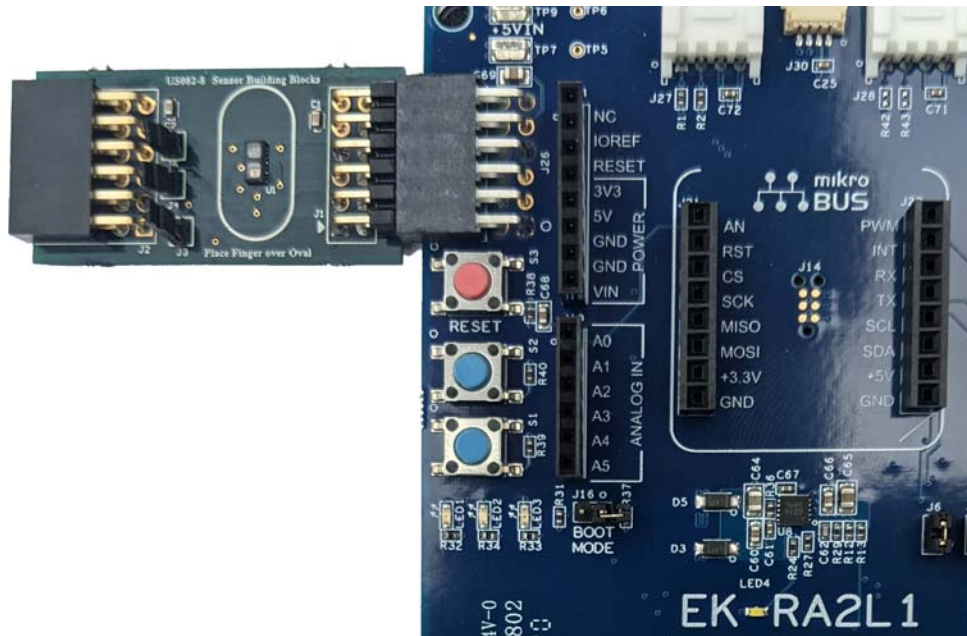


Figure 2. US082-OB1203EVZ Pmod Board with RA2L1 MCU Kit

## 2. Setup

### 2.1 Required or Recommended User Equipment

The following additional lab equipment (sold separately) is required for using the board:

- Any MCU board that supports a Type 6A Pmod.
- The US082-INTERPEVZ interposer board when using one of the Renesas MCU kits shown in [Table 1](#).

Table 1. Renesas MCU Evaluation Kits<sup>[1]</sup> that support a Type 6A Pmod when used with the US082-INTERPEVZ

RA	RX	Synergy
EK-RA4W1	RX111-Starter-Kit	PK-S5D9
EK-RA2A1	RX231-Starter-Kit	DK-S3A7
EK-RA4M1	RX23W-Starter-Kit	DK-S128
EK-RA6M1	RX23T-Starter-Kit	TB-S1JA
EK-RA6M2	RX24T-Starter-Kit	TB-S3A6
EK-RA6M3	RX24U-Starter-Kit	DK-S7G2
EK-RA6M3G		

1. This table is not a comprehensive list of supported MCU Kits. See the evaluation kit hardware manual to confirm Pmod pinout.

## 2.2 Software Installation and Usage

See the Renesas [website](#) for the latest version of the e<sup>2</sup> studio installer. The minimum FSP version supporting sensor blocks is FSP 3.1.0. For the latest sensor support, ensure you are using the latest release.

Visit [Renesas Quick-Connect IoT](#) for more information about creating your customized system solution.

## 2.3 Kit Hardware Connections

Follow these procedures to set up the kit as shown on [Figure 2](#).

