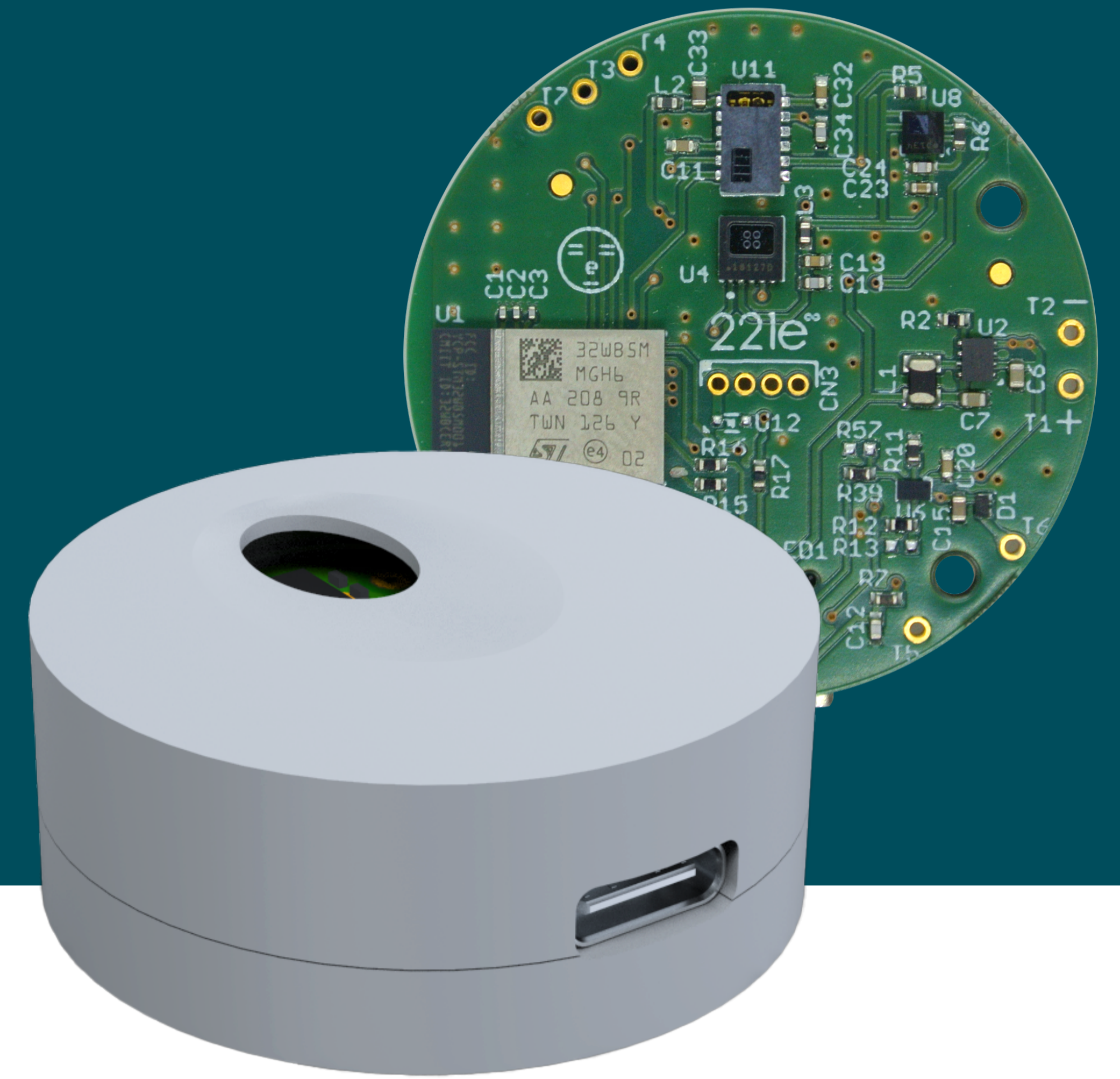


ThermO2

2-in-1 Thermometer & Pulse Oximeter

Track the Health of Your Loved Ones
With 2sec Instant Accurate Readings

Product Code: A3b5v02



∞ General Information

Fields of Application

- Smart pulse-oximeter
- COVID-19 patients monitoring
- SpO₂, heart rate and body temperature measurements
- Periodic health self-checks

