

DEVSN2

User Guide

24G Smart mmwave sensing solution

About this document:

Scope and purpose

This application note describes the key features of ICLegend's DEVSN2 module equipped with the 24GHz transceiver chip S5KM312C and the MCU STM32F429 and helps the user to quickly get started with the demo board.

1. The application note describes the hardware configuration and specifications of sensor module in detail.
2. It also provides a guide to configure the hardware and implement simple radar application with the firmware/software developed.

Intended audience

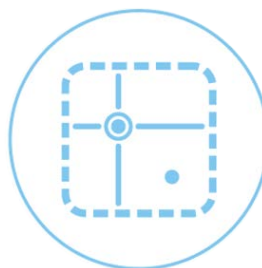
This document serves as a primer for users who want to get started with hardware design for target position estimation using the Frequency Modulation Continuous Wave (FMCW) radar technique at 24GHz.

The DEVSN2 from ICLegend is an easy-to-use module for the mmWave sensing device, with direct connectivity to the PC.

Typical application:



Gesture recognition



Object detect and movement discrimination



Distance/velocity/angle measurement



Vital signs monitoring

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1 key Feature

Detect and track position of multiple targets in outdoor environments
 Measure distance of multiple targets in a user-configurable range
 Detect motion, presence, speed and direction of movement (approaching or retreating) for human target
 Operational in different weather conditions
 Can be hidden in the end application as it detects through non-metallic materials
 Micro USB 5V power supply
 24GHz K band highly integrated FMCW radar sensor SoC
 On board antenna with 6dBi gain
 5-pin, 2.54mm interface for mcu SWIO firmware download
 One button and five LEDS for basic user interface
 4-pin, 2.54mm interface for UART data communication
 6-pin, 1.0mm connector to external uart panel display
 Small form factor: 4.5 x 3.3 cm

