SMART HOME MICRADAR PERCEPTION

Mmwave radar solution provider

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Micradar is an industry-leading solution provider and module developer of millimeter-wave radar. Its self-developed radar solutions have been widely applied to vertical fields and scenarios of IoT. Having its headquarter located in Shenzhen, Micradar has set up its Chengdu R&D Center, Hangzhou and Qingdao branches. Micradar insists on technological innovation as the driving force, and is committed to reaching the maximum value for customers, providing them with radar solutions with expertise and continuous innovation as well as technical services of excellent quality and efficiency.

Micradar possesses core patents in fields of radar core algorithms, antenna design, and micro-electronic products. Our self-developed fall radar and breath & heartrate detection algorithms have taken the lead in the industry. We have independent, complete systems for RF R&D, validation, production, and tests, and have established production lines for radar testing. In the human sensing solutions of 24G, 60G, 77G and other frequency bands include a number of affordable functions, e.g. precise human existence, fall alarm, posture judgement, sleep quality monitoring, vital sign detection such as breath and heartbeat, trajectory tracking, people counting, and gesture recognition, constantly powering home automation, health care for elderly and children, smart security and other scenarios.

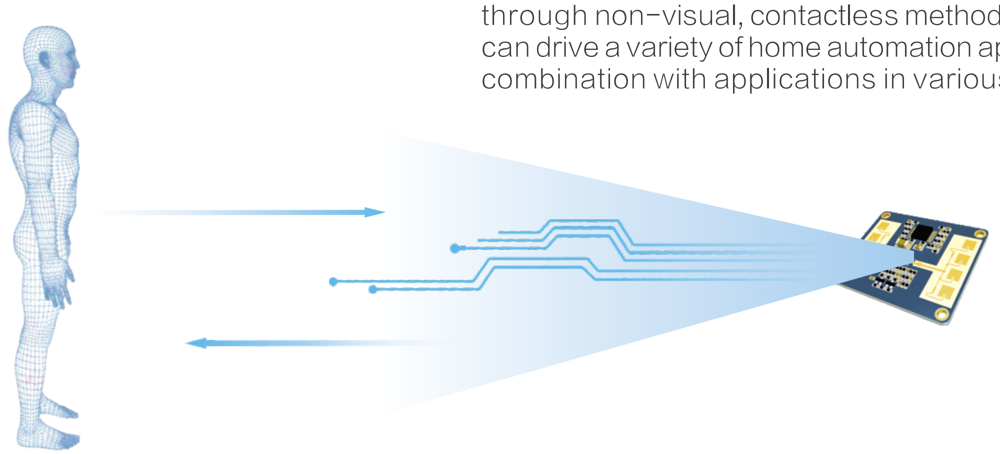
MicRadar

THEORY OF OPERATION

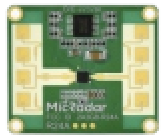
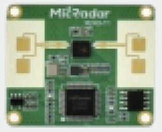
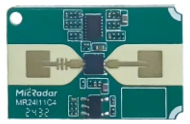
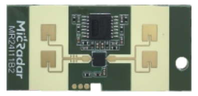
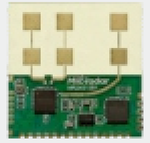
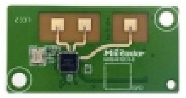
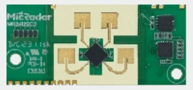
Working frequency: 30 – 300 GHz frequency domain (wavelength 1 – 10 mm)
Common frequency bands currently: 24G, 60G, 77G

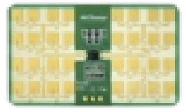
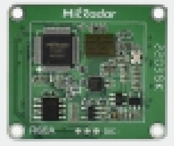
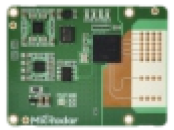
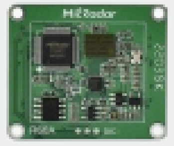
The millimeter wave has a wavelength between centimeter waves and optical waves, imbuing itself with the merits of both.

The human millimeter-wave radar transmits actively electromagnetic wave signals, and calculates target data based on the waveform characteristics of echo signals. It can realize detection of multi-dimensional parameters, such as motions, postures, heartbeat rate and breath, distance, etc. It detects vital signs through non-visual, contactless methods, and hence can drive a variety of home automation applications in combination with applications in various scenarios.

