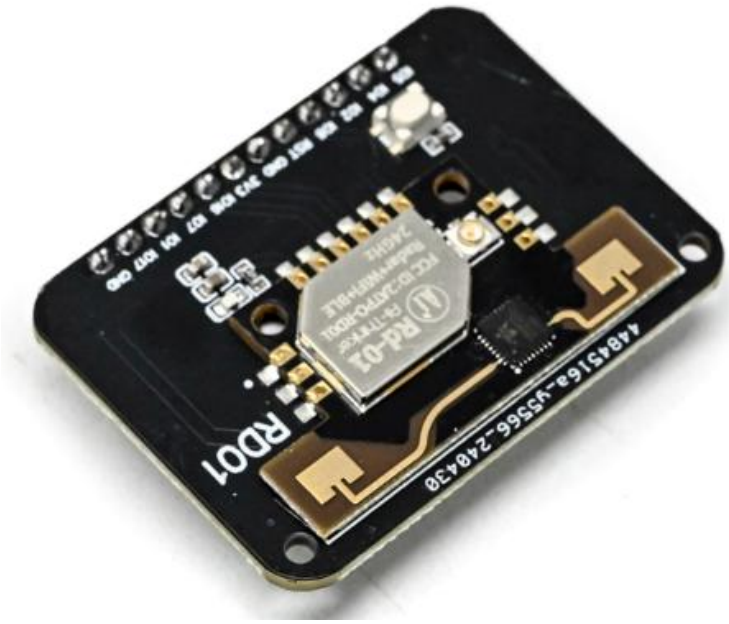
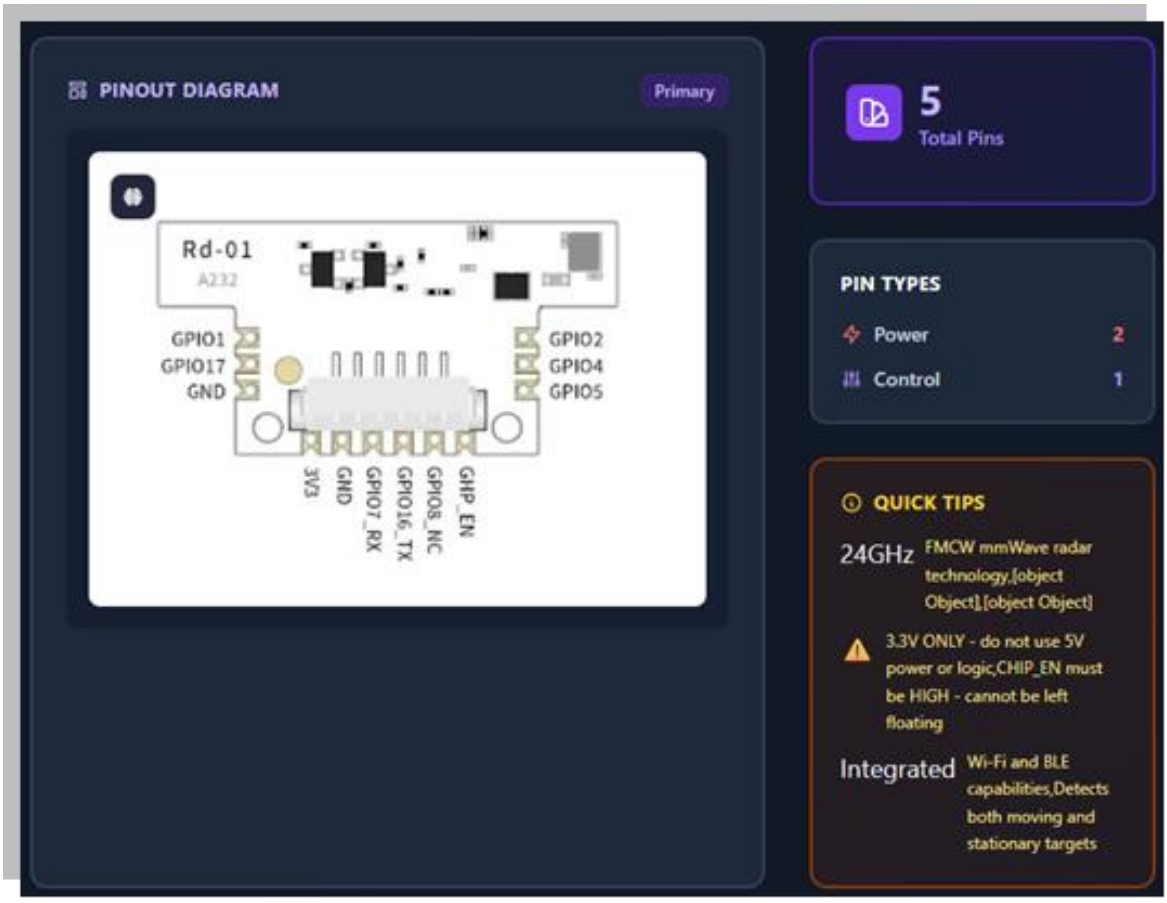
SmartElex Ai-Thinker RD-01 Radar Module