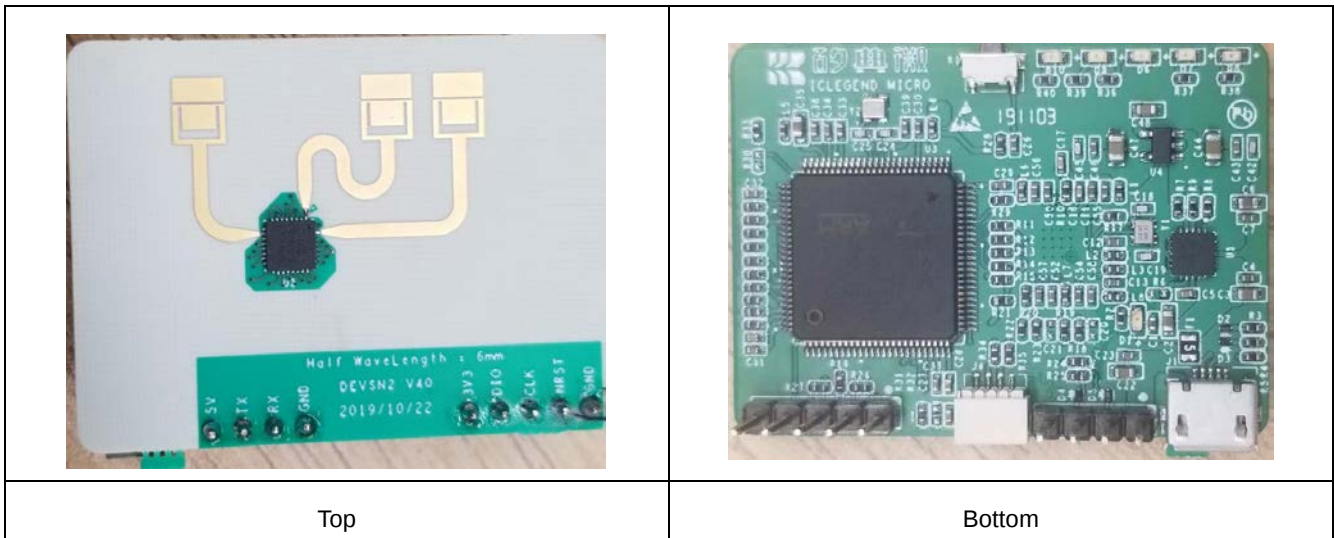
2 Hardware Description

2.1 Specification

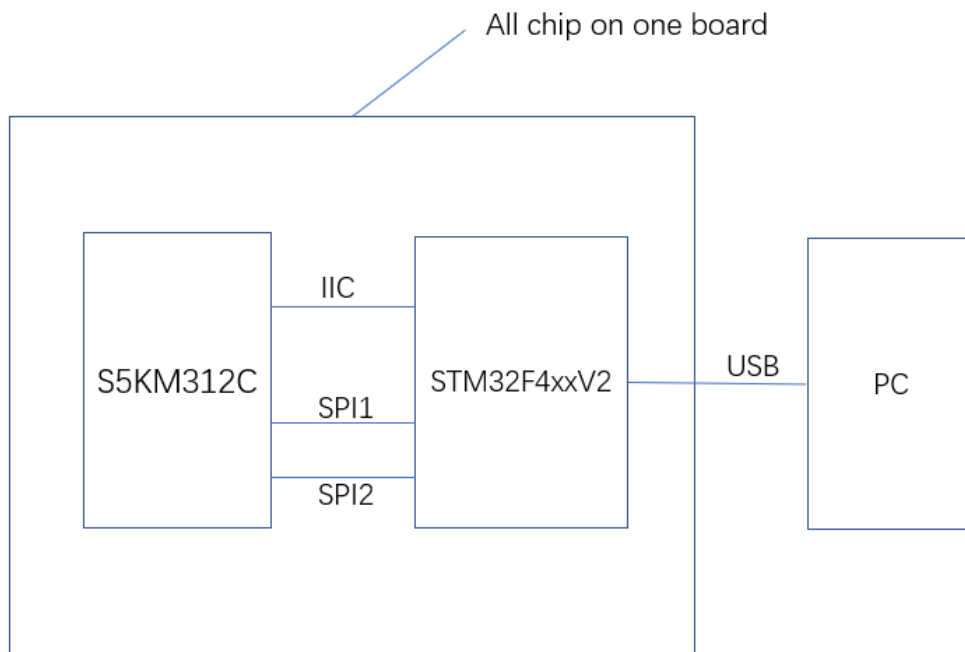
DEVS2 module parameter below:

Operation Frequency:	24GHz~24.25GHz
Power supply:	USB 5V
Modulation Technique:	FMCW
Number of Channel:	1TX, 2RX
Antenna Type	PCB Antenna
Antenna Gain	6 dBi
Crystal:	25MHz
Board dimension	4.5cm x 3.3cm
Work current	300mA
Angle	+/-40 degree