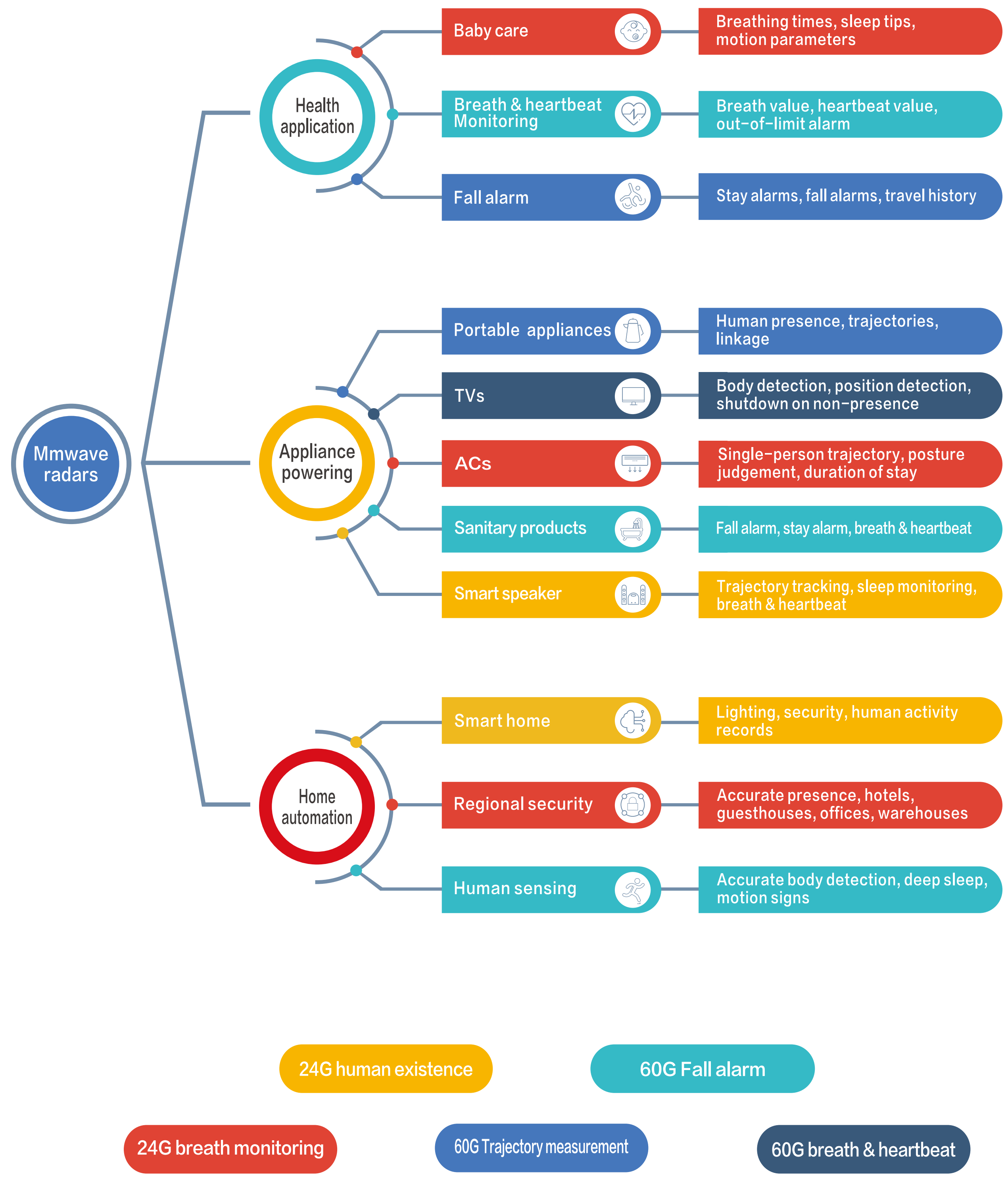


PRODUCT CATALOGUE

Category		Pictures	Name & model	Functions	Applications
Home automation / Smart home empowering	Human presence		Human presence radar R24AVD1	Occupied/Unoccupied motion parameter, Active/Static	This solution realizes human existence detection and smart scenarios linkage with other appliances. It's applicable for smart home, smart security and energy saving, etc.
			Human presence radar R24DVD1	Occupied/Unoccupied, motion parameters, active/still, speed/distance measurement	This solution realizes human existence detection, and smart linkage to lights, electronic peepholes and other devices. It's applicable for area security and entry & exit recording.
			Human presence radar R24AVD2	Occupied / Unoccupied Motion parameters Active/still Distance detection	Installation of Wall mouned & top mounted are available,using for human presence and motion detection in a wide range of angles, applied to smart home appliances, office energy saving, regional personnel detection and other scenarios
			Human presence radar R24AVD3	Detection of personnel position, recording of the motion and stationary status of person, output of motion amplitude parameters	Enabling of automatic regulation of TV images and sounds, and tracking of the motion status and position information of the nearest target.
			Human presence radar R24AVD4	Recording of the motion and stationary status of personnel, output of motion amplitude parameters, and detection of personnel position	Intelligent air conditioning to avoid direct air blowing to personnel, and adjustment of the air supply mode depending on the distance of personnel.
			Human Presence&People tracking Radar R24FTT1	Occupied/Unoccupied Motion parameter Active/Static People tracking for single person	Embedded in smart ACs, TVs and other smart appliances. It can detect movement and distance for human body, and can be used for automatical linkage with other home appliances.
	Human presence &people tracking		Human presence & people tracking radar R24FTT2 (Low power consumption)	Occupied/Unoccupied Location & distance Accurate partition detection	The average current is 40uA, supports battery power supply, and is used in smart door locks and electronic peepholes.
	Counting & Tracking		People tracking radar (Single person) R24ETT1	People tracking, People counting, Gesture recognition	Horizontally installed, used for home automation such as switches, central console wake-up, trajectory tracking, and light follow-ups.

