ARIA Sensing® by Cover Sistemi

LT102 UWB Radar Board

Rev.1.2

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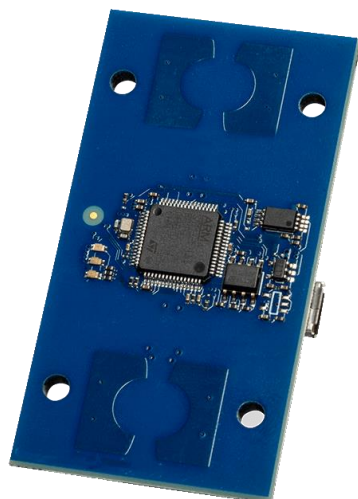
LT102 UWB Radar Board

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1   Summary

LT102 radar module is a turn-key Ultra-Wide Band radar system for indoor applications. LT102 integrates high-end antennas, the signal processing unit and the communication interfaces. It is designed to fit EU EN 302 065 (EU), FCC CFR 47 Part 15 (USA), RS220 03/2009 (Canada), UWB Regulations.

General Specifications

- Typ. Detection range: 10 meters
- Maximum power consumption: 500mW
- Operating frequency: 6.5GHz to 8.5GHz
- Power supply: 3.3Vdc or USB 5Vdc
- Temperature range: -40°C to +85°C
- Integrated Antenna (aperture ±60° by ±60°)
- Communication interfaces: USB full speed, SPI, UART
- Dimensions: 36mm x 68mm

General Applications:

- Presence detection
- Position tracking
- Breath detection and monitoring
- Gesture recognition

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2   Features

The LT102 is a high configurable UWB radar. This module combines a full UWB transceiver and an on board MCU.

The module is targeted for application like presence detection, position tracking, breath detection and analysis. The communication is achieved by an USB full speed (virtual com port). The module has an auxiliary connector that may be used as GPIOs or additional communication interface such as SPI and UART. The module is USB powered.

3   Operating principle

The operating principle of the system is based on the direct readout of the backscattered pulse

- The transmitter emits pulses (Fig. 1a) which travels into space and hits the targets that are into active area of the radar;
- The targets reflect part of the incoming energy (echoes) backward to the radar module (Fig. 1b);
- The receiver converts the incoming signal to digital data, these data are provided to the MCU and processed according to the application.
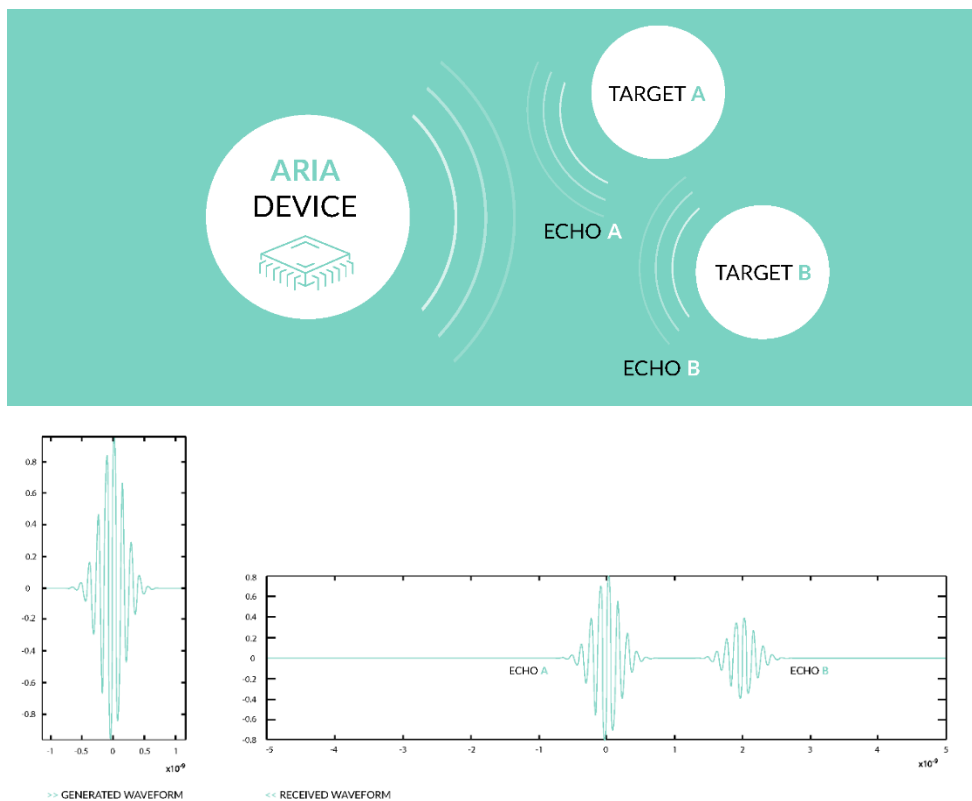
Fig. 1: The basic principle and the waveforms: a) generated pulse at transmitter (left) and b) generated echoes from targets (right)