System Description

ThermO2 is a low power, wireless pulse oximeter and infrared thermometer integrated in a compact form factor. ThermO2 runs proprietary algorithms to estimate heart rate, body temperature, blood oxygen saturation and perfusion index from the sensors data. ThermO2 has been specifically designed to help fighting the Covid-19 pandemic. It has been developed mostly to allow monitoring of mild cases at home, providing a quantitative tool to recognize if rapid deterioration occurs. ThermO2 is designed as a smart device, connectable to a smartphone, capable to run spot checks in an easy way, providing the results at two levels: a color-coded visual feedback and a numerical value through its mobile application. The device can be used to measure peripheral oxygen saturation (SpO₂), pulse rate, and body temperature.

System Summary

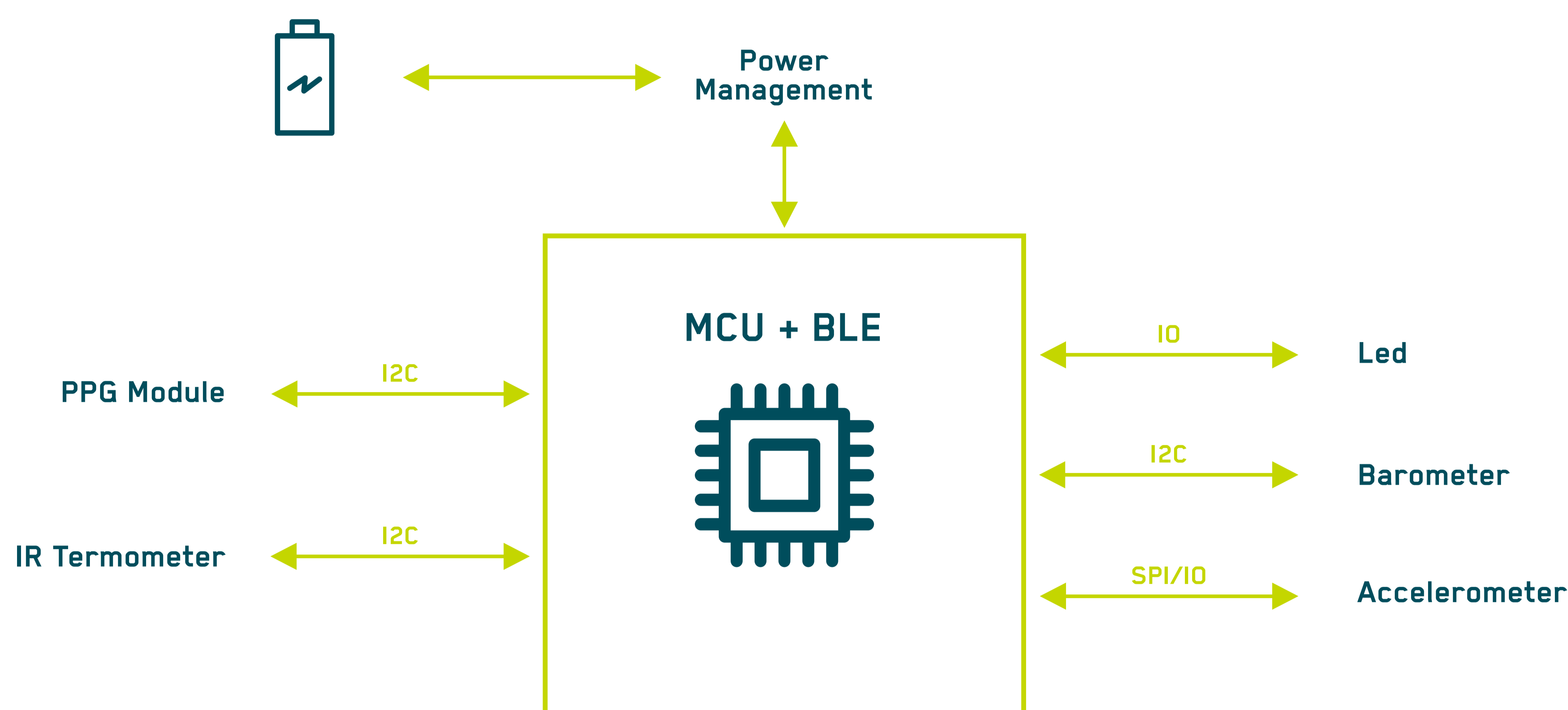
- Pulse rate accuracy better than or equal to 5 bpm in the range 25-240 bpm.
- Body temperature range accuracy better than or equal to 0.2 °C in the range 35-41 °C.
- SpO₂ accuracy of 2% in the range 70-100%.
- PPG data sampling up to 100 Hz.
- IR temperature data up to 25 Hz.
- Heart rate estimation up to 50 Hz.
- Blood oxygen saturation estimation up to 50 Hz.
- Perfusion index estimation up to 50 Hz.
- Bluetooth or USB streaming of the sampled data up to 100 Hz.
- Up to 400 spot checks with the battery fully charged.
- Battery duration up to 2 years in standby.
- System recharge via USB-C. Time to full charge around 2 hours.

