JMT LD2451

JMT LD2451 24G Vehicle Status Monitoring Sensor Module

Model: LD2451

User Manual

1. Introduction

The JMT LD2451 is a 24G radar module designed for vehicle status monitoring. It integrates a 1T2R (one transmit, two receive) RF transceiver channel, enabling accurate measurement of distance, speed, and orientation for multiple targets within its detection area.
This module is primarily utilized in applications such as high-speed intersections, non-motorized lanes, motorized lanes, and intelligent driving scenarios to detect the status of rear vehicles.

Key Features:

- **Frequency:** 24G-24.25GHz
- **Sweep Bandwidth:** 250MHz (meets CE/FCC certification standards)
- **Modulation Mode:** FMCW (Frequency Modulated Continuous Wave)
- **Detection Angle:** ±20 degrees
- **Detection Distance:** Maximum sensing distance of 100 meters
- **Data Format:** Serial port ASCII output, GPIO level output

2. Technical Specifications

Parameter	Value
Frequency	24G-24.25GHz
Sweep Bandwidth	250MHz
Modulation Mode	FMCW
Power Requirement	5V (Typical) / >300mA

Exterior Dimension	35×70mm
Detection Angle	±20°
Detection Distance	Max 100m
Environment Temperature	-40°C ~ +85°C
Data Format	Serial port ASCII output, GPIO level output
Package	Default 2.54mm x 6Pin
Item Weight	0.705 ounces
Package Dimensions	3.94 x 3.15 x 1.97 inches

3. Setup and Installation

This section provides general guidelines for setting up the LD2451 module. Specific application requirements may vary.

3.1. Module Overview

The LD2451 module features a compact design with a 2.54mm x 6Pin interface for power and data communication.

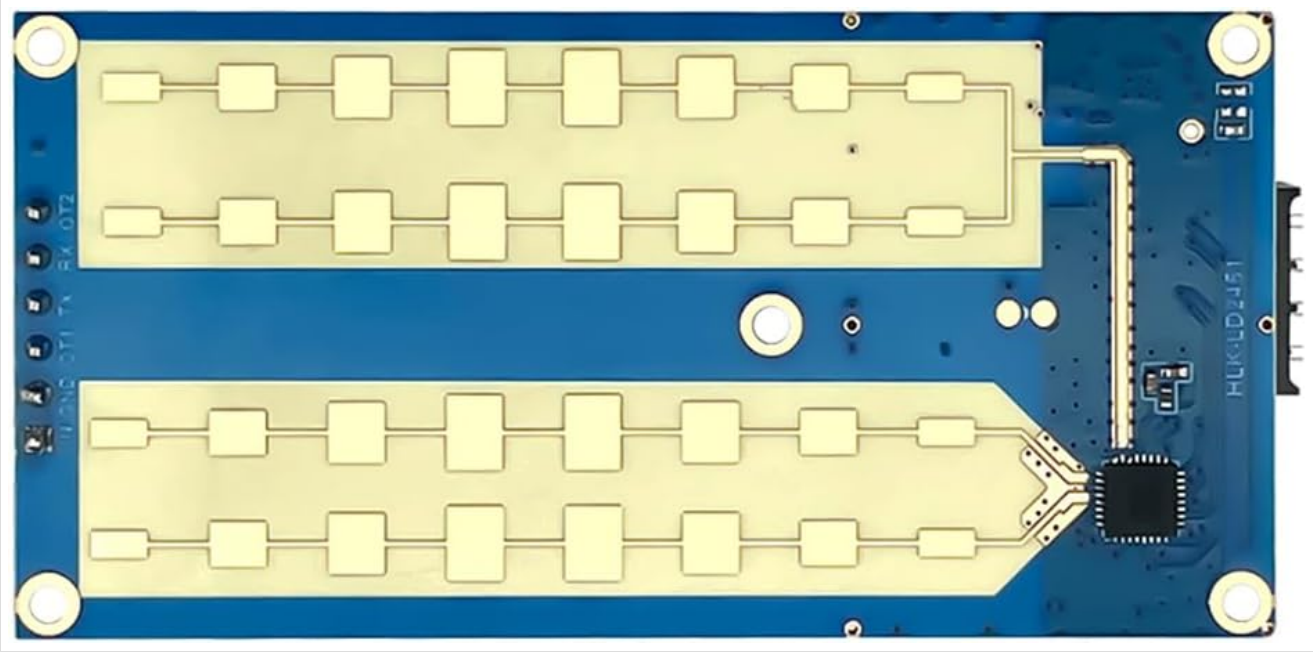

Figure 1: Top view of the JMT LD2451 radar module, illustrating the antenna array and the main integrated chip. This view highlights the compact form factor and the layout of the radar elements.

