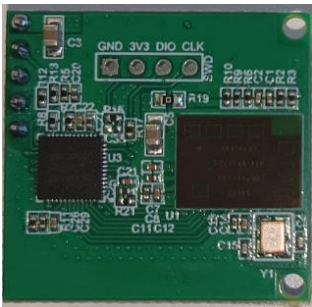# Millimeter Wave Radar
MS72SF1

Specification V1.0

MinewSemi

◆ Subsidiary of Minew Technologies

◆ Nordicsemi Strategy Partner

◆ Bluetooth SIG Associated Member

◆ Fira Alliance Adopter Member

INDEX
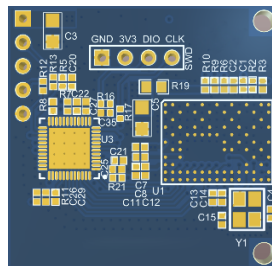
1 Product Function Description

Compared with traditional perception methods such as vision, infrared, and laser, millimeter-wave radar is not affected by light, and can realize non-sensing and active monitoring of indoor occupants throughout the day, and has the function of personal privacy protection. It is currently the best sensor for home scene applications. This product adopts domestically produced chips and is independently controllable to realize accurate tracking and positioning of many people in the room. At the same time, it can detect people in static states such as reading and sleeping, and can suppress interference such as curtains and green plants. This product has the advantages of low cost, domestic production, high reliability and high performance.

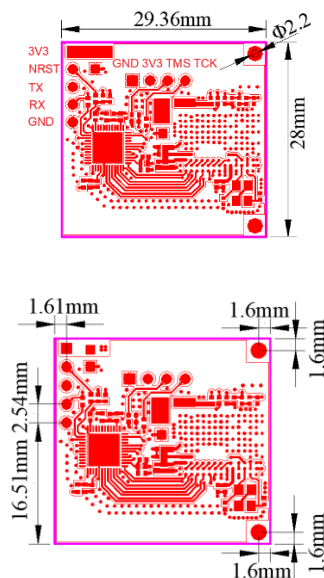| NO.	Function	Detailes
1	multi-target tracking	1) It can realize the target tracking function of up to 10 people, including the target movement trajectory and the real-time position of the target; 2) Strong ability to suppress false targets (curtains, green plants, multipath, etc.); High sensitivity to detect micro-moving targets (stationary, shaking, waving, etc.).
2	area division	The user can flexibly configure the detection area

2 Product Parameters Introduction

NO	Parameter	NO.	Parameter
1	Installation method: top installation	6	Max Consumption：1.7w
2	Detection Distance：0.5~8m，(The effective projection ground is a circle with a radius of 3.5 meters, and the installation height is 2.7 meters)	7	Number of Trackers：≤10
3	Azimuth Coverage：±60°	8	Working Frequency：60-64GHz
4	Pitch angle coverage：±60°	9	Processing Period：≤30ms
5	Avg Consumption：0.3w	10	Dimension：29.36*28mm
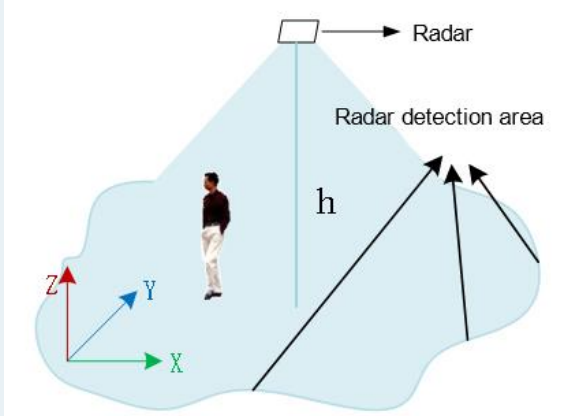
2.1 Shape

2.2 Dimension
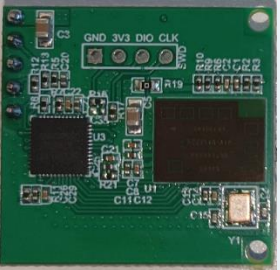
3 Product Features Introduction

NO.	Feature	Details
1	Installation scene	Detection distance: 0.5~8m, (the effective projection ground is a circle with a radius of 4 meters, and the installation height is 2.7 meters) Note: The detection distance is related to factors such as installation environment, human body volume, relative angle, and movement range. The above parameters are the test results of our company. Under different test conditions, the actual test results shall prevail.
2	Unaffected by the environment	Unaffected by temperature, humidity, dust, light, noise, etc.
3	Flexible parameter configuration	The detection threshold, function mode, etc. can be configured through the serial port.