Category		Pictures	Name & model	Functions	Applications
	Counting & Tracking		Multi-person track (1-3 persons) R60ATT1	Multi-person tracking, people counting, Location & distance	Real-time tracking of multi-person trajectories, and output of static coordinates. Applicable for appliance linkage for advertising machines, ACs, etc. and area security.
Home health care	Babysitting		Babysitting radar R60BBD1	Breath & heartbeat detection, sleep status, sleep evaluation	Recognizes motion states specific to sleep care for babies, raises alarms for respiratory anomalies, and realizes smarter care with the help of the baby monitor.
Home health care	Sleep monitoring		Sleep monitoring radar R24BBD1	breath & heartbeat & sleep quality monitoring, Occupied/Unoccupied, Motion parameter	Outputs sleep state and provides monitoring over sleep. Applicable for smart hotels, smart home and other scenarios of sleep monitoring.
Home health care	Sleep monitoring		Breath & sleep radar R60ABD1	breath & heartbeat & sleep quality monitoring, Occupied/Unoccupied, Motion parameter	Provides sleep monitoring for the elderly and people who live alone by constantly detecting human breath and motions, and gives warnings through App or messages on anomalies.
Home health care	Sleep monitoring		Breath & heartbeat radar (77G) R77ABH1	breath & heartbeat & sleep quality monitoring, Occupied/Unoccupied, Motion parameter	Applicable forauxiliary healthmonitoring, healthcare monitoring,infant monitoringand care for theelderly.
Home health care	Fall alarm		Fall detection radar R60AFD1	Fall alarm, Dwell Alarm, Posture recognition, Location & Speed & Distance (Top mounted)	Judges postures through point cloud data. Applicable for care for the elderly, fall detection, alarms for falling down from beds.
Home health care	Fall alarm		Fall alarm radar R60BFD1	Fall alarm, Dwell Alarm, Posture recognition, Location & Speed & Distance (Wall mounted)	Wall mounted, 4T4R antenna design. Recognize human body falls through posture consist of the point cloud, which can be used in elderly care, nursing house, etc.

APPLICATION AREAS



PRODUCT APPLICATIONS

01
Bio-sensing radar

Detects human existence based on subtle motion parameters, including motions, breathing movements, heartbeat movements, etc.
· Capable of effectively recognizing people in the area, and identifying whether they are moving/static, the intensity of the movements, and whether they are approaching/leaving away.
· Applicable scenes: To judge whether people are present in the room with the help of the radar, and confirm people in the room of houses, hotels, guesthouses; and to link switches for lights, ACs, air purifiers, water supply, gas supply and etc. for home automation.

02
Sleep monitoring radar

Comprehensively evaluates current sleep state, sleep quality, and physiological status based on physiological and motion parameters. The radar is capable of detection sleep state without being noticed, and hence suitable for long-term monitoring to establish Big Data of personal monitoring.
· The sleep monitoring radar is able to detect subtle motions on body surface and thus detect respiratory rate and motion status, so as to determine: sleep duration, rollover times, apnea times, respiratory rate anomalies, and sleep quality;
· Applicable scenes: mainly applicable to monitoring on infant/elderly sleep, chronic diseases such as sleep apnea syndrome, and sleep disorder sufferers.

03
Fall detection radar

The radar detects in real-time the motion characteristics of people in the specified zones and establishes a parameter set for them. When someone falls, the instant speed and location of the body are different from those of other motions, and this makes it possible to detect a fall through pattern recognition. However, since the motion of falls varies significantly, fall detection alone might lead to false alarms or missing detection. On this account, further abnormal behavior detection is required in combination with the case of application.
· Applicable scenes: bathrooms, monitored zones in hospitals, special workplaces, etc., where the safety of the elderly, children, patients and staff should be confirmed.

04
Breath & heartbeat monitoring radar

The skin dilation arising from breath and heart causes a change in the parameters of radar echoes. The common practice is to calculate breath/heartbeat parameters based on the fluctuation in instantaneous phase of echo signals.
· With the data of breath and heartbeat, it can be determined that: whether there are any anomalies in breath/heartbeat indicators, health, and sleep quality, which can be used for assessment of chronic diseases.
· Applicable scenes: Mainly applicable for patient monitoring in hospitals, care for the elderly in massive health industry, data acquisition for chronic diseases, and state monitoring for operators engaging in hazardous jobs such as drivers.

05

People counting radar

The people counting radar realizes human sensing, position detection, trajectory tracking, and people counting within the specific place. It is the better choice for monitoring cases where light, weather and other factors are irrelevant as well as a good one to assist cameras in moving object sensing.