The SmartElex Ai-Thinker RD-01 Radar Module a 2.4GHz mmWave radar sensor designed for human presence detection. It utilizes FMCW (Frequency Modulated Continuous Wave) technology to detect both moving and stationary human targets within a range of up to 5 meters. The sensor integrates Wi-Fi and BLE capabilities, allowing for wireless configuration and data transmission. It supports UART communication for integration with microcontrollers. For more information,



Pin Descriptions

PIN NAME	TYPE	DESCRIPTION	NOTES
1 3V3	Power	Power input (3.3V ONLY). Do not exceed 3.6V.	⚠ 3.3V only - exceeding voltage will damage the module.
2 GND	Power	Ground reference. Must be shared with ESP32.	Common ground essential for signal integrity.
3 TX	UART	UART transmit pin. Outputs presence and motion data.	Connect to ESP32 RX pin (e.g., GPIO 16). 3.3V logic.
4 RX	UART	UART receive pin. Accepts configuration commands.	Connect to ESP32 TX pin (e.g., GPIO 17).
5 CHIP_EN	Control	Chip enable (active high). MUST be pulled HIGH for operation.	⚠ REQUIRED: Tie to 3.3V or control with GPIO. Cannot be left floating.

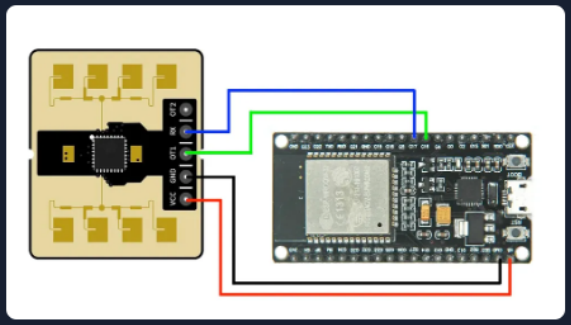
Interfacing with ESP32:

Wiring RD-01 to ESP32

To interface the RD-01 with an ESP32, connect 3V3 to 3.3V power, GND to ground, TX to GPIO 16 (RX2), RX to GPIO 17 (TX2), and CHIP_EN to 3.3V or a GPIO pin.

