

## ISP131001 Bluetooth Low Energy Wireless Accelero-Magnetometer, Temperature and Barometer Detection Sensor

### Key Features

- + Single Mode BLE v4.0 Slave or Master
- + Proprietary 2.4 GHz protocols
- + Based on Nordic Semiconductor nRF51 family
- + 2.4GHz low energy RF Transceiver
- + 32bit ARM Cortex M0 CPU with 256kB Flash
- + Analog and Digital peripherals
- + Ultra Low Power Consumption
- + Single 2.1 to 3.6 V supply
- + Overall Size 12.5 x 25 x 3 mm
- + Temperature -25 to 75 °C
- + Fully integrated RF matching and Antenna
- + Integrated 16 MHz and 32.768 kHz Clocks
- + Coin cell battery CR2032
- + Low Power 3-Axis Accelerometer Detection
- + Low Power Temperature/Barometer Detection
- + Programmable controlled mini LED
- + Certified CE, FCC, IC and TELEC

### Applications

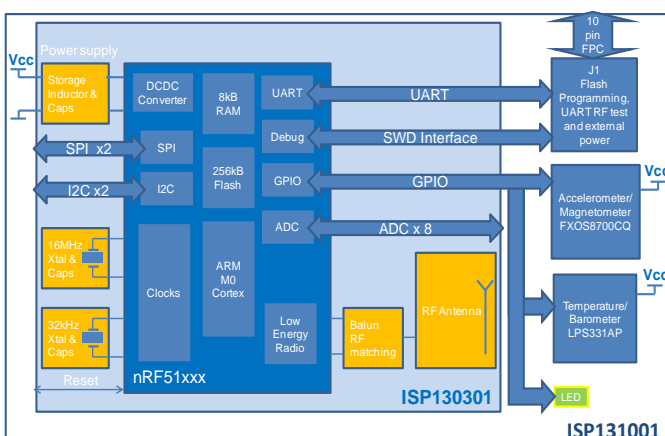
- + Sport and fitness sensors
- + Health care sensors
- + Industrial sensors
- + Gaming sensors
- + Motion detection and transmission

### General Description

ISP131001 is an autonomous low-power device for wireless acceleration, temperature and barometer detection and transmission. The complete device makes use of Insight SiP ISP130301 BLE module together with low power 3-axis accelerometer and temperature/barometer sensors connected to a primary button cell battery CR2032. Overall size of the device is 12.5 x 25 x 3 mm.

The host processor that handles the autonomous sensor application, the high level portion of the BLE protocol stack and communication with the sensors is a low power 32-bit MCU (ARM Cortex-M0 based), integrating 256 kB flash memory.

The Freescale FXOS8700CQ 3-axis linear accelerometer and 3-axis magnetometer is used to detect acceleration and is combined with ST Micro LPS331AP temperature and barometer sensor. A Rohm SML-P11MTT86 mini-LED is also part of the board and is available to be controlled by software. Data are transmitted via GPIO processor port. Data sampling rate is set to 50 samples/second.



A development kit ISP130301-DK1 is available from Insight SiP and allows for easy flash programming application processor via the 10 pin removable FPC connector. During firmware modification and debug, the ISP131001 device may be supplied via the DC voltage from the development kit interface board. The ISP131001 sensor can be reprogram on the air with the bootloader interface.



