# Grove - Doppler Radar (BGT24LTR11) - 24GHz Transceiver

**SKU** 109020021

The Grove – Doppler Radar is based on the BGT24LTR11 Silicon Germanium MMIC which is a 24GHz radar transceiver. It is driven by an XMC1302 MCU based on Arm® Cortex®-M0. This comes in a compact package and runs on very low power, providing high-precision measurements.

## Features

- The first radar-based sensor in the Grove Family
- Compact size for easy deployment
- Light-weight design, suitable for UAV applications
- Low power consumption for prolonged usage
- 24GHz Transceiver MMIC for high-precision measurements
- Fast response using electromagnetic waves
- ESD protection to avoid system failures caused by ESD strikes
- High penetration which allows it to be deployed behind an object
- Maintains operation through harsh weather conditions (temperature, light, dust, rain)

## Description

How would you build a system that could calculate the distance towards an object or detect whether there is motion present?

Normally you would use an Ultrasonic or LiDAR Sensor for distance measurement and PIR Motion Sensor for motion detection.

What if we told you there is an all-in-one module that could do all these functions more precisely and also perform functions such as velocity detection of moving objects and angle detection of objects. Would you believe it?

We were tired of using these traditional modules for motion-sensing applications and wanted to deliver you a better solution, integrating new technologies.

Well…For the first time in the history of Grove, we are very excited to bring you a Grove Module based on Radar Technology!

This is the Grove – Doppler Radar.

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The high frequency of this module allows for high penetration though objects and therefore this module does not need to be exposed outside when deploying, but rather behind an object. This, in turn, is extremely useful in security systems. Also, this is able to operate in harsh weather conditions such as high temperatures, dust, and rain.

You can watch the Seeed Weekly Show video below to learn more about this product and other interesting products as well.

## How Does Doppler Radar Technology Work in This Module?

Doppler radar works by sending a beam of electromagnetic radiation waves from the transmitter (TX Antenna), with a precise frequency, at a moving object.

Once the electromagnetic radiation wave comes in contact with an object, it travels back towards the receiver (RX Antenna). However, when the wave got reflected from the moving object, the wave now has a different frequency compared to the original frequency, it emitted.

Then the change in this frequency can be used to calculate the velocity of the moving object.
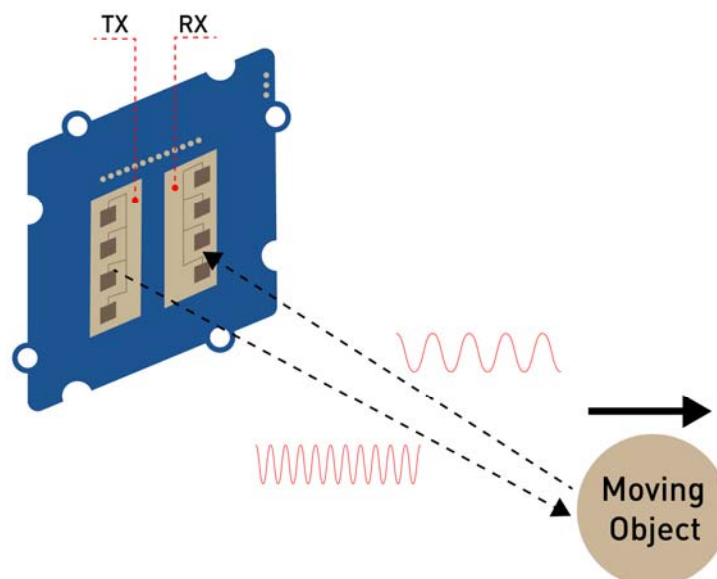
## More Possibilities for Advanced Users

The Grove – Doppler Radar module is designed so that the pinouts are broken out from the MCU and the MMIC to enable advanced users to tinker with this module.