1. Ensure the MCU evaluation kit being used has a Pmod connector set to Type 6A (refer to the kit hardware manual if unsure).
  - a. If no Type 6A Pmod is available, ensure the MCU evaluation kit can use the US082-INTERPEVZ interposer board and insert the board into the MCU connector before adding any sensor boards.
2. Plug in the US082-OB1203EVZ to the Type 6A connector, being careful to align Pin 1 on the sensor board and MCU kit.
3. Connect the J3, J4, and J5 jumpers to place 4.7k pull-up resistors on the I<sup>2</sup>C bus lines, respectively.
  - a. Only one set of pull-up resistors should be used on the I<sup>2</sup>C bus and the interrupt line. If multiple sensor boards are used, only one board should have the jumpers present.
  - b. MCU kits typically do not have pull-up resistors present on these lines but be sure to check for them.
4. The sensor is now ready to be used in the system. Follow the MCU kit instructions for connecting and powering up the evaluation kit.

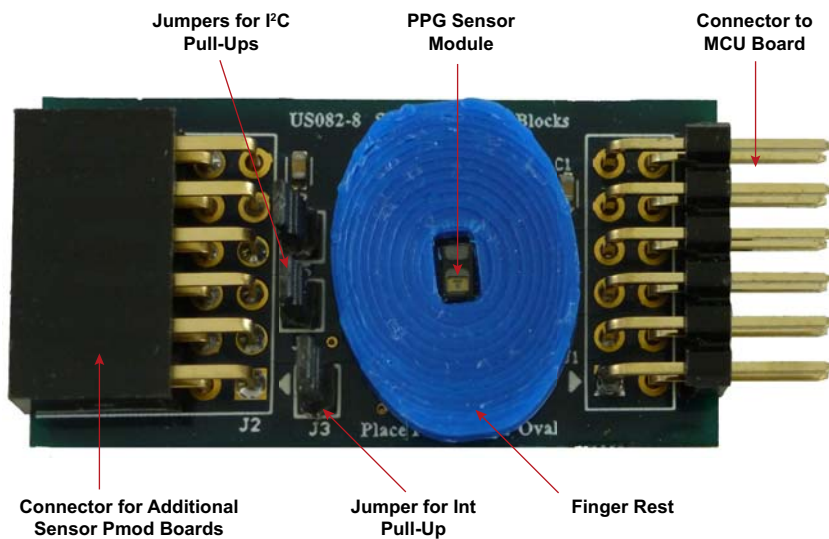


Figure 3. US082-OB1203EVZ Pmod Board

## 2.4 Schematic Diagram

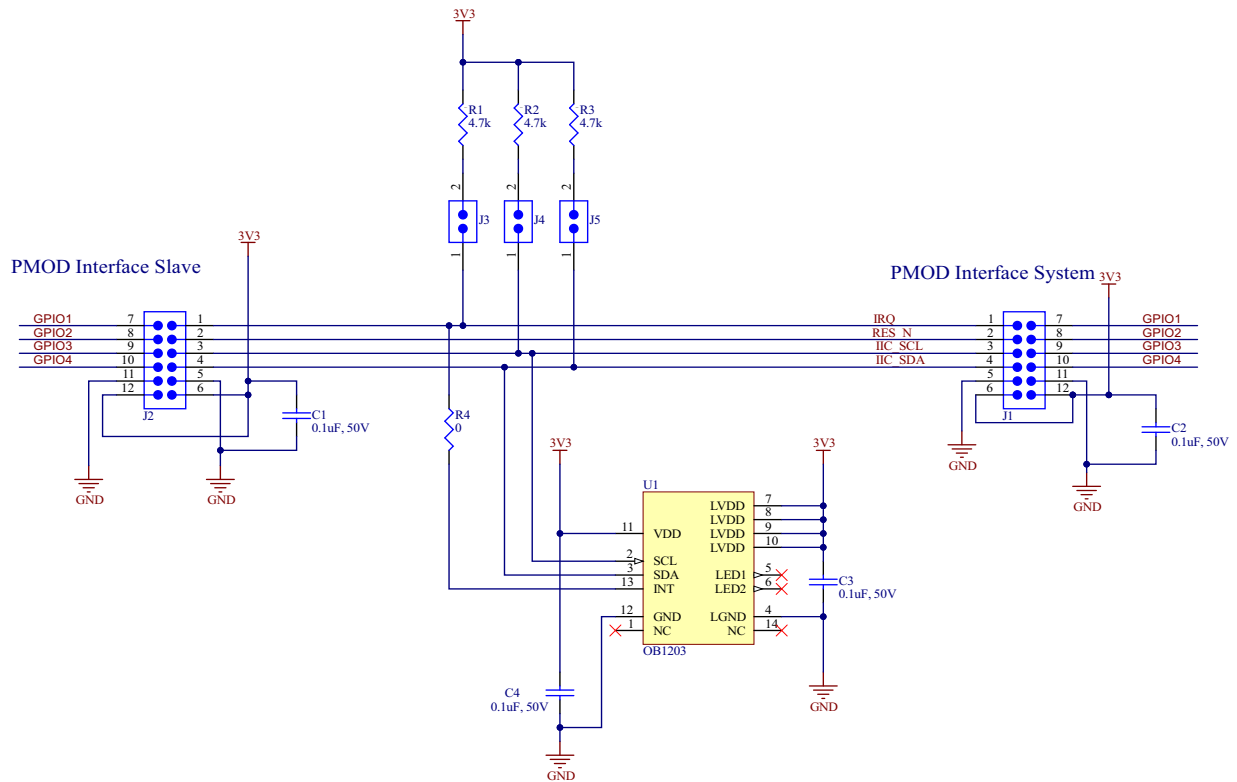


Figure 4. US082-OB1203EVZ Application Schematic

## 2.5 Bill of Materials

Qty	Reference	Description	Value	PCB Footprint	Part Number
4	C1, C2, C3, C4	Capacitor, 0.1µF, 50V, 0603	0.1µF	0603	C0603C104J5RACTU
1	J1	Male Header 0.1" pitch PMOD 2x6 Right Angle	Pmod™	PMOD-MALE-TOP	M20-9950645
1	J2	Female Header 0.1" pitch PMOD 2x6 Right Angle		CON-000050-01	SSW-106-02-F-D-RA
3	J3, J4, J5	CONN HEADER VERT 2POS 1.27 MM		HDR-1X2-FTS	FTS-102-01-L-S
3	R1, R2, R3	Resistor, 0Ω, 0603	0Ω	0603	RC0603JR-074K7L
1	R4	Resistor, 4.7k, 0603	4.7k	0603	RT0603DRD07560RL
1	U1	Sensor Digital RGB / IR / Proximity / Pulse Oximeter / Heart-Rate		OB1203-LGA14	OB1203SD-C4
3	J3, J4, J5	1.27" 1x2 Jumper with Grip, Gold			NPB02SVFN-RC
1		3D printed Finger Support, blue			NPB02SVFN-RC