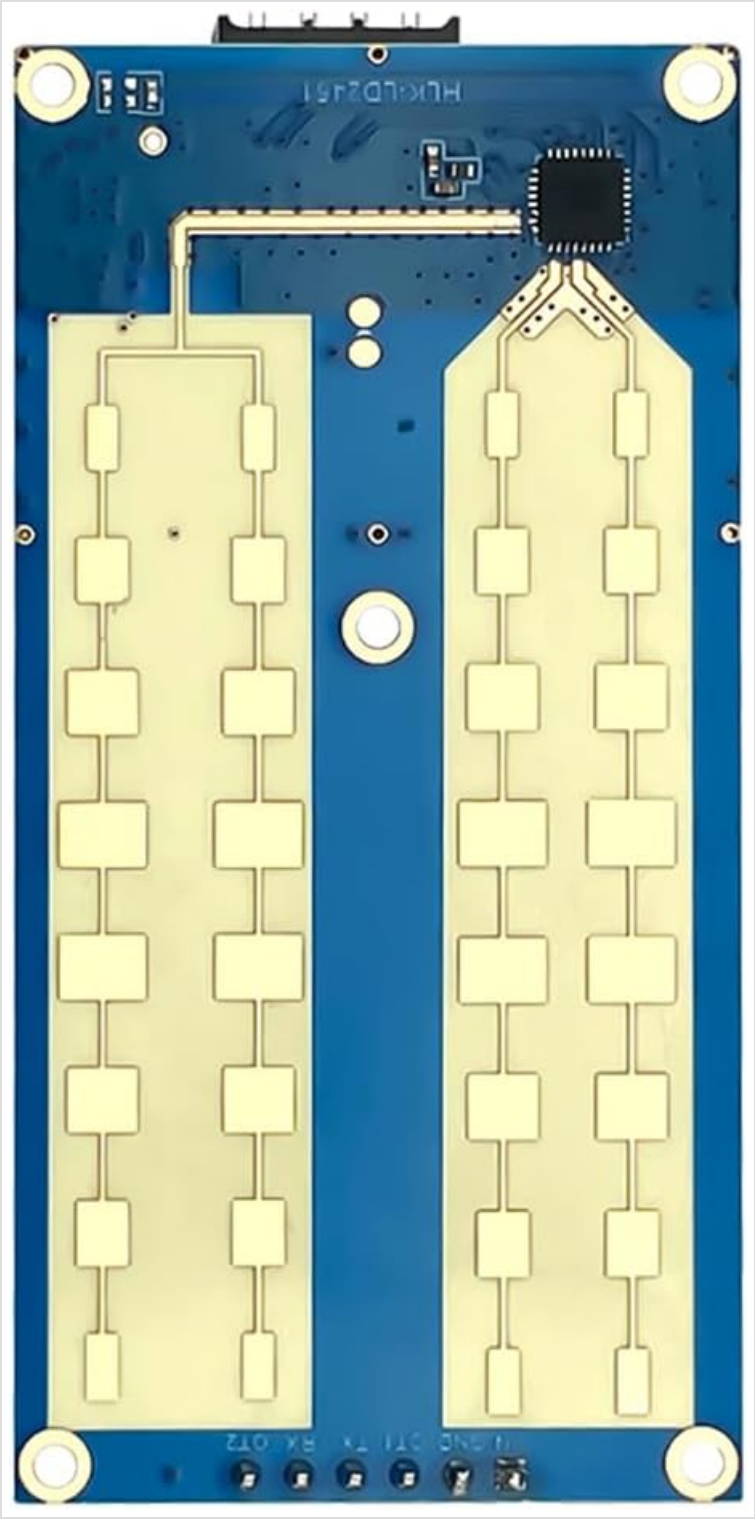

Figure 2: Side view of the JMT LD2451 radar module, displaying the pin header for electrical connections. This perspective helps in understanding the module's physical dimensions and connection points.

3.2. Power Supply Connection

- Connect a stable 5V DC power supply to the module. Ensure the power supply capacity is greater than 300mA to prevent operational issues.
- Observe correct polarity when connecting power. Refer to the module's pinout for specific VCC and GND pins.

3.3. Data Interface Connection

The module provides serial port (UART) and GPIO level outputs for data communication.