4   Electrical specifications

	Min	Typ	Max
Operating frequency	6.5GHz	7.29GHz	8.5GHz
Temperature Range	-40°C		+85°C
Supply voltage (AuxIO)	3.0V	3.3V	3.6V
Supply voltage (USB)		5V	
Current consuption (AuxIO)			100mA
Range resolution		6mm	
VIL			0.3 Vdd
VIH	0.7Vdd		
Rseries (AuxIO protection)		220 Ohm	
Operating frequency	6.5GHz	7.29GHz	8.5GHz
Temperature Range	-40°C		+85°C

Table 1: LT103OEM electrical specifications

5 Module connection

5.1 USB operation

In a default configuration, the LT102 module can be attached to a PC through a A-plug, micro-B USB cable. In this configuration, the power supply of the LT102 is taken from the +Vcc pin of the USB cable.
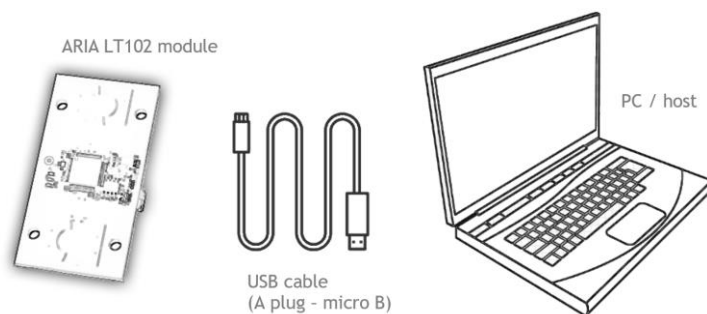

Fig. 2: Plug and Play configuration, the only driver required is STM Virtual ComPort.

5.2 Auxiliary IO connector

The module provides an auxiliary connector (AuxIO) that may be used in order to control external electronics, or as alternate communication interface (SPI and/or UART).

The connector center is in position (x=33.7mm, y=25.2mm) with respect to the lower-left vertex of the board, (connector part number FTSH-105-01-F-DV-007)

Pin	Description
1	External Vdd input
2	Ground
3	SPI_MOSI/GPIO
4	GPIO
5	GPIO
6	SPI_CLK/GPIO
7	UART_RX/GPIO
8	SPI_MISO/GPIO
9	UART_TX/GPIO
10	GPIO

Table 1: AuxIO Pinout description

6   Firmware

LT102 module is provided with a pre-programmed FW, this FW provides:

- Direct access to the data processing section: raw data or partially processed data
- Moving target detection algorithm
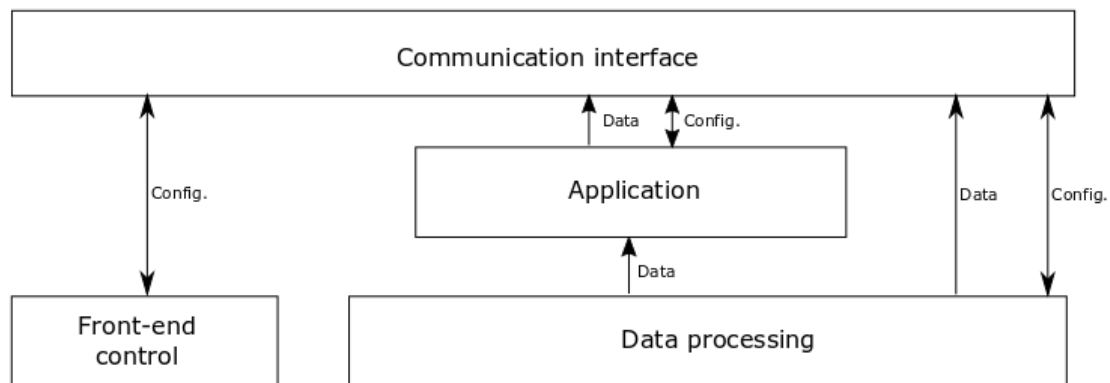- Front-end control and parametrization

Fig. 3: FW structure

The figure shows the basic structure of the FW. Currently only one application is provided, but the module can run multiple application according to the user needs (ex. Presence detection, breath analysis, etc.). See documentation for details about communication protocol and algorithms.