## 2.6 Board Layout

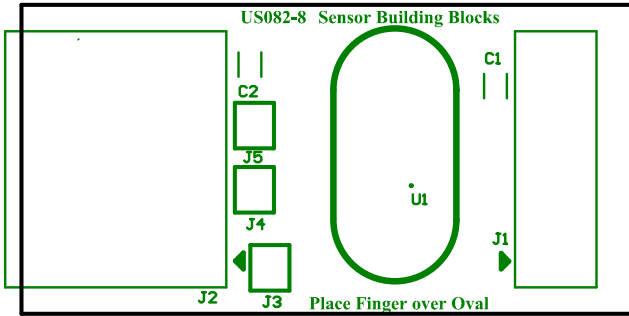


Figure 5. Silkscreen Top

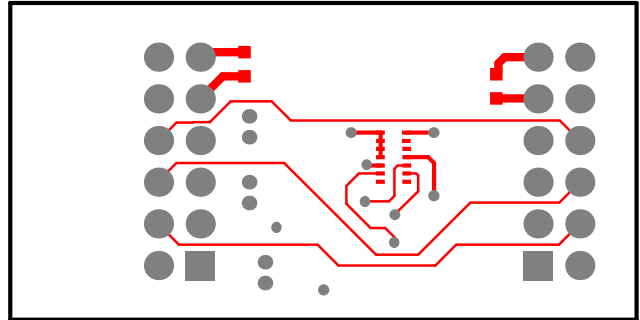


Figure 6. Copper Top

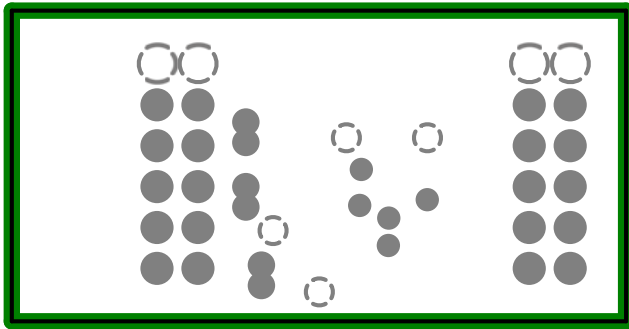


Figure 7. Copper L1 Layer

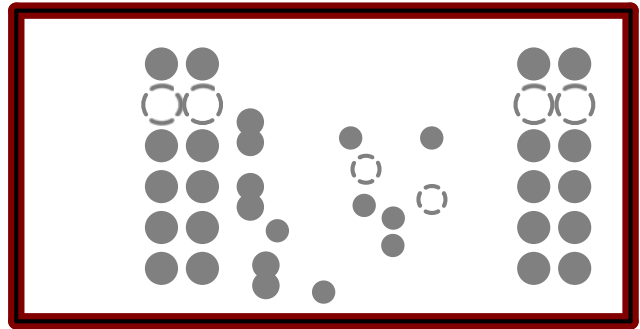


Figure 8. Copper L2 Layer

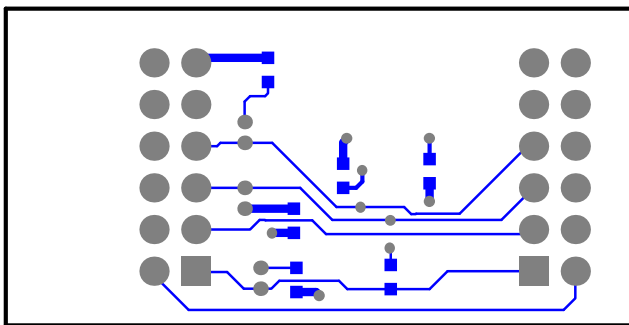


Figure 9. Copper Bottom

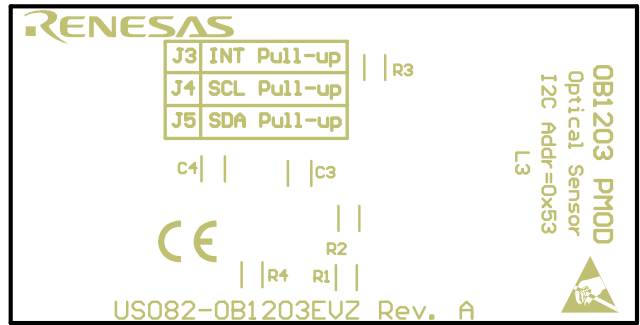


Figure 10. Silkscreen Bottom

### 3. Ordering Information

Part Number	Description
US082-OB1203EVZ	OB1203 Pmod Board
US082-INTERPEVZ	Pmod interposer board to convert Type 2A and 3A to Type 6A on older Renesas MCU kits.

### 4. Revision History

Revision	Date	Description
1.0	Jun 15, 2021	Initial release

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