- **Serial Port:** Connect the module's TX (transmit) and RX (receive) pins to your host controller's corresponding RX and TX pins. Configure the serial port baud rate as per the module's default or specified settings (not

provided in current data, typically 9600 or 115200 baud).

- **GPIO Output:** For applications requiring simple status or trigger signals, utilize the GPIO output pins. Consult the module's datasheet for specific GPIO functions.

3.4. Mounting Considerations

- Mount the module securely in a location that provides an unobstructed view of the detection area.
- Ensure the module is protected from direct exposure to water, extreme vibrations, and physical impact.
- Consider the detection angle (±20°) when positioning the module to cover the desired area effectively.

4. Operation

Once properly powered and connected, the LD2451 module begins its radar sensing operations. The module continuously monitors the detection area for targets and outputs data via its configured interfaces.

4.1. Data Output

- **Serial Port (ASCII):** The module outputs target information, including distance, speed, and orientation, as ASCII strings via the serial port. A host controller (e.g., microcontroller, PC) can parse these strings for further processing.
- **GPIO Level:** Specific GPIO pins may change state (high/low) to indicate the presence of a target or other predefined events. Refer to the module's detailed protocol documentation for GPIO mapping and behavior.

4.2. Interpreting Data

The module's output data provides real-time information about detected vehicles. For example, in vehicle status monitoring, the data can be used to determine:

- **Distance:** How far away a vehicle is from the sensor.
- **Speed:** The relative speed of the vehicle towards or away from the sensor.
- **Orientation:** The angular position of the vehicle within the detection cone.

Detailed data protocols and parsing instructions are typically provided in the module's comprehensive datasheet or programming guide, which should be consulted for advanced integration.

5. Maintenance

The JMT LD2451 module is designed for reliable operation with minimal maintenance. Adhering to the following guidelines can help ensure its longevity and performance:

- **Keep Clean:** Ensure the module's surface, especially the antenna area, is free from dust, dirt, and moisture. Use a soft, dry cloth for cleaning. Avoid abrasive cleaners or solvents.
- **Environmental Protection:** Operate the module within its specified environmental temperature range (-40°C to +85°C). Protect it from extreme humidity and direct water exposure unless it is housed in a suitable enclosure.
- **Physical Handling:** Handle the module with care to avoid physical damage to the PCB, components, or connectors. Avoid bending or stressing the board.
- **Power Supply Stability:** Ensure the power supply remains stable and within the specified voltage range (5V). Fluctuations or incorrect voltage can damage the module.

6. Troubleshooting

If you encounter issues with your JMT LD2451 module, consider the following common troubleshooting steps:

6.1. No Power / Module Not Responding

- **Check Power Connection:** Verify that the 5V power supply is correctly connected to the VCC and GND pins and that the polarity is correct.
- **Power Supply Capacity:** Ensure your power supply can provide at least 300mA. Insufficient current can lead to erratic behavior or non-operation.
- **Physical Damage:** Inspect the module for any visible signs of damage, such as bent pins, cracked components, or burnt areas.

6.2. No Data Output

- **Serial Connection:** Double-check the TX/RX connections between the module and your host controller. Ensure TX connects to RX and RX connects to TX.
- **Baud Rate:** Confirm that the serial port baud rate on your host controller matches the module's configured baud rate.
- **Software Configuration:** Verify that your software or firmware is correctly configured to read data from the serial port or monitor GPIO states.
- **Obstructions:** Ensure there are no physical obstructions directly in front of the module's antenna that could block radar signals.

6.3. Inaccurate Readings

- **Mounting Position:** Review the module's mounting position and angle. Ensure it is stable and provides a clear line of sight to the detection area.
- **Environmental Interference:** While radar is robust, strong electromagnetic interference from other devices nearby could potentially affect performance.
- **Multiple Targets:** In scenarios with many targets, the module's processing capabilities might be challenged. Refer to the detailed protocol for multi-target handling.

For persistent issues, consult the official JMT LD2451 datasheet or contact JMT technical support.

7. Warranty and Support

7.1. Warranty Information

The JMT LD2451 module typically comes with a limited manufacturer's warranty covering defects in materials and workmanship. The duration and terms of the warranty may vary. Please retain your proof of purchase for warranty claims.
For specific warranty details, refer to the documentation provided at the time of purchase or contact JMT customer service.

7.2. Technical Support

For technical assistance, detailed datasheets, programming guides, or advanced integration queries, please visit the official JMT website or contact their technical support team. You can often find resources and contact information on the product's Amazon listing or the manufacturer's official site.

JMT Store Link: Visit the JMT Store on Amazon