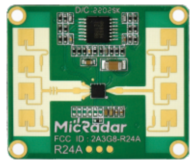
PRODUCT INTRODUCTION

01

Human existence radar

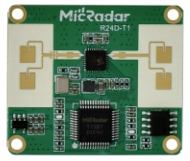
1.1 R24AVD1 Breath sensing radar

Introduction	The human existence radar scans subtle motions through electromagnetic waves to detect the vital signs in the room, and is able to learn whether someone is in the detection area and whether he/she is moving without involvement of camera privacy.
Functions	Existence/inexistence, Active/still, Motion parameters
Working frequency	24-24.25GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	1T1R (1 transmitter 1 receiver)
Working voltage	5V
working current	≤110mA
Output power	6dBm
Detection direction	90° horizontally, and 60° vertically
Triggering distance	≤ 12 m (diameter)
Body sitting range	≤ 6 m (diameter)
Sleep range	≤ 3 m (diameter)
Communication method	Uart, serial port
Product measurements	≤35*31*7.5mm
Mounting orientation	Top/side/inclined
Applicable scene	This product realizes human existence detection, and appliance linkage for automatic start-up/shutdown. It's applicable for scenes such as appliance linkage and home security.



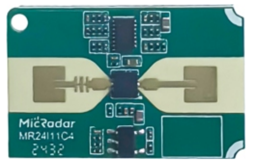
1.2 R24DVD1 Life sensing radar

Introduction	R24DVD1 is based on the millimeter wave radar to realize human biological presence perception and human movement perception. It keeps recording human existence, residence time, and body movement amplitude, and can realize scene linkage through wireless signal notification gateway.
Functions	Existence/inexistence Active/still Motion parameters Speed/distance measurement
Working frequency	24-24.25GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	1T1R (1 transmitter 1 receiver)
Working voltage	5V
working current	≤110mA
Output power	6dBm
Detection direction	90° horizontally, and 60° vertically
Triggering distance	≤ 8 m
Body sitting distance	≤ 4 m
Sleep range	≤ 3 m (diameter)
Communication method	Uart, serial port
Product measurements	≤35*31*7.5mm
Output parameters	Existence/inexistence Active/still Motion parameters Speed/distance measurement
Mounting orientation	Top/side/inclined
Applicable scenes	This product realizes human existence detection, and linkage to lights, electronic peepholes and other devices. It's applicable for area security and entry & exit recording



1.3 R24AVD2 Human Presence Detection Radar

Introduction	The R24AVD2 radar module uses millimeter wave radar technology to achieve human presence detection and distance measurement. This module is based on the 1T1R frequency modulation continuous wave signal processing mechanism, supports ceiling installation or tilted installation, and realizes human presence and motion detection in a large angle range. It is used in scenarios such as smart home appliances, office energy saving, and regional personnel detection.
Features	Occupied / Unoccupied Motion parameters Active/still Distance detection
Working frequency	24-24.25GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	PCB micro-band antenna
Working voltage	5V
working current	90mA
Output power	6dBm
Detection direction	100° horizontally, and 100° vertically
Motion detection distance	The detection range for inclined installation is 8 m, and the detection radius for top mounting is 4.5 m.
Distance of staying still detection	The detection range for inclined installation is 4 m, and the detection radius for top mounting is 3 m.
Communication method	Uart, serial port
Product measurements	15*24mm
Installation method	wall-mounted / top-mounted
Applicable scenes	Using for human presence and motion detection in a wide range of angles, applied to smart home appliances, office energy saving, regional personnel detection and other scenarios

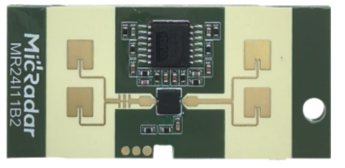


1.4 R24AVD3 Personnel Perception Radar

Introduction	The R24AVD3 radar module based on FMCW radar system is used to detect the real-time personnel position information, continuously record the motion and stationary status of personnel, output the motion amplitude parameters, enable the automatic regulation of TV images and sounds, and track the motion status and position information of the nearest target.
Features	Existence/Inexistence, Active/Still, Motion parameters, Personnel position detection
Working frequency	24-24.25GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	PCB micro-band antenna
Working voltage	5V
working current	≤100mA
Output power	6dBm
Detection direction	100° horizontally, and 100° vertically
Triggering distance	≥ 6m (radial)
Sensing distance for static human bodies	≤ 4m (radial)
Distance resolution	≤0.5m
Communication method	Uart, serial port
Product measurements	6*46mm
Mounting orientation	Horizontal installation / inclined installation
Mounting height	0.7-1.5m (horizontal), 2-3m (inclined)
Applicable scenes	Enable the automatic regulation of TV images and sounds and track the motion status and position information of the nearest target