Therm02

2-in-1 Thermometer & Pulse Oximeter

Product Code: A3b5v02

∞ Block Diagram



∞ Ordering Information

Product number	Description
221e-A3b5v02	Wireless pulse oximeter and thermometer

∞ Contact Information

For the latest specifications, additional product information, worldwide sales, and distribution locations, as well as information about 221e:

• *Web:* www.221e.com

• *Email:* info@221e.com

• *For technical questions:* support@221e.com

∞ Certification

Therm02 is CE certified. CE conformity corresponds to the device being in compliance with the following European directives: ElectroMagnetic Compatibility (Directive 2014/30/EU), Radio Equipment Directive (Directive 2014/53/EU) and Safety (Low Voltage Directive 2014/35/EU). Standard compliance: EN 62368-1, RED / ETSI RADIO / EN 300 328 / 301 489, EMC EN 55032 / EN 55035, EMF IEC 62479:2010, IEC 62133, ROHS, EN 60601-1 (Medical electric equipment - Part 1: General requirements for basic safety and essential performance). Bluetooth qualified module: CE, FCC, IC, KCC, MIC and Anatel certified.

Therm02

2-in-1 Thermometer & Pulse Oximeter

Product Code: A3b5v02

∞ System Specifications

Microcontroller

- Core 1 → Arm® Cortex®-M4
- Core 2 → Arm® Cortex®-M0+
- Frequency → Up to 64 MHz

Data Rate

- Ble Streaming → 25 / 50 / 100 / 200 Hz
- Usb Streaming → 25 / 50 / 100 / 200 Hz

Communication Interface

- Wired → USB 2.0, type C connector
- Wireless → Bluetooth Low Energy v5.2

User Interaction

- Visual → Red, Yellow, Green and Blue LEDs
- Touch → System shake to wake-up

Therm02

2-in-1 Thermometer & Pulse Oximeter

Product Code: A3b5v02

Sensors - Raw Data

Medical Sensors	
PPG	
Emitting LEDs wavelength	660 nm and 880 nm
ADC resolution	14 bit
ODR	fixed 50 Hz
INFRARED THERMOMETER	
Ambient temperature accuracy	±1 °C in the 15 °C - 45°C range
Object temperature accuracy	±0.2 °C in the 35 °C - 41°C Ambient temperature range
ODR	up to 64 Hz
Inertial Sensor	
ACCELEROMETER	
Measurement range	±2 / ±4 / ±8 / ±16 g
Sensitivity	0.244 / 0.488 / 0.976 / 1.952 mg/LSB
ODR	max 400 Hz
BAROMETER	
Measurement range	260 -1260 hPa
Sensitivity	±1 hPa
ODR	fixed 25 Hz