Also, the onboard LED indicators can help users to identify whether the objects are moving towards or away from the module. When the object moves towards the radar, it indicates "NEAR" and when the object moves away from the radar, it shows "AWAY".
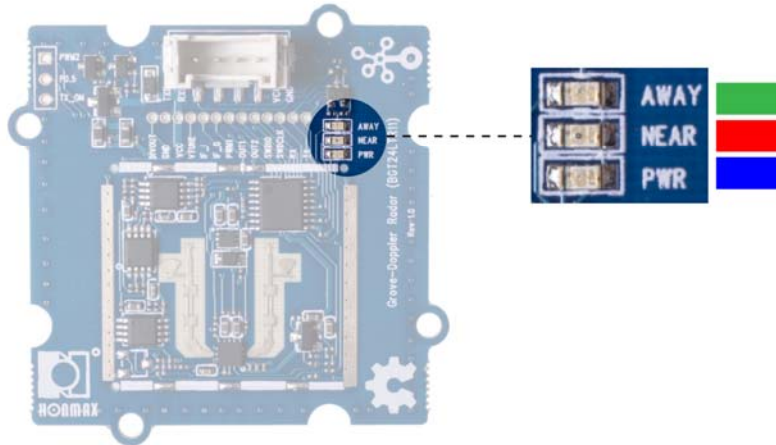


All in all, we believe that the Grove – Doppler Radar will open you to a whole new world of possibilities!

## Specifications

| MMIC | BGT24LTR11 |
|---|---|
| MCU | XMC1302 Arm® Cortex®-M0 |
| Transmission Frequency | Min: 24GHz |
| | Typical: 21.125GHz |
| | Max: 24.25GHz |
| Output Power (EIRP) | 7dBm @ 25°C |
| Update Time | 300ms |

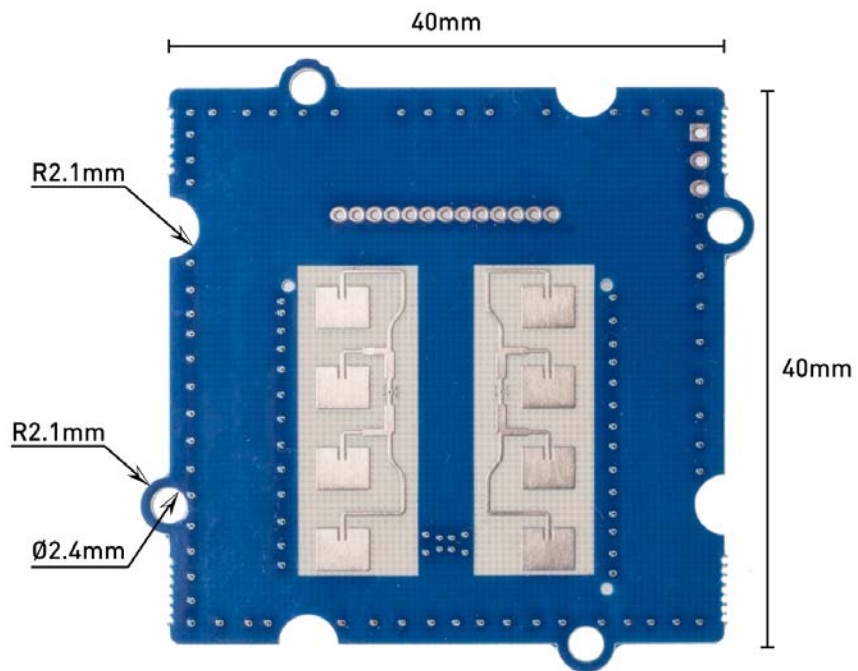| | |
|---|---|
| **Communication Interface** | UART (115200) |
| **Detection Distance** | 10m @ 0dBsm |
| **Standard Detection Field** | 65° / horizontal (-6dB) |
| | 22° / vertical (-6dB) |
| **Supply Voltage** | 3.3-5V |
| **Weight** | 5g |

## Applications

- Smart Home
- Smart Building
- Automatic Door
- Lighting Control
- Industrial Robotics
- Intruder Alarm Systems
- UAV