Visual Wiring Diagram

WIRING DIAGRAM — Recommended



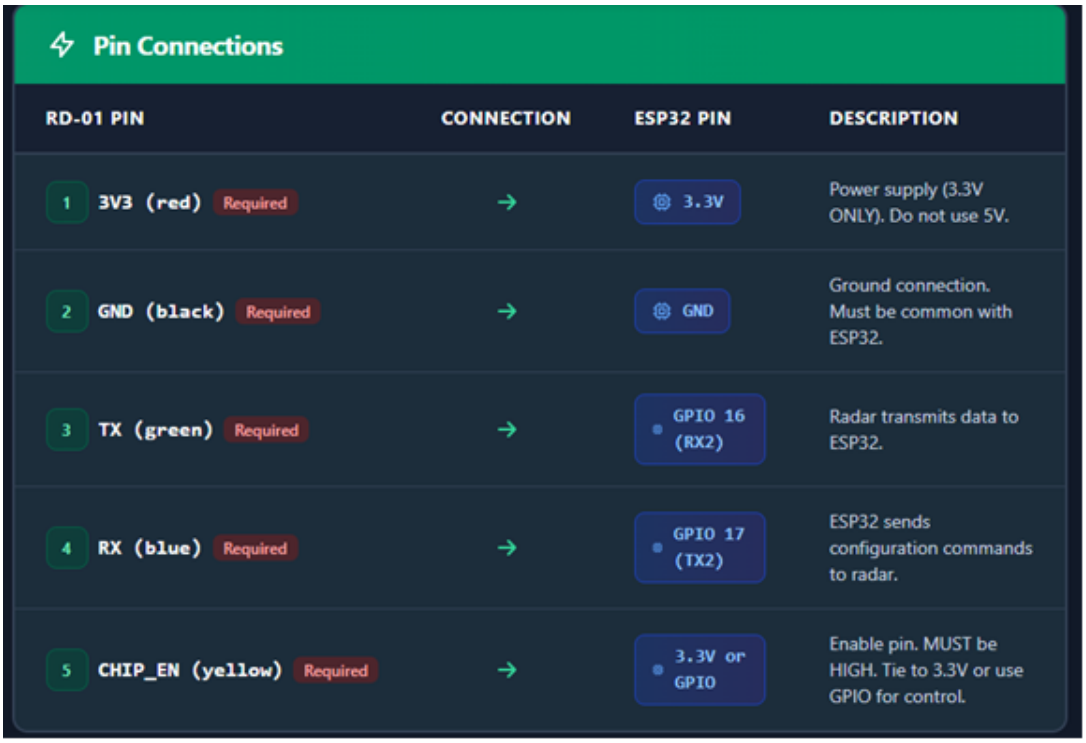
5 Connections

CONNECTION STATUS

Required 5

PROTOCOL

UART



GPIO Functionality:

No.	Name	Function
1,11	GND	Ground
2	GPIO17	GPIO17/SPI_MOSI/MISO/IIC_SDA/PWM_CH2/JTAG_TCK/TMS
3	GPIO1	GPIO1/SPI_MOSI/MISO/IIC_SDA/PWM_CH1
4	GPIO2	GPIO2/SPI_SS/IIC_SCL/PWM_CH2
5	GPIO4	GPIO4/SPI_MOSI/MISO/IIC_SCL/PWM_CH4/ADC_CH1
6	GPIO5	GPIO5/SPI_MOSI/MISO/IIC_SDA/PWM_CH0/ADC_CH4/JTAG_TMS/TCK
7	CHIP_EN	By default, it is enabled on the chip. The high level is valid
8	GPIO8	Bootstrap/GPIO8/SPI_MOSI/MISO/IIC_SCL/PWM_CH3
9	GPIO16	TXD/GPIO16/SPI_MOSI/MISO/IIC_SCL/PWM_CH1/JTAG_TMS/TCK
10	GPIO7	RXD/GPIO7/SPI_SCLK/IIC_SDA/PWM_CH2/JTAG_TDO/TDI
12	3V3	3.3V power supply; It is recommended that the output current of the external power supply be at least 500mA
Note: 1. GPIO8 is used as Bootstrap. The instant of power-on is high power level, and the module enters the burning mode; The power-on moment is at low power level, and the module starts normally.		

• RD-01 ESP32 – Quick Info

- Chip: **ESP32-WROOM-32**
- Wi-Fi + Bluetooth
- 3.3V logic
- UART programming
- BOOT button required for flashing

• Basic Hardware Connections (USB-TTL)

USB-TTL	RD-01
3.3V	3V3
GND	GND
TX	RX
RX	TX
EN	3.3V (via 10k or direct)
IO0	GND (only while flashing)

Important

- Use **3.3V only**
- Pull **IO0 to GND** while uploading
- Release IO0 and reset after upload

- # Arduino IDE Settings

- Board: **ESP32 Dev Module**
- CPU Frequency: **240 MHz**
- Flash Mode: **QIO**
- Flash Size: **4MB**
- Upload Speed: **921600**
- Port: Your COM port

- # Common Problems & Fix

Problem	Solution
Upload stuck	Hold **BOOT**, press **RESET**
No COM port	Install **CP2102 / CH340 driver**
Garbage serial	Set **115200 baud**
Reset loop	EN pin floating → pull up

Visit to Site :: https://en.ai-thinker.com/pro_view-125.html
YouTube Link : https://www.youtube.com/watch?v=kkJn8zxYC8Q