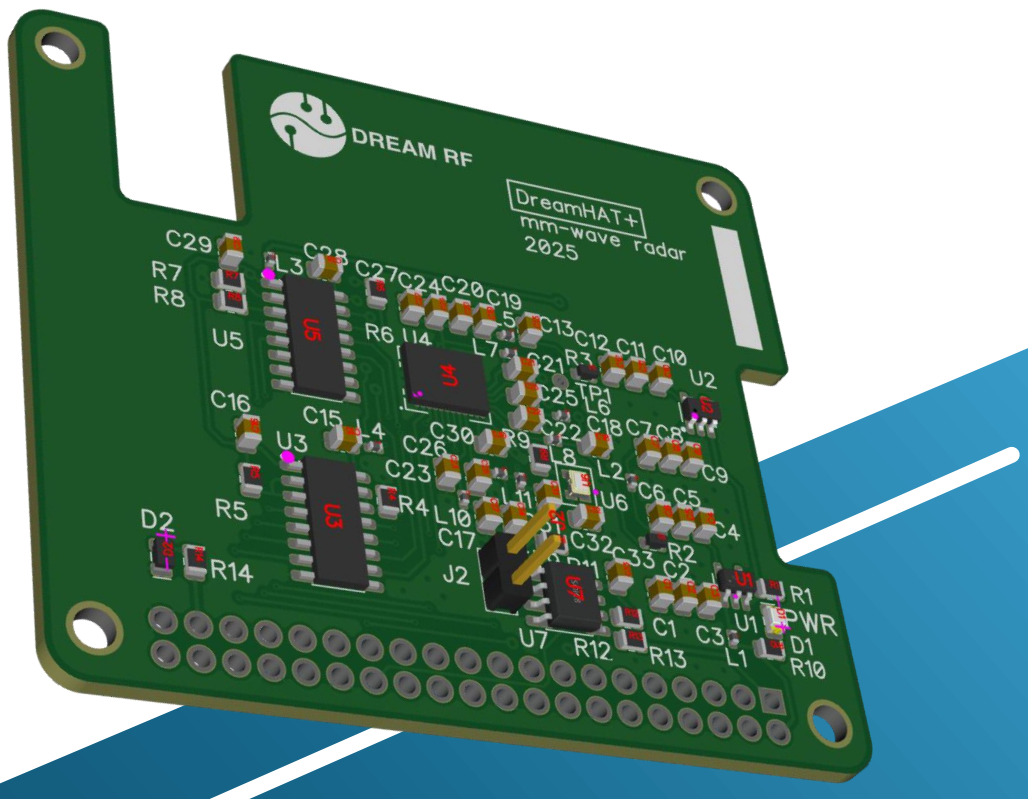
DREAM RF

DreamHat+ Radar

Product Brief

60 GHz mm-Wave Radar
For Raspberry Pi 4B and 5



www.dreamboards.co.uk

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Introducing the DreamHAT+ Radar

The 60 GHz mm-wave DreamHAT+ radar is a cutting-edge HAT+ breakout board designed to seamlessly integrate with Raspberry Pi 4B and 5, offering advanced ultra-wide band (UWB) frequency modulated continuous wave (FMCW) radar sensing capabilities in a compact and user-friendly package.

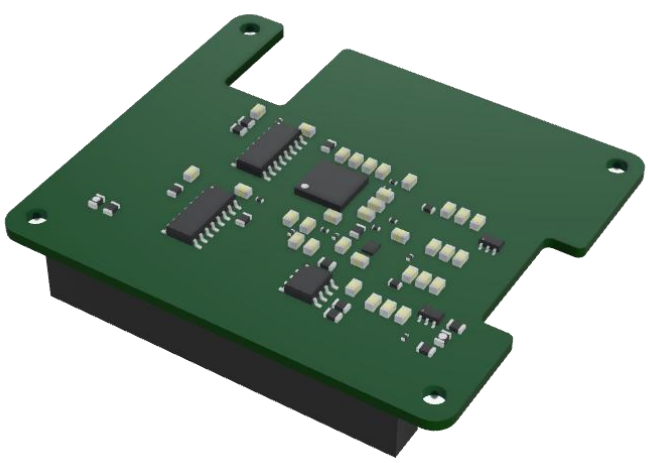
The DreamHAT+ is built around the Infineon BGT60TR13C radar MMIC with 4 integrated antennas on the chip (1 transmitting antenna and 3 receiving antennas) to offer directional sensing and motion tracking in a wide range of applications, from robotics and smart home automation to proximity monitoring and gesture recognition.

Compact, reliable, and intuitive, the DreamHAT+ empowers developers, engineers, and hobbyists to explore radar sensing technology with ease.

A New Standard for Radar Sensing Technology

By leveraging millimetre-wave FMCW radar technology, the DreamHAT+ achieves exceptional precision even in challenging conditions such as low light, smoky, and foggy environments where cameras fail.