4 Environmental Build

4.1 Hardware components

NO.	Name	Figure	Description
1	Radar Module		Model NO.： MS72SF1
2	USB to TTL Module		USB to TTL module for serial port command configuration, antenna calibration and other functions.
3	USB Extension Cable		USB extension cable for connecting PC to USB TTT module.
4	ST-LINK Downloader		ST-LINK downloader for radar module firmware upgrade and secondary development simulation debugging.

4.2 Installation position

The module is installed on the ceiling with the antenna facing down, and the installation height is 2.3-2.8m. When installing the module, try to keep it as fixed as possible to avoid shaking of the module. The surrounding environment should be as open as possible, and the USB extension cable should be fixed as much as possible to avoid interference caused by the cable.
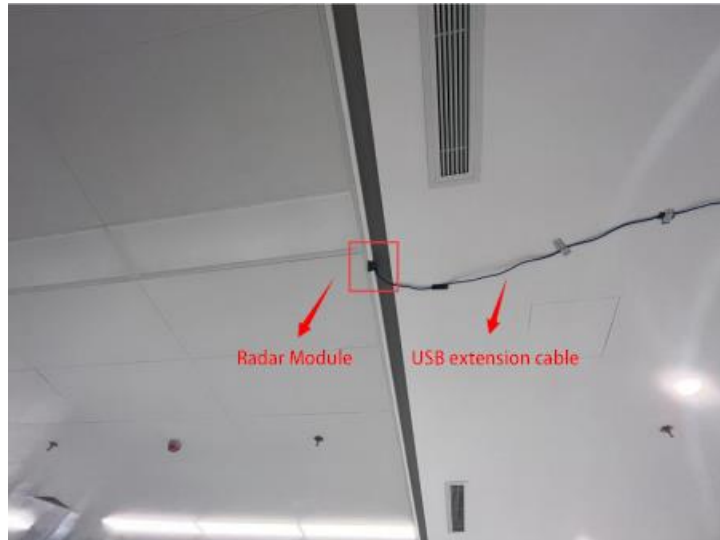
5 Parameter Configuration
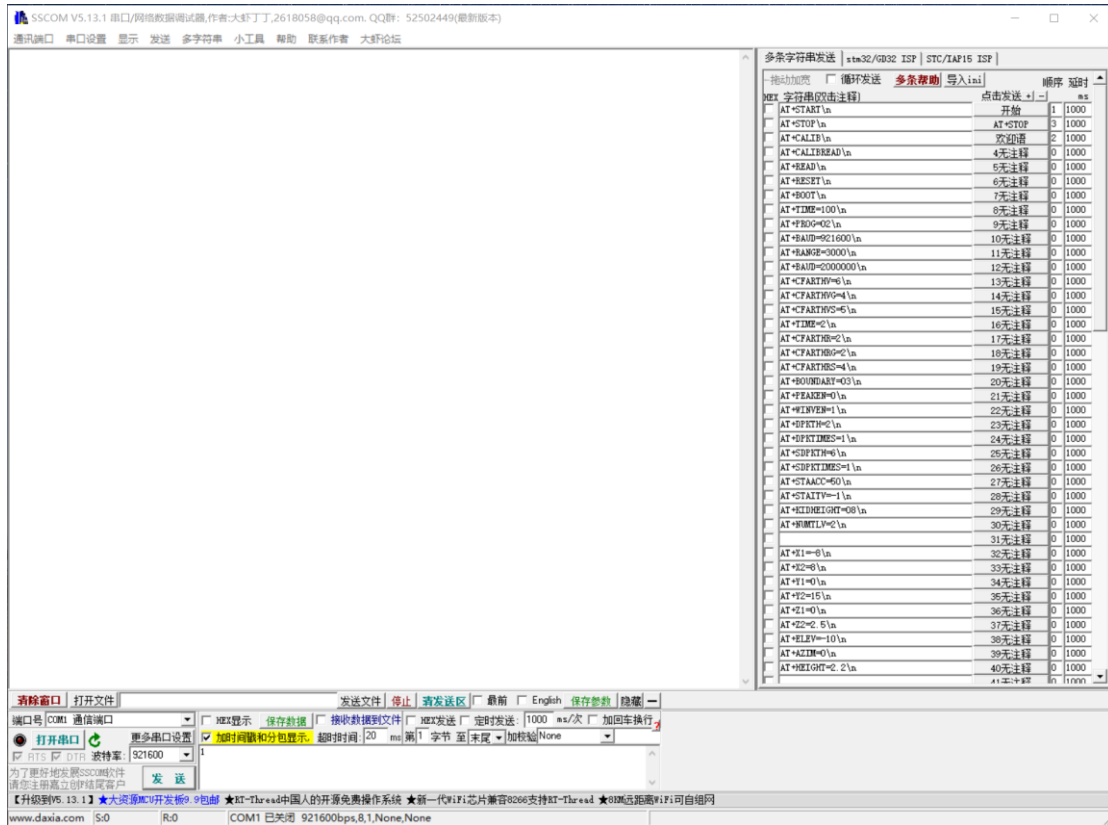
Adjust the corresponding parameters as needed. Note: After modifying the parameters, click the button behind the parameters to complete the parameter modification.