## Hardware Overview
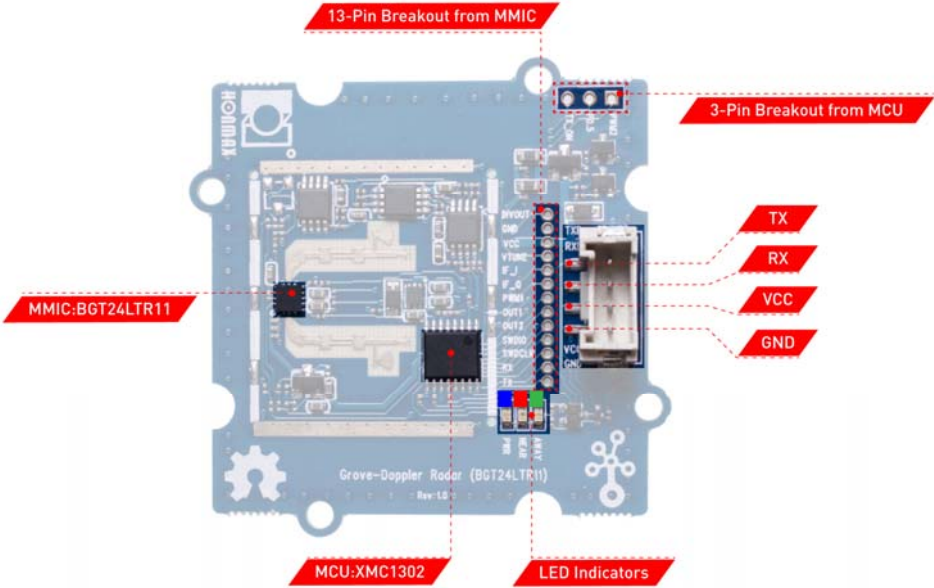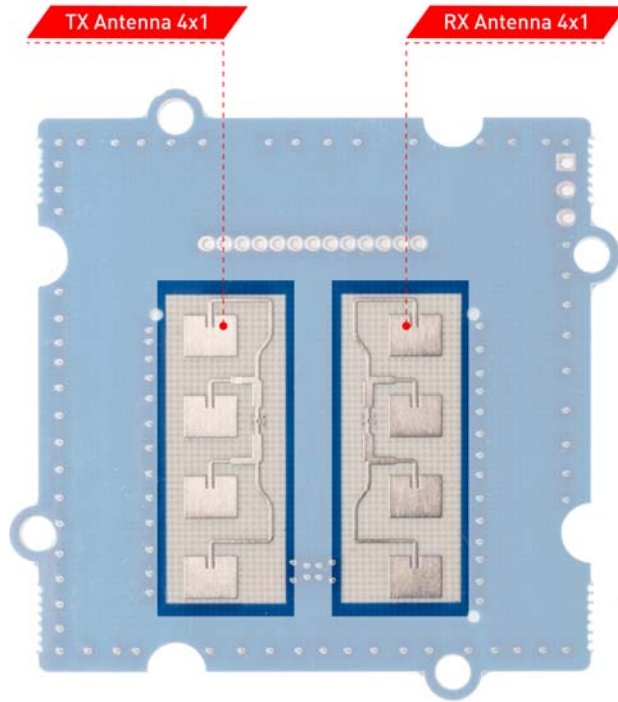
Dimensions



This product came into life with the joint efforts between Seeed Studio, Infineon Technologies, and Honmax Technology.

- Infineon Technologies: www.infineon.com
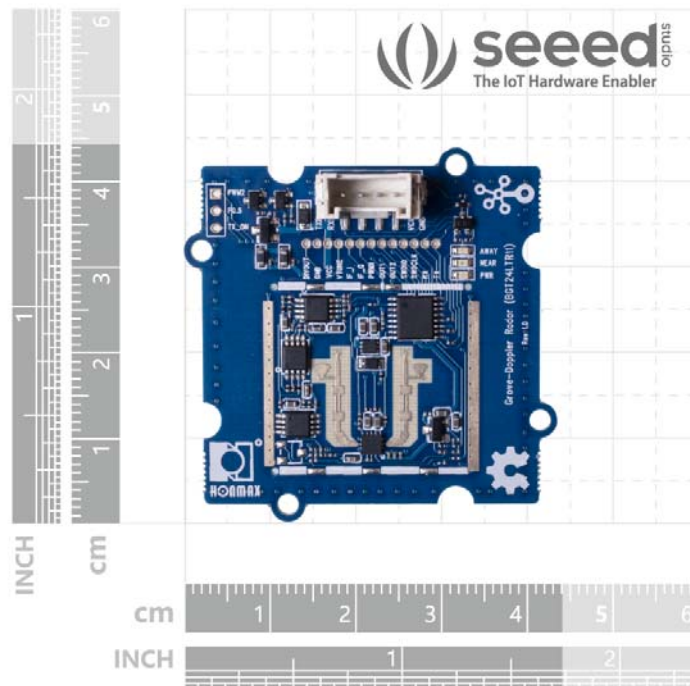- Honmax Technology: www.honmax.com.cn

Parts List

- 1 x Grove - Doppler Radar
- 1 x Grove Cable

## ECCN/HTS

| | |
|---|---|
| HSCODE | 8529905000 |
| UPC | |