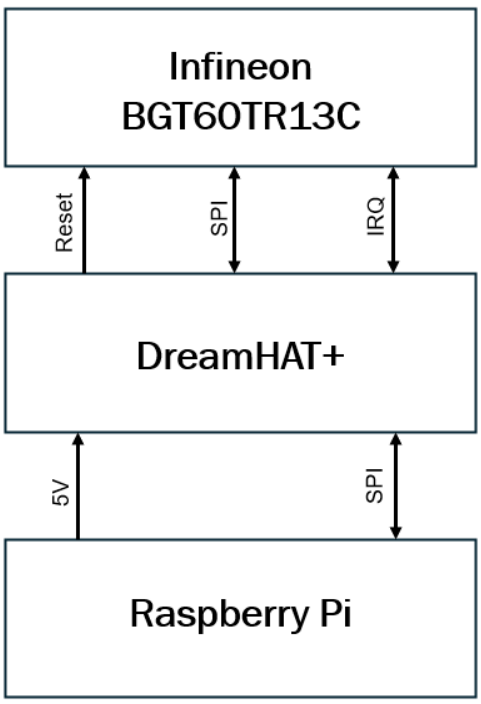
This HAT+ is particularly appealing to hobbyists looking to develop smart home applications, as well as professionals seeking reliable sensing solutions for production systems. By providing open-source libraries and detailed examples, it lowers the barrier to entry, enabling users to harness the power of radar technology without requiring specialised expertise.



Key Features

- **High-Resolution Sensing:** Achieve millimetre-level accuracy to detect objects, gestures, and movement. Perfect for dynamic environments requiring precise sensing.
- **Plug & Play:** Enjoy effortless integration within the Raspberry Pi ecosystem using the included open-source Python library. Also contains power and activity LEDs
- **Real-Time Data Processing:** Real-time data acquisition, processing, and visualisation in fast-changing conditions.
- **Advanced Features:** Leverage configurable sensing ranges up to 15 meters and various modes tailored for specific applications.
- **Ready to Deploy:** Accelerate your prototyping journey with provided sample code, examples, and comprehensive documentation.
- **IoT ready:** Low Power Consumption **(**~0.5W typical) makes it suitable for multicomponent operation and reduces thermal throttling.
- **Standardised Architecture:** Conforms to the Raspberry Pi HAT+ specification