1.5 R24AVD4 Personnel Perception Radar

Introduction	The R24AVD4 radar module based on FMCW radar system is used to detect the breathing of personnel and other creatures, continuously record the motion and stationary status of personnel, output the motion amplitude parameters, and detect the real-time personnel position information. It is applied in intelligent air conditioning to avoid direct air blowing to personnel. The air supply mode is adjusted depending on the distance of personnel.
Features	Existence/Inexistence, Active/Still, Motion parameters, Personnel position detection
Working frequency	24-24.25GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	PCB micro-band antenna
Working voltage	5V
working current	≤100mA
Output power	6dBm
Detection direction	120° (horizontal), 120° (pitch)
Triggering distance	5m
Distance resolution	≤0.5m
Communication method	Uart, serial port
Product measurements	17*38mm
Mounting orientation	Inclined installation
Mounting height	2-3m
Applicable scenes	It is applied in intelligent air conditioning to avoid direct air blowing to personnel. The air supply mode is adjusted depending on the distance of personnel.

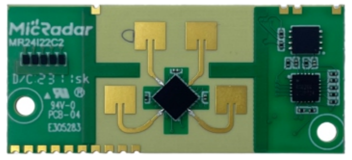


02

Counting & tracking radar

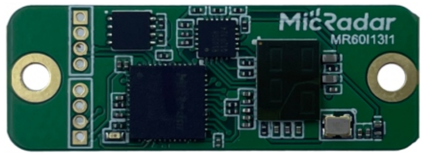
2.1 R24ETT1 Track linkage radar

Introduction	The R24ETT1 radar module employs 24G millimeter-wave radar technology to realize human existence sensing, breath & sleep sensing, real-time trajectory tracking, gesture recognition and other functions. It determines output by detailed states of people in the specific scenario such as their positions and whether they are asleep, and allows a variety of applications in combination with gesture recognition.
Functions	Tracking, people counting, gesture recognition, breath detection
Working frequency	24-24.25GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	1T4R (1 transmitter 4 receivers equivalent to 2 transmitters and 2 receivers)
Working voltage	5V
working current	≤110mA
Output power	6dBm
Detection direction	100° horizontally, and 60° vertically
Triggering distance	≤ 5 m
Sleep distance	≤ 5 m
Number of detected persons	3 persons
Communication method	Uart, serial port
Product measurements	≤17*38mm
Mounting orientation	Horizontal
Applicable scenes	Used for home automation such as switches, central console wakeup, person trajectory tracking, and light follow-ups.



2.2 R60ATT1 Multi-person track radar

Introduction	The R60ATT1 radar module employs 60G millimeter-wave radar technology to realize sensing of states for multiple targets at the same time and detection of real-time angle variation and distance. It tracks trajectories of multiple targets in real time within the detection range of specific places, and can locate the coordinates of persons that stay still.
Functions	Multi-person trajectory tracking, people counting, target static position locking
Working frequency	61-61.5GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	1T3R (1 transmitter 3 receivers)
Working voltage	5V
Working current	≤110mA
Output power	6dBm
Detection direction	100° horizontally, and 80° vertically
Triggering distance	≤ 5 m
Static distance	≤ 4 m
Number of detected persons	3 persons
Communication method	Uart, serial port
Product measurements	≤12*30mm
Mounting orientation	Horizontal/inclined
Applicable scenes	Real-time tracking of multi-person trajectories, and output of static coordinates. Applicable for appliance linkage for advertising machines, ACs, etc. and area security.



2.3 R60AMP1 Multi-person track

Introduction	The R60AMP1 radar module employs 60 G millimeter-wave radar technology to realize sensing of states for multiple targets at the same time and detection of real-time angle variation and distance. It tracks trajectories of multiple targets in real time within the detection range of specific places, and can locate the coordinates of persons that stay still.
Functions	Tracks trajectories of multiple targets in real time
Working frequency	61-61.5GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	1T3R (1 transmitter 3 receivers)
Working voltage	5V
working current	⩽110mA
Output power	6dBm
Detection direction	100° horizontally, and 100° vertically
Triggering distance	⩽ 5 m
Static distance	⩽ 4 m
Number of detected persons	3 persons
Communication method	Uart, serial port
Product measurements	⩽35*31*7.5mm
Mounting orientation	Horizontal
Applicable scenes	Applicable to appliance linkage and security management

2.4 R60APS1 People counting radar

Introduction	The R60APS1 radar module employs 60G millimeter-wave radar technology to scan the space and the movement track of people in the room through point cloud imaging technology, and perform people counting. This people counting product has incorporated the statistical functions of static and moving bodies.
Functions	People counting and position detection
Working frequency	61-61.5GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	1T3R (1 transmitter 3 receivers)
Working voltage	5V
working current	⩽110mA
Output power	6dBm
Detection direction	100° horizontally, and 100° vertically
Triggering distance	⩽ 5 m
Static distance	⩽ 4 m
Number of detected persons	7 persons
Communication method	Uart, serial por t
Product measurements	⩽35*31*7.5mm
Mounting orientation	Horizontal
Applicable scenes	Applicable to appliance linkage and security managemen