Common parameters are as follows:

Command	Implication
AT+START\n	Start working
AT+STOP\n	Stop working
AT+RESET\n	Module reset
AT+TIME=XX\n	Configure scan interval (unit:ms, range 100-10000, default value 100)
AT+MONTIME=XX\n	Configure monitoring interval (unit s, range 1-99, default value 1)
AT+HEATIME=XX\n	Configure heartbeat interval (unit s, range 10-999, default value 60)
AT+RANGE=XX\n	Configure radial distance (in cm, range 10-1000, default 600)
AT+SENS=XX\n	Configure sensitivity (range 1-19, default is 2)
AT+SETTING\n	Fixed-point detection mode

AT+SEEKING\n	Query work status
AT+WINARANGE=XXXXXXXXXXXX\n	Gate 1 configuration
AT+WINBRANGE=XXXXXXXXXXXX\n	Gate 2 configuration
AT+WINCRANGE=XXXXXXXXXXXX\n	Gate 3 configuration
AT+WINDRANGE=XXXXXXXXXXXX\n	Curtain 1 configuration
AT+WINERANGE=XXXXXXXXXXXX\n	Curtain 2 configuration
AT+WINFRANGE=XXXXXXXXXXXX\n	Curtain 3 configuration

Illustrate:

If the configuration is successful, it will return AT+OK, if the configuration fails, it will return Save Para Fail, and you need to resend the command.

AT+SETTING\n

Before performing fixed-point detection, please first ensure that the detection environment has no other interference and let people stand still at the place where the fixed point is required, and then send AT+SETTING\n to configure. At this time, the module will upload the location information of the person as follows.

In this way, the coordinates of each point are recorded

AT+WINARANGE=XXXXXXXXXXXX\n

AT+WINARANGE followed by 12 digits, e.g.AT+WINARANGE=123211128217\n

It means that the doors and windows are on the straight line between point x1=-2.3, y1=1.1 and point x2=-2.8, y2=1.7, and the radar module will discard detection targets outside the straight line.

AT+WINARANGE=999999999999\n means to delete the restriction（the 1st, 4th, 7th, and 10th digits indicate that the sign bit can only be 1 or 2, and 1 means negative, 2 means positive,AT+WINBRANGE=,   AT+WINCRANGE=,   AT+WINDRANGE=,   AT+WINERANGE=, AT+WINFRANGE= the same reason）

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