7   Communication Interface

The FW provided implement a USB communication using a CDC Virtual comport device driver. See the "LT102 and LT103OEM COM Protocol" document for more details.
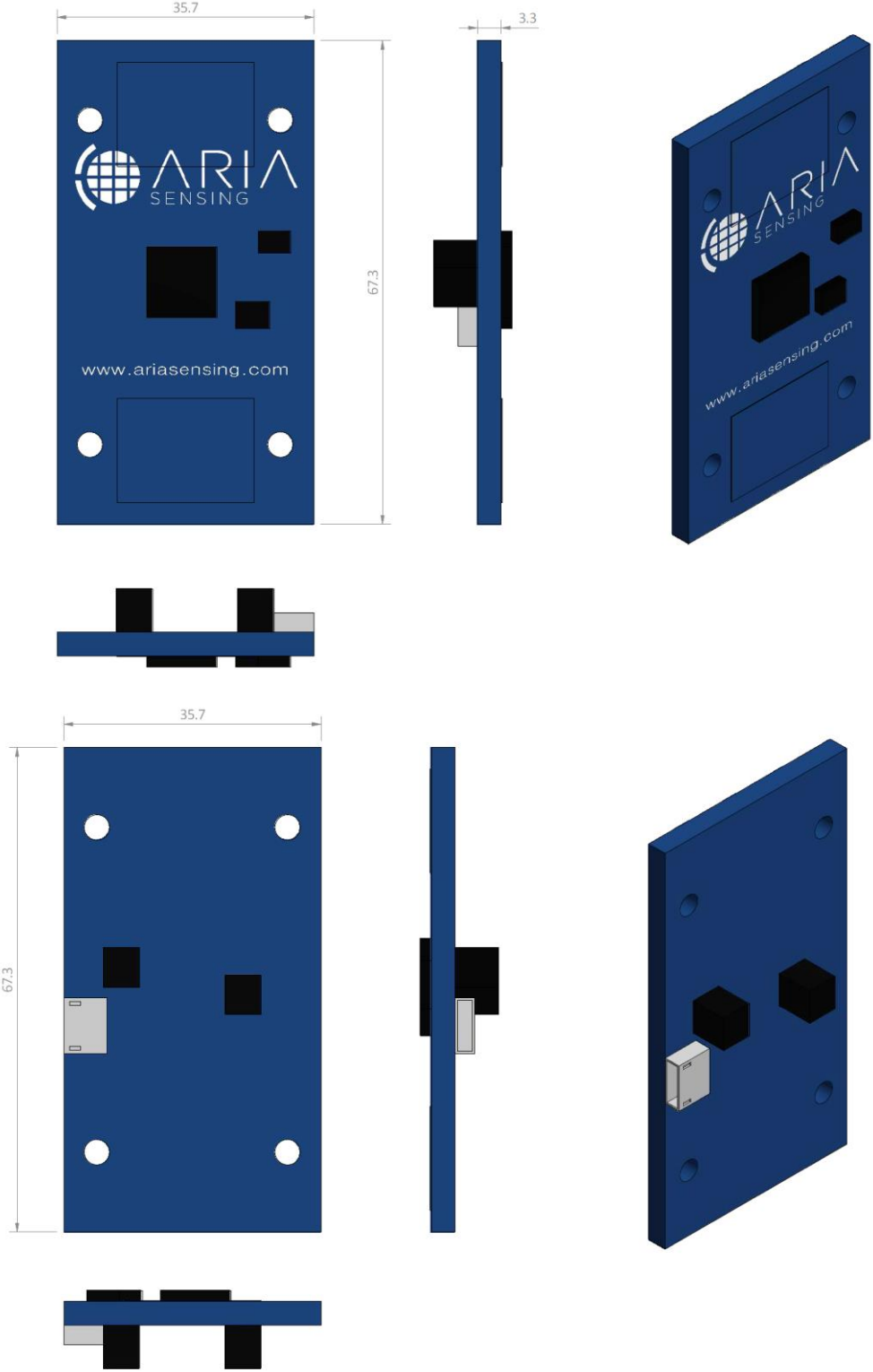
8   Drawings

Fig. 4: LT102 drawings. Note: all mounting holes are 3.5mm diameter