2.5 R60ATR1 Single track radar (top loading)

Introduction	The R60ATR1 radar module employs 60G millimeter-wave radar technology to realize sensing of states for a moving body and detection of real-time angle variation and distance. It reports the states of persons within the specific places and can sense remotely the real-time positions and trajectories.
Functions	Existence/inexistence, Active/still, Real-time orientation and distance of a single person
Working frequency	61-61.5GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	1T3R (1 transmitter 3 receivers)
Working voltage	5V
working current	≤110mA
Output power	6dBm
Detection direction	100° horizontally, and 100° vertically
Triggering distance	≤ 3 m (diameter)
Static range	≤ 3 m (diameter)
Communication method	Uart, serial port
Product measurements	≤35*31*7.5mm
Mounting orientation	Top loading
Applicable scenes	Used for fresh air system of home automation to realize wind oscillation to or away from persons

2.6 R60ATR2 Multi-person track radar (horizontal)

Introduction	The R60ATR2 radar module employs 60G millimeter-wave radar technology to realize sensing of states for a moving body and detection of real-time angle variation and distance. It can sense remotely the states of persons within the specific places, real-time positions, and trajectories.
Functions	Real-time output of target trajectories and the positions and distance of people
Working frequency	61-61.5GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	1T3R (1 transmitter 3 receivers)
Working voltage	5V
working current	≤110mA
Output power	6dBm
Detection direction	100° horizontally, and 100° vertically
Triggering distance	≤ 5 m
Static distance	≤ 4 m
Communication method	Uart, serial port
Product measurements	≤35*31*7.5mm
Mounting orientation	Horizontal
Applicable scenes	Applicable to appliance powering and other scenarios, and can realize sound and wind follow-up for intelligent speakers, ACs, etc.

03

Babysitting radar

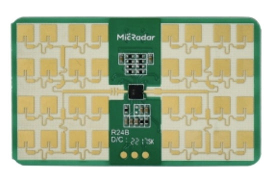
3.1 R60ABD1 Infant monitoring radar

Introduction	The R60BBD1 radar module employs 60G millimeter-wave radar technology. It reports the sleep status and history of babies in time based on the breath and heartbeat frequency output of babies in specific environments in combination with the sleep posture and body movement data collected over a long period of time.
Functions	Information outputs on breath & heartbeat, sleep quality, awakening/light sleep/deep sleep states, and going to bed/getting out of bed.
Working frequency	61-61.5GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	1T3R (1 transmitter 3 receivers)
Working voltage	5V
working current	≤110mA
Output power	6dBm
Detection direction	40° horizontally, and 40° vertically
Sleep distance	≤ 2 m
Distance of breath detection	≤ 1.5 m
Communication method	Uart, serial port
Product measurements	≤35*31*7.5mm
Mounting orientation	Inclined installation
Applicable scenes	Recognizes motion states specific to sleep care for babies, raises alarms for respiratory anomalies, and realizes smarter care with the help of the baby monitor.

04
Sleep monitoring radar

4.1 R24BBD1 Sleep monitoring radar

Introduction	The R24BBD1 radar module employs 24G millimeter-wave radar technology to monitor the characteristics of the time of falling asleep, respiratory intensity, snores, and apnea, so as to detect the apnea and heartbeat anomalies of people of different ages, and allow the guardians to be aware of their family's physiological status through data sharing.
Functions	Sleep monitoring, respiratory rate detection, sleep quality data output
Working frequency	24-24.25GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	1T1R (1 transmitter 1 receiver)
Working voltage	5V
working current	≤110mA
Output power	6dBm
Detection direction	40° horizontally, and 40° vertically
Sleep distance	≤ 1.5 m
Distance of breath detection	≤ 1.5 m
Communication method	Uart, serial port
Product measurements	≤46mm*27.5mm*7.5mm
Mounting orientation	Inclined installation
Applicable scenes	Outputs sleep state and provides daily monitoring over sleep. Applicable for hotels, bedrooms and other scenarios of sleep monitoring.

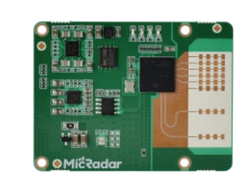


4.2 R60ABD1 Breath & sleep radar

Introduction	The R60ABD1 radar module employs 60G millimeter-wave radar technology to detect the subtle changes in the skin and calculate respiratory rate, heartbeat frequency, movement amplitude, and abnormal activities. It can also output sleep analysis reports based on continuous sensing.
Functions	Information on respiratory rate, heartbeat value, breath anomaly alarms, awakening/light sleep/deep sleep states, and going to bed/getting out of bed.
Working frequency	61-61.5GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	1T3R (1 transmitter 3 receivers)
Working voltage	5V
working current	≤110mA
Output power	6dBm
Detection direction	40° horizontally, and 40° vertically
Sleep distance	≤ 2 m
Distance of breath detection	≤ 1.5 m
Communication method	Uart, serial port
Product measurements	≤35*31*7.5mm
Mounting orientation	Inclined installation
Applicable scenes	Provides daily sleep monitoring for the elderly and people who live alone by constantly detecting human breath and motions, and gives warnings on anomalies.