## Contents

1. Electrical Specifications .....	Page 2
2. RF Performances .....	Page 4
3. Mechanical Outlines .....	Page 4

## 1. Electrical Specifications

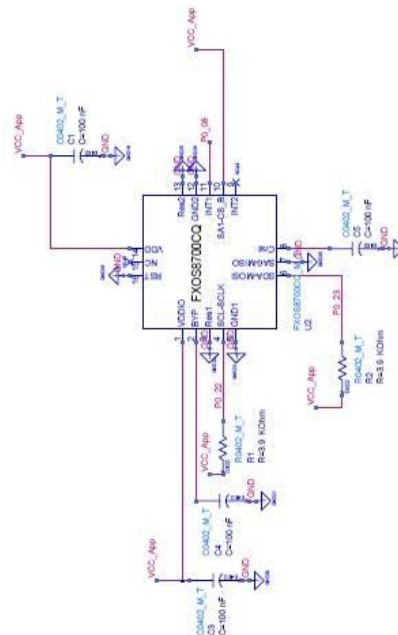
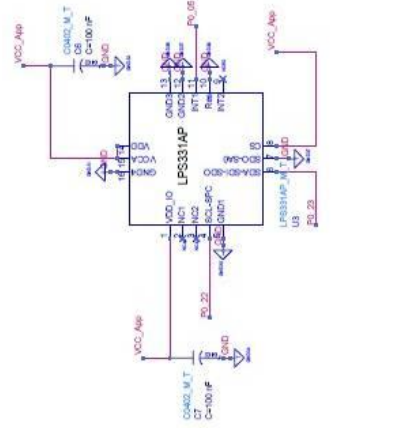
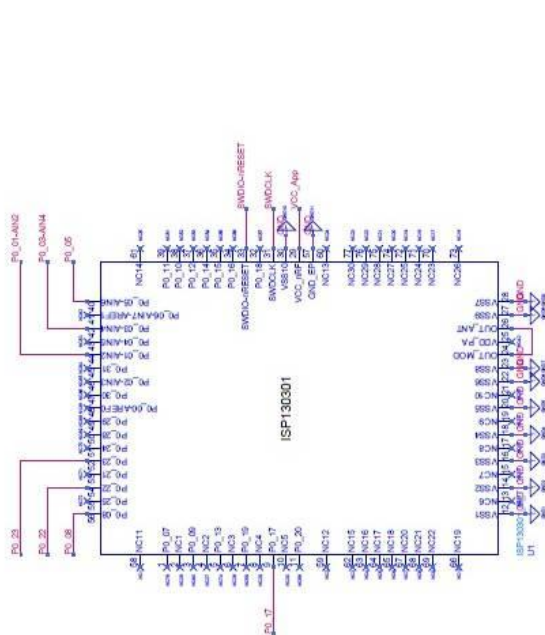
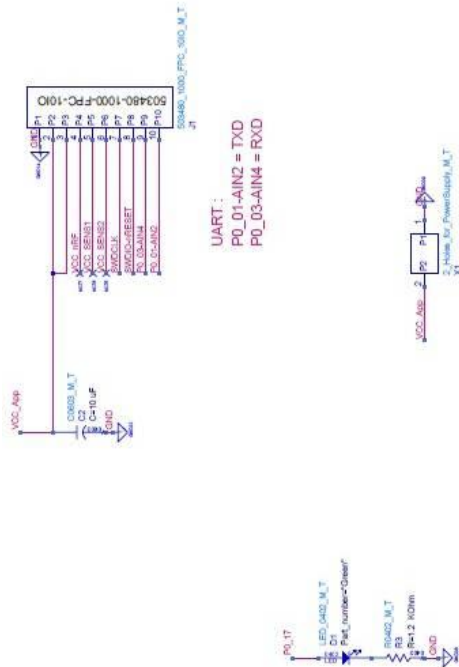
### Sensor Performance

The performance of the motion sensor is that obtained by the Freescale FXOS8700CQ. Key characteristics are shown below.

Parameter	Value	Unit
Number of axes	6	
Acceleration range	±2g / ±4g / ±8g	g (9.81m/s <sup>2</sup> )
Magnetic measurement range	±1200 μT	g (9.81m/s <sup>2</sup> )
Number of bits for full range for each axis (accelerometer)	14	bits
Number of bits for full range for each axis (magnetometer)	16	bits
Data sampling rate (FIFO for acceleration only)	32	samples



## Electrical Schematic



## 2. RF Performances

### RF Specifications according to standards

The performance of the Bluetooth Low Energy Radio link is that obtained by the ISP130301 module.  
Temperature range -25°C to +75°C.

Parameter	Value	BT V4 Std limit	Unit	Condition
Output Power	-20 to +4	-20 to 10	dBm	Channels 0 to 39
RF Frequency tolerance	Better than +/-20	+/- 50	Hz	Channels 0 to 39
Rx sensitivity	-93	-70	dBm	Level for BER <0,1% ideal Tx
Max range	> 200		m	Open field @1m height
EIRP	4.6		dBm	
Antenna Gain	0.6		dBi	
Rx sensitivity	51.4		dBuV/m	

## 3. Mechanical Outlines

### Dimensional drawing