Block Diagram

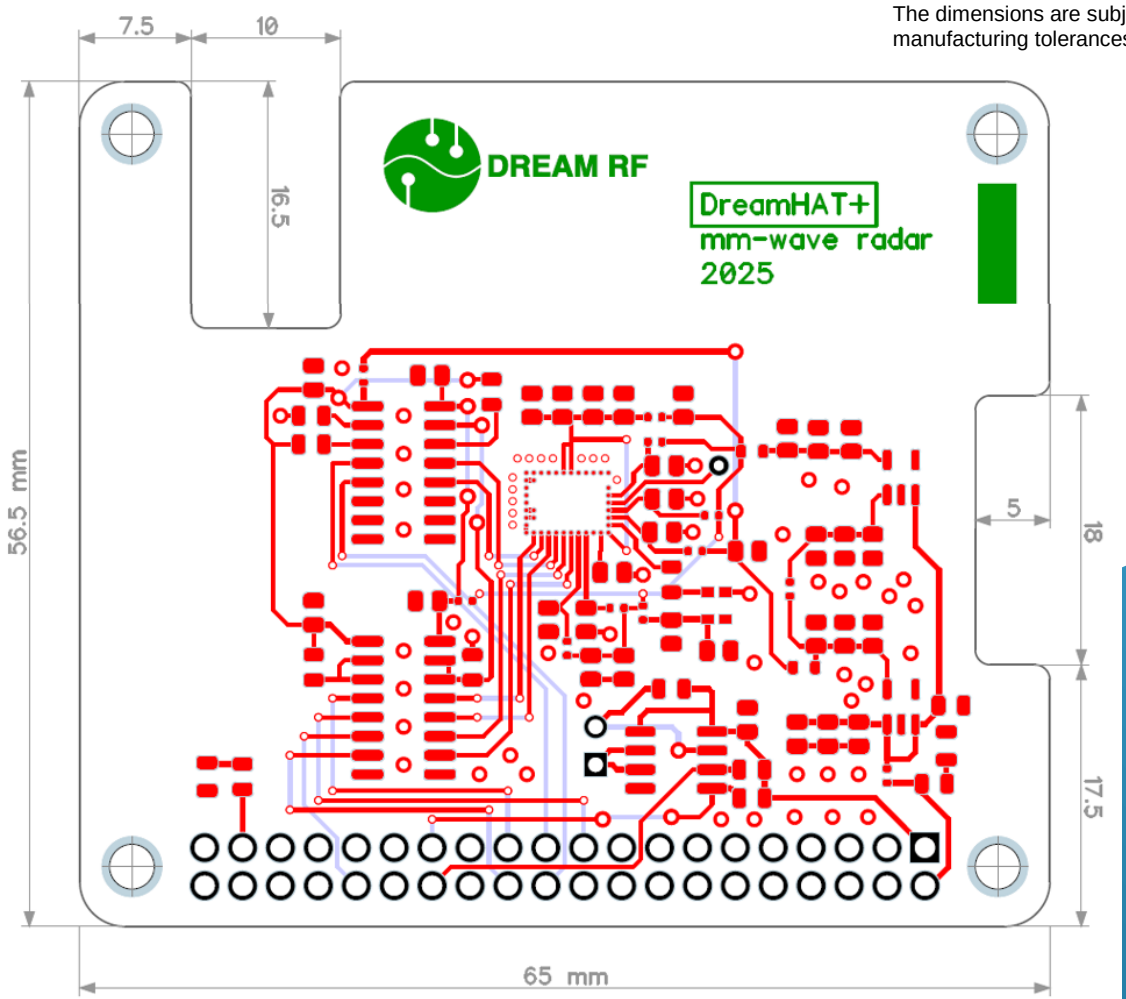


Pin Connections

Pin Number	Name	Description
2	5 V	Power supply input
19	MOSI	Master Out Slave In
21	MISO	Master In Slave Out
22	IRQ	Chip interrupt pin
23	SCLK	SPI clock input
24	CSN	Chip Select, active low
32	RST	Chip reset pin

Physical Specification

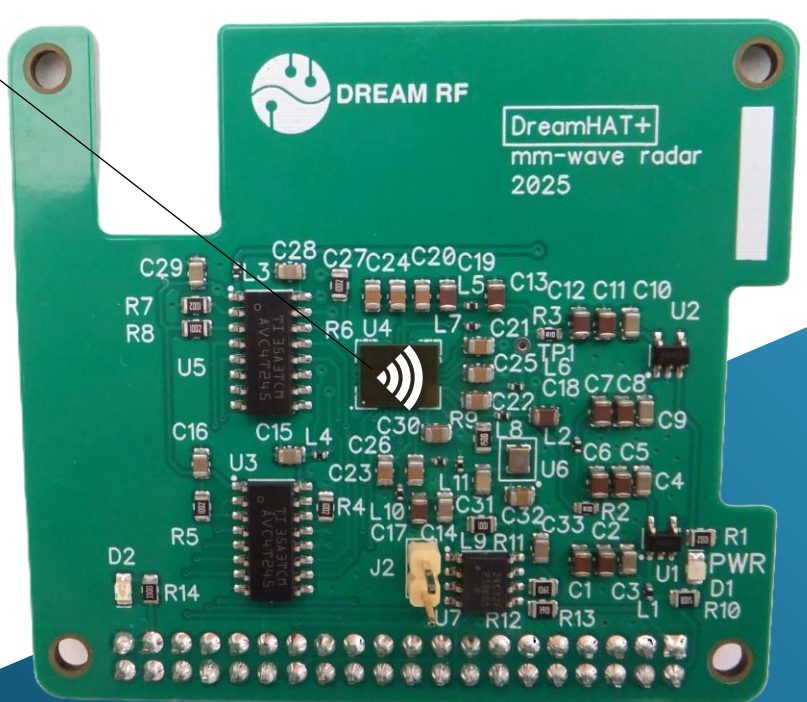
Note:
All dimensions in mm
The dimensions are subject to part and manufacturing tolerances



Radar Specifications

Operating Frequency	– 58 – 63.5 GHz
Transmission Bandwidth	– 5 GHz
Output Power	– <10 mW – EIRP: <15 dBm
Detection Range	– 0.1 – 15 m
Range Resolution	– 3 cm
Field of view	– 40° horizontal – 65° vertical
Analogue-to-Digital Converter (ADC)	– 3 ADC Channels – 12-bit resolution – 4 MSps
Integrated Antennas	– 1 Tx antenna – 3 Rx antennas – 5 dBi (max) gain

Infineon BGT60TR13C radar chip with 4 integrated antennas



Precautions

- **Compliance with Local Radio Regulations**

  Ensure that the use of the mm Wave radar development board complies with local radio frequency management regulations. Avoid interference with other mm Wave devices operating in the vicinity by adhering to the designated frequency bands and power limits.

- **Electrostatic Discharge (ESD) Protection**

  Avoid directly touching the components on the development board to prevent damage caused by electrostatic discharge (ESD). Always handle the board with care and consider using an anti-static wrist strap or working in an ESD-safe environment.

- **Heat Management and Safety**

  During operation, the Raspberry Pi and mm Wave radar development board may reach temperatures exceeding 60°C. Avoid touching the devices while they are powered on to prevent burns. Ensure adequate ventilation to mitigate overheating.