Electrical Specification

Power Supply	
BATTERY (LI-ION BATTERY)	
Core voltage	3.3 V - 4.2 V
Capacity	110 mAh
Full charge time	2 hr
USB - C	
Core voltage	5 V
Absolute Maximum Rating	
Rated voltage	6.5 V
Protection Circuit	
Cell protection	Over-charge, Over-discharge, Over-current detection
Input protection	Over-voltage, Reverse-voltage detection
Power Consumption	
Standby	3 µA (Over 2 years of battery)
Streaming	14 mA worst case (7 hours of continuous streaming)
Temperature Range	
Minimum / Maximum	-20°C - 60 °C

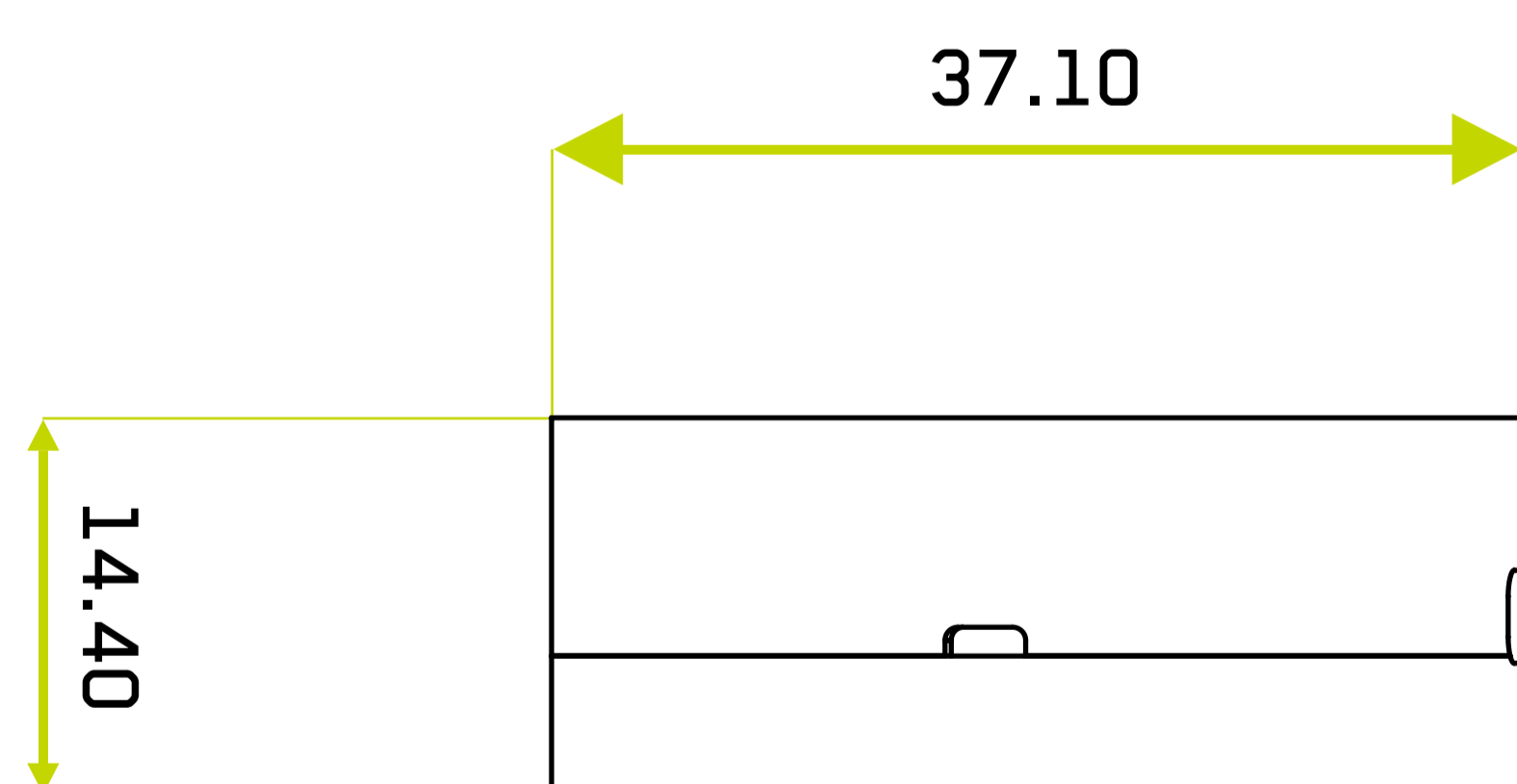
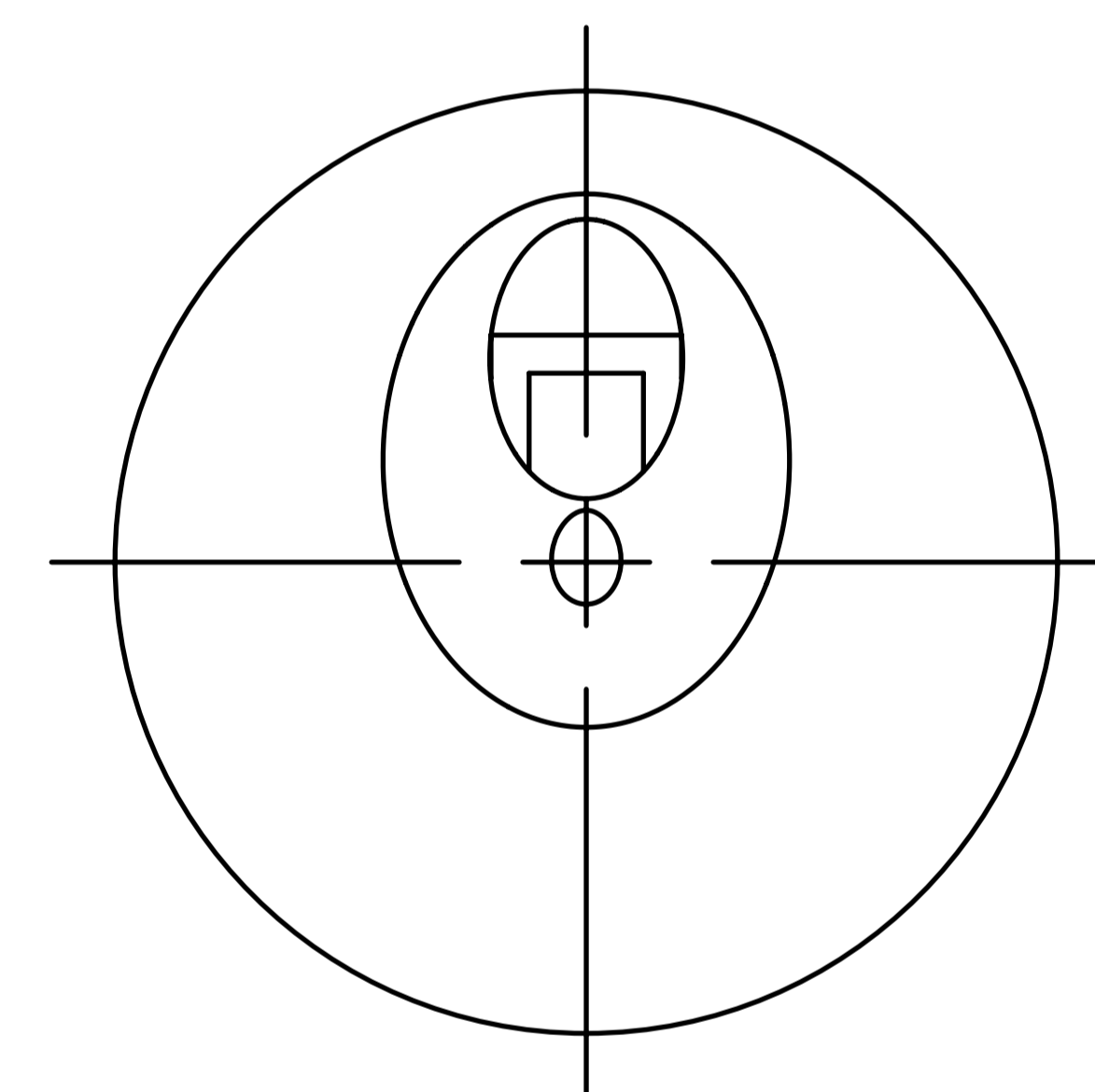
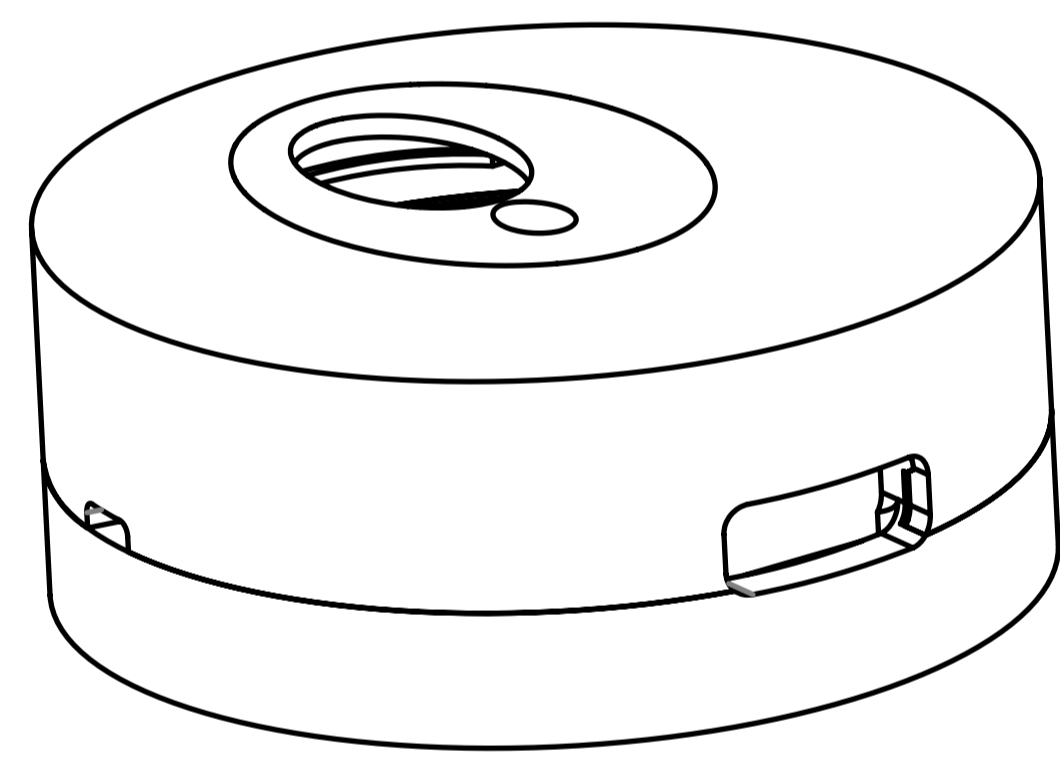
Therm02