4.3 R70ABH1 Breath & heartbeat radar (custom)

Introduction	The breath & heartbeat radar works in the millimeter wave band of 77GHz. It is a radar detection module that realizes real-time sensing and measurement of respiratory rate and heartbeat frequency by detecting the echoes reflected from the skin.
Functions	Real-time detection of respiratory rate and heartbeat frequency
Working frequency	77-78GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	2T4R (2 transmitters and 4 receivers)
Working voltage	5V
working current	≤300mA
Output power	10dBm
Detection direction	40° horizontally, and 20° vertically
Distance of detection	≤ 2 m
Communication method	Uart, serial port
Product measurements	≤60*45*5mm
Mounting orientation	Horizontal
Applicable scenes	Applicable for auxiliary health monitoring, health care monitoring, infant monitoring, and care for the elderly.



05
Fall alarm radar

5.1 R60AFD1 Fall alarm radar

Introduction	The R60AFD1 radar module employs 60G millimeter-wave radar technology and realizes posture recognition through point cloud imaging algorithm to present accurate detection of lying state. It can also perform accurate life detection and give accurate reports on the state of falling, time of lingering, and the state of staying still.
Functions	Fall alarm, prolonged staying alarm, privacy protection, staying time recording
Working frequency	61-61.5GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	1T3R (1 transmitter 3 receivers)
Working voltage	5V
working current	≤110mA
Output power	6dBm
Detection direction	100° horizontally, and 100° vertically
Triggering range	≤ 4 m (diameter)
Fall detection	≤ 3 m (diameter)
Communication method	Uart, serial port
Product measurements	≤35*31*7.5mm
Mounting orientation	Inclined/Top
Applicable scenes	Judges postures through point cloud data. Applicable for care for the elderly, fall detection, alarms for falling down from beds.

5.2 R60BFD1 Fall Detection Radar

Introduction	The R60BFD1 radar module employs the 60G millimeter-wave radar technology to sense human body motions and postures, thereby realizing fall monitoring. Based on the FMCW radar system, the module can realize wireless sensing of personal status in specific places, and timely report fall states of people, or stay-still alarms upon prolonged state of remaining still.
Features	Posture recognition, area setting, fall alarm, prolonged staying alarm, motion amplitude output, staying time recording
Working frequency	60-62GHz
Work mode	FMCW (frequency modulated continuous wave)
Type of antenna	AIP on-chip antenna 4T4R (four transmitters and four receivers)
Working voltage	5V
working current	500mA
Output power	6dBm
Detection direction	100° horizontally, and 80° vertically
Motion detection distance	5m
Distance of staying still detection	3m
Fall detection distance	3m
Communication method	Uart, serial port
Product measurements	40*25mm
Mounting orientation	Inclined installation
Applicable scenes	It is applicable to detecting the fall of the elderly in small areas, such as bathrooms, toilets, kitchens, etc.