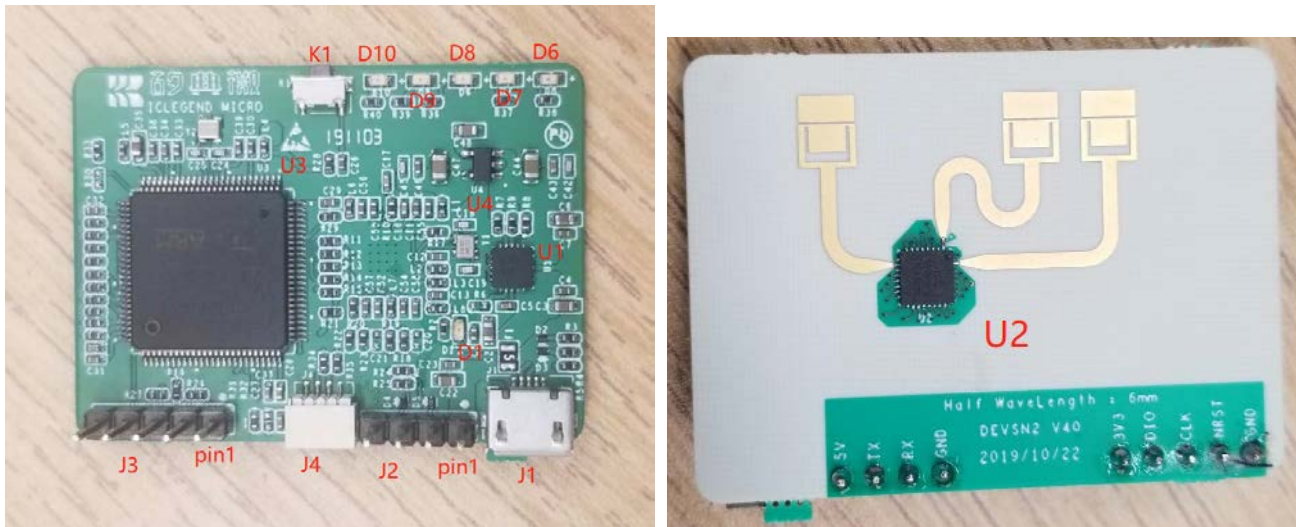
2.2 Board picture



2.3 Block Diagram

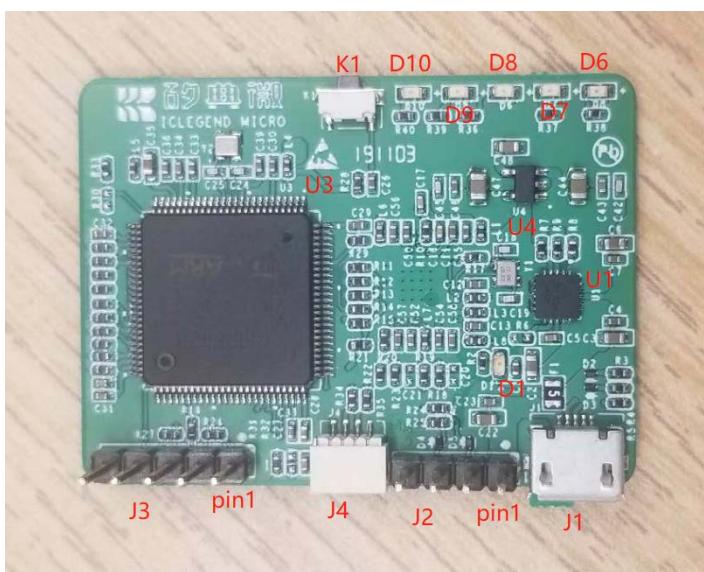


2.4 Key component



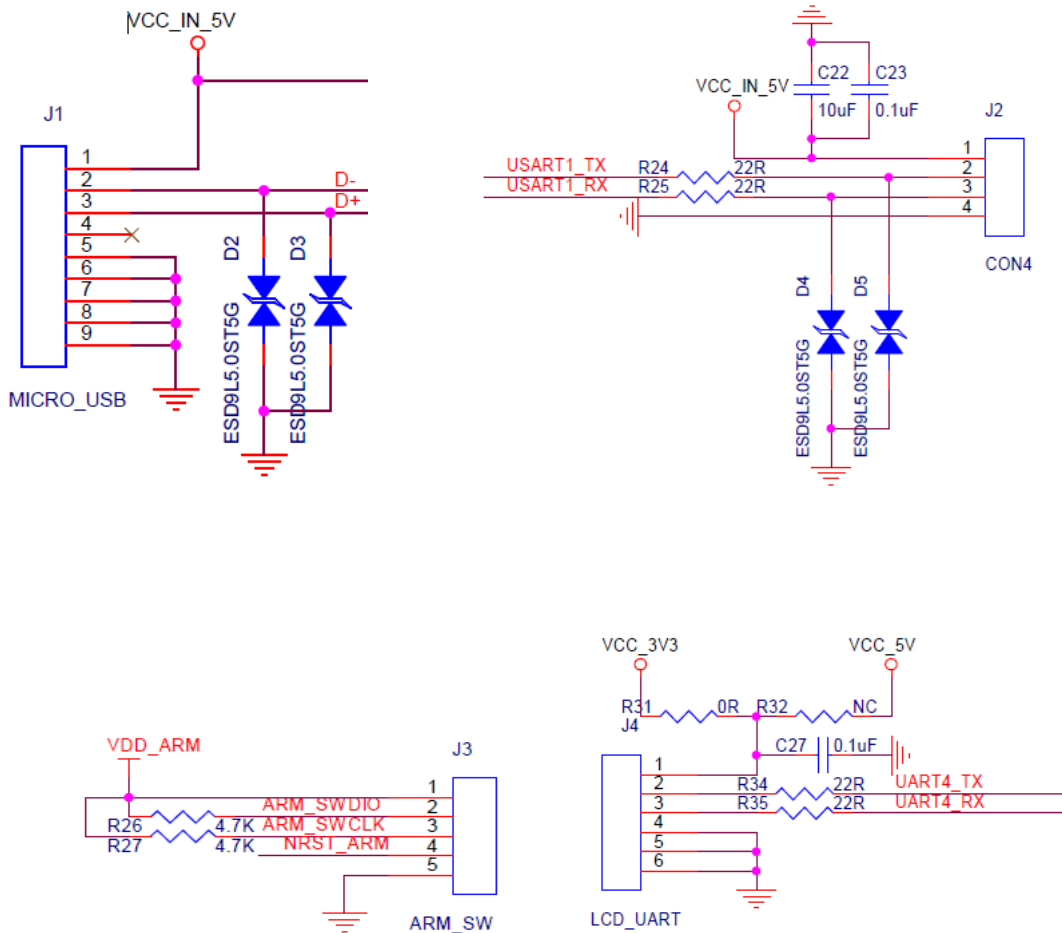
Part number	type	description
U1	TPS7A84A	Power IC
U4	TPS73616DBVT	Power IC
U2	S5KM312C	mmwave sensor IC
U3	STM32F4xxV2	MCU
K1	button	MCU reset key
D1	Green-LED	Power on light
D6	Green-LED	Working mode light
D7	Green-LED	Power on light
D8	Green-LED	Power on light
D9	Green-LED	Power on light
D10	Green-LED	Power on light

2.5 Interface function



Part number	Description
J1	USB interface to PC
J2	Uart interface
J3	SWIO download interface
J4	Uart panel interface

2.6 Connector description



Pin detail description

J# PIN #	Pin name	Description
J1PIN1	VCC_IN_5V	
J1PIN2	D-	
J1PIN3	D+	
J1PIN4	OPEN	
J1PIN5	GND	
J1PIN6	GND	
J1PIN7	GND	
J1PIN8	GND	
J1PIN9	GND	

J2PIN1	VCC_IN_5V	
J2PIN2	USART1_TX	
J2PIN3	USART1_RX	
J2PIN4	GND	
J3PIN1	VDD_ARM	
J3PIN2	ARM_SWDIO	
J3PIN3	ARM_SWCLK	
J3PIN4	NRST_ARM	
J3PIN5	GND	
J4PIN1	VCC_LCD	
J4PIN2	UART4_TX	
J4PIN3	UART4_RX	
J4PIN4	GND	
J4PIN5	GND	
J4PIN6	GND	

3 Version information

Version	Date		说明
V1.00	2020/04/28		

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.