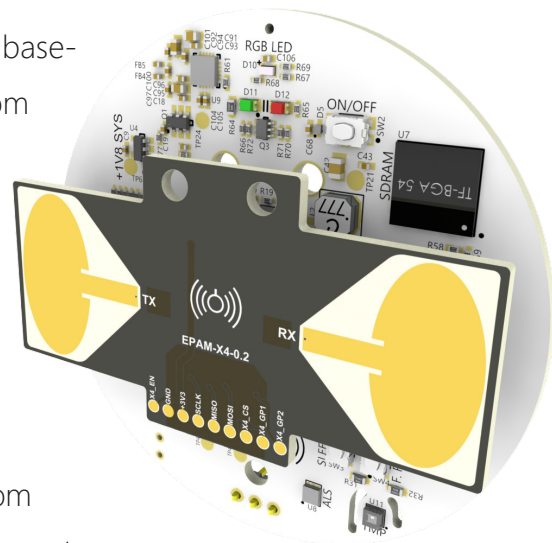


## Overview

The SLMX4 Health Module is a 2-piece hardware set consisting of the base-board (SLMX4-Base) which utilizes the i.MX RT1060 crossover MCU from NXP and the elliptical patch antenna module (EPAM) that is equipped with Novelda's X4 UWB Radar. This combination means the Health Module is capable of applications including, but not limited to, occupancy, proximity, respiration, and embedded machine learning. The Health Module also boasts large data storage accessible via micro SD card. Furthermore, the Health Module features optional configurations to include WIFI+Bluetooth capabilities and additional sensors that collect data such as room temperature, humidity, illuminance and noise pressure at the customer's request.



## Sensing Capabilities

### Sensing Metrics

- Presence Detection
- Respiration ( $\pm 1$  RPM)
- Target Distance ( $\pm 10$ cm)

### Range

- Up to 10 meters

### Optional Peripheral Sensors

- Ambient Light
- Temperature
- Humidity

### Communication Interfaces

- USB
- WiFi
- BLE

## Hardware

### X4 SoC Transceiver

- Impulse Radar
- CF = 7.29 GHz
- BW = 1.4 GHz
- Integrated Planar Patch Antenna Pair

### NXP i.MX RT1060 Cortex-M7 MCU

- 1284 DMIPS @ 600 MHz
- 1MB On-Chip SRAM

### Memory Options

- 16 MB Flash
- 8 MB SDRAM
- uSD Card Slot

### Visual Indicators

- Three user-controlled LEDs (1 RGB)

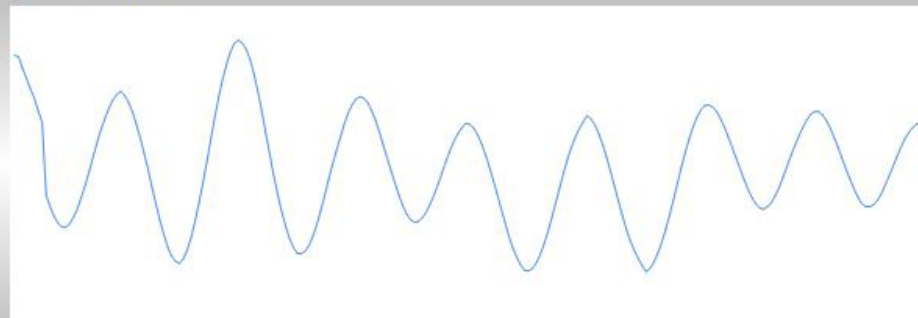
### Health Firmware:

- Presence and distance to a human target
- Respiration within  $\pm$  RPM, out to 5 meters.
- Fast and Slow Movement Indicator
- *Health Message* via USB or Wi-Fi
- Client-side GUI

### Radar Firmware:

- MATLAB / Python Client Connector
- RF data sampled at 23.328 GS/s
- In-Phase/Quadrature (IQ) downsampled data
- User control of all radar register parameters

Respiration Waveform:



Health:

Frame Counter:	685	Presence Detected:	1
Humidity:	1.55	Distance:	0.91
Temperature:	0.06	Distance Signal Quality:	10
Lux:	473.74	Movement Detected:	0
SPL:	-	Movement Type:	None
RMS:	0.59	Respiration Detected:	1
RMS Std (x1000):	21.66	Respiration Signal Quality:	10
		Respiration RPM:	20.5

Data