2-in-1 Thermometer & Pulse Oximeter

Product Code: A3b5v02

Mechanical Specification

Mechanical Dimension	
Board	16.5 R x 6.2 H mm
Housing	18.55 R x 14.4 H mm
Weight	
Board	2 gr
Housing	16 gr
Enclosure	
Material	Nylon
IP Rating	IP30 (protected against solid objects over 2.5mm)



Board dimension in mm.

Therm02

2-in-1 Thermometer & Pulse Oximeter

Product Code: A3b5v02

Faqs & Further Informations

Q: Can I stream ppg and ir thermometer data at the same time?

A: No, if the user is interested in both temperature and PPG data, it should perform two different measurements. The best spot for PPG measurements is the finger, and the best spot for the thermometer measurements is the forehead.

Q: How can I control the system?

A: The system can be configured and controlled via Bluetooth commands; we provide an application to seamlessly interface with the system, implementing all the functionalities in a more intuitive way.

Q: How can I recharge the system?

A: You can recharge the system battery by connecting it via a standard USB-C cable. A full system charge will take around 2 hours.

Q: How can I save power when I'm not using the system?

A: The system, if not connected via Bluetooth, will automatically enter standby after 30 seconds of inactivity. The system can be removed from the standby mode by starting a recharge or by shaking the system.

Q: How long is the bluetooth connection range?

A: The Bluetooth range greatly depends on the obstacles between the system and the host (usually a smartphone), but can reach a maximum of 30 meters. Metal objects or peoples in between the system and the host can lead to a reduction in this figure.