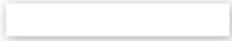


# Product specifications

## 3.1. Industrial design intent

### Colors, materials, finish (CMF) requirements

**Colors.** The colors used in the design of the [redacted] should be in accordance with the color palette of the brand:

			
<b>RGB</b> 30/50/97	<b>RGB</b> 0/174/255	<b>RGB</b> 18/30/58	
<b>CMYK</b> 99/88/34/24	<b>CMYK</b> 66/19/0/0	<b>CMYK</b> 95/85/47/56	
<b>PANTONE</b> 534 C	<b>PANTONE</b> 306 C	<b>PANTONE</b> 289 C	
			
<b>RGB</b> 225/225/225	<b>RGB</b> 238/238/238	<b>RGB</b> 135/135/135	<b>RGB</b> 25/25/25
<b>CMYK</b> 0/0/0/0	<b>CMYK</b> 5/4/4/0	<b>CMYK</b> 49/41/41/5	<b>CMYK</b> 73/67/65/79
<b>PANTONE</b> WHITE	<b>PANTONE</b> 663 C	<b>PANTONE</b> BLACK 6 C	<b>PANTONE</b> BLACK 6 C

**Materials.** Plastic is the main material used for the [redacted] production. The [redacted] enclosure may contain metallic inserts, decorative elements, creating the premium look of the product - to the extent that this does not compromise the cost-to-make targets.

**Finish.** The surface types should be determined at the stage of industrial design development, taking into account the requirements for protecting the device from corrosion and atmospheric influences described in the section Environmental Requirements.

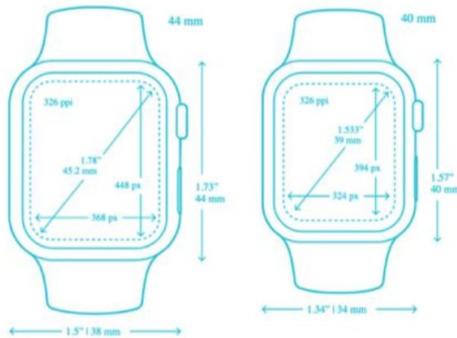
A detailed description of the materials used, design renders, spaced view are given in the design kit.

### Shape and dimensions

The shape and dimensions of the [redacted] should closely resemble the Apple Watch 40mm size. This shape is familiar to many consumers, so it won't pose any difficulties to wear the [redacted] on a wrist, if such use-case is preferred by the user.

The 40mm size, with the help of a mounting adapter, fits very well on a [redacted] as well.

Apple Watch Series 6



### Brand/Logo



### 3.2. Mechanical hardware requirements

Below are the key hardware requirements for the [redacted] and accessories:

### Mechanical hardware requirements

- **Target weight:** less than 50 grams (1.76 oz)
- **Dimensions and shape:** approx 38x44 mm, 1.5x1.73 inches, thickness 6-8 mm to accommodate the battery.
- **External indicators:** At least two status LEDs (power, charging, software defined functions)
- **External display:** none
- **Haptic feedback:** built-in vibration unit
- **Buttons:** one button (mechanical or touch) able to switch on the device, reset the device, initiate pairing.
- **Charging port:** 2-pin magnetic charging port. Bundled USB-A to 2-pin charging cable.
- **IP protection:** IP54 (splash-resistant)
- **Wearable on a wrist:** using a wristband with [redacted]
- **Other mounting options to be developed during the project:**
  - Mount on [redacted]
  - Mount on [redacted]
  - Mount on [redacted]

### Operating conditions

- **Temperature range** -10 .. +40 °C (14 .. 131 °F);
- **Humidity** - up to 100%, non-condensing, no rain
- **Direct solar radiation**
- **Acceleration:** able to handle acceleration of up to 10g during gameplay. Able to withstand shocks of up to 20g (fall).
- **Exposure to dust:** No impact. Fully sealed enclosure.

### Storage conditions

- **Temperature range:** -20 .. +50 °C (-4 - 122 °F);
- **Humidity** - up to 100%;

### 3.3. Electronics Hardware Requirements

#### Hardware Functional diagram

The Hardware Functional diagram is shown in Figure 1.

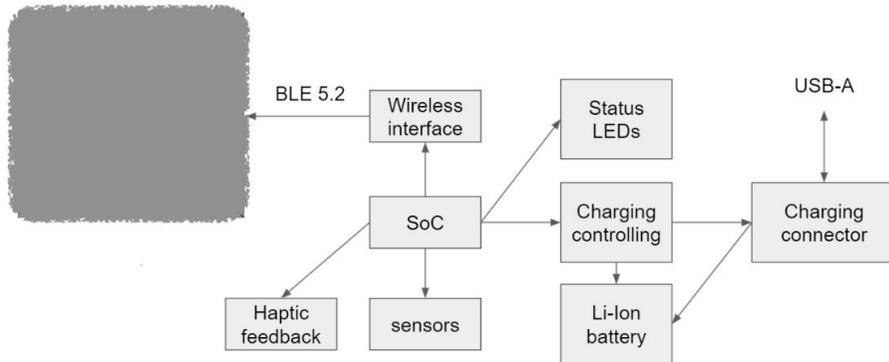


Figure 1. Hardware Functional diagram

The functional diagram above represents a reference design of the [REDACTED], the individual components and their characteristics may change during development in order to meet product requirements.

#### System-on-Chip (SoC)

An ultra-low power SoC, one of the industry standard solutions for IoT devices should be used. Availability for mass production should be ensured.

#### Wireless connectivity

The device must be able to connect to [REDACTED] via Bluetooth Low Energy (BLE) protocol version 5.0 or higher.

- BLE profile: custom-developed profile

- Estimated connection frequency: at least **100 Hz**. Higher transmission frequency is possible with BLE, but a trade-off will be made between low latency and low power consumption.
- Packed size: we estimate a set of sensor samples will occupy less than **32 bytes**. Five sensor samples may take approx **160 bytes**, and will be sent in one packet ensuring that the data polled at **~500 Hz** is transmitted at **~100 Hz**, thus keeping the latency vs real-time below 10 milliseconds.
- Estimated transmission speed up to 1 mbit/second (no high-power transmission used)

#### Sensors

The following data should be captured from sensors and sent over BLE to [REDACTED]

- Gyroscope: 3-axis angular velocity, 16 bit precision
- Accelerometer: 3-axis acceleration, 16 bit precision
- Battery charge level, charging status

The acceleration should be measured up to 200g.

#### Battery

The built-in battery must ensure active usage time of approx. **7-8 hours**, with standby time of at least **5 days** without charge.

The built-in battery and the internal circuitry must ensure the following means of protection of the battery and the device:

- Battery overheating protection

- Charging overvoltage protection
- Charging overcurrent protection
- Deep discharge protection (low-voltage operation cut-off)

The battery used must be **UN 38.3 certified**.

### 3.4. Software design

#### Platform requirements

All software development of [REDACTED] software and its wireless communication with [REDACTED] should be done using standard Android API of [REDACTED] side. Off-the-shelf software libraries for wireless stack implementations should be preferred for the [REDACTED] side.

#### Pairing / Wireless connection

All initial pairing with the device is performed wirelessly using an [REDACTED] app and/or [REDACTED] interface. A pairing button is provisioned on the device.

#### APIs / Interfaces

The communication protocol and the details of the custom BLE communication profile must be documented as part of project deliverables.

#### User Software updates

All application features are implemented on [REDACTED]

#### Embedded firmware updates

The SoC used in the [REDACTED] needs to support Over-the-Air Firmware updates. The firmware will be uploaded to the [REDACTED] from the [REDACTED] BLE. The firmware update is then installed seamlessly on the [REDACTED].

The firmware update functionality must be developed as part of this project, and must offer the following functionality:

- Sending the encrypted and signed firmware binary to the [REDACTED]
- Checksum validation, signature verification and decryption of the binary at the controller
- Flashing the firmware to the controller, rollback to old firmware if update fails

In all scenarios the firmware update process should be transparent to the end user and should not prevent the user from interacting with the device.

#### UI/UX design

Not applicable

#### First switch-on procedure and On boarding

The pairing button must be pressed by the user to pair the device with [REDACTED]. Subsequent power-on and pairing is done automatically.