MicRadar

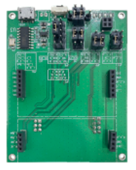
06
Development board

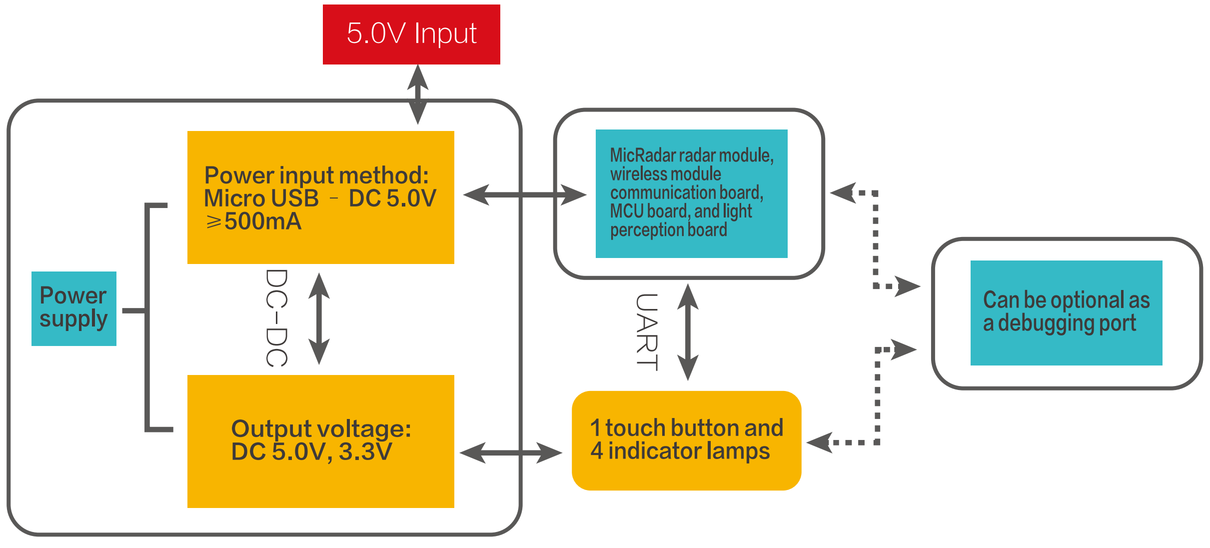
4.1 24G-RADAR-EVB

Introduction	24G-RADAR-EVB is the very first demo board of Micradar designed specifically for 24G radar modules. To give the customers easier and more direct access to the performance of radar modules and faster connection to the wireless general modules, the radar and the communication modules are designed pluggable, so that the customers can create their own service platform freely. Interfaces for MCU boards are also provided, allowing the customers to communicate with the radar and the wireless modules with their own MCUs.

Functions	**Firmware engineers of vendors:**	Preliminary development and debugging of embedded programs with 24G-RADAR-EVB
	Makers:	Implements hardware demos with 24G-RADAR-EVB, and performs project development with the help of the communication module.
	Technophiles:	Experiences the theory of radar operation, output parameters and interface protocols with 24G-RADAR-EVB

Power input method	Micro USB - DC 5.0V ≥500mA
Output voltage	DC 5.0V, 3.3V
TTL serial port	Can be optional as a debugging port
Functions board interfaces	MicRadar radar module, wireless module communication board, MCU board, and light perception board
Others	1 touch button and 4 indicator lamps

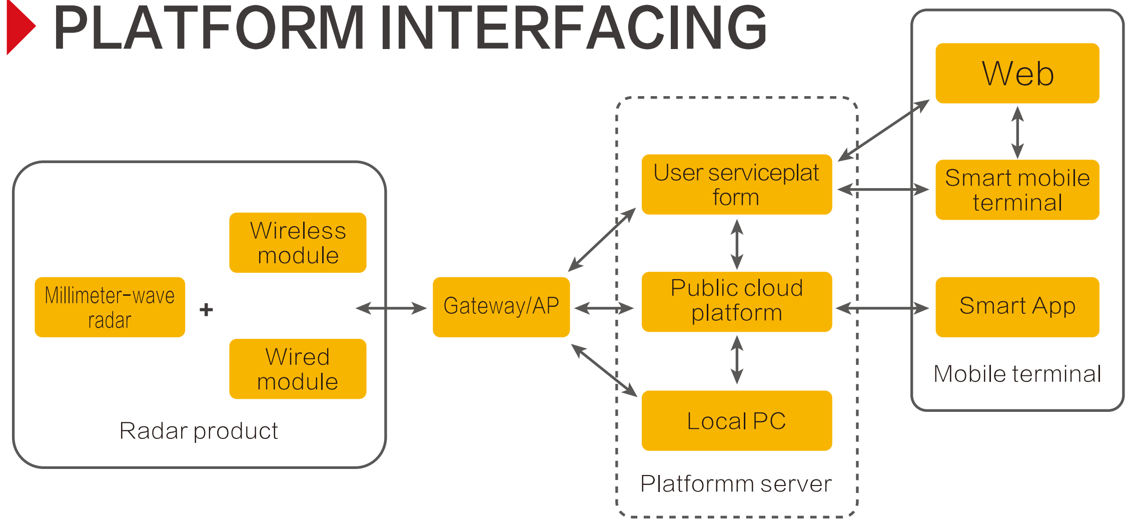




ADVANTAGES OF MILLIMETER-WAVE RADARS

High precision	Higher measurement precision on speed, distance, angles, etc. Capable of measuring motion amplitude down to 0.1 mm.
Adaptability to environments	Immune to light, temperature, smog, etc.
Privacy protection	No collection of characteristic parameters. No involvement of cameras. No privacy disclosure.
Reliability	In compliance with applicable laws of China, and certified by FCC and Rohs
Cost-effciency	From low-end triggering applications to high-end multi-target recognition, all are realizable. High cost-efficiency, with high application extendibility.

PLATFORM INTERFACING



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Third-party service platforms
Standardized protocols for radar data formats and network communication
Examples of transmission: HTTP, MQTT

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Public cloud platforms
Tuya IoT, Alibaba Life IoT, and MIJA.
Tuya IoT: OEMs can mass-produce the whole set of schemes (Wi-Fi, Zigbee, and Cat1.)
Tuya IoT: Clout-to-cloud interfacing, and API calls.

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Custom services
Business evaluation on practicable and customizable platform schemes

TECHNICAL SUPPORT

User manual documents	providing product and user manuals for the modules and testing for trial use of module samples in typical applications.
Online technical support	Our application engineers will provide online technical supports
Test equipment	We have the test equipment developed for the series and the testing lines for mass production of self-developed products.
Customization agreements /application development	We customize agreements based on the needs of customers, and support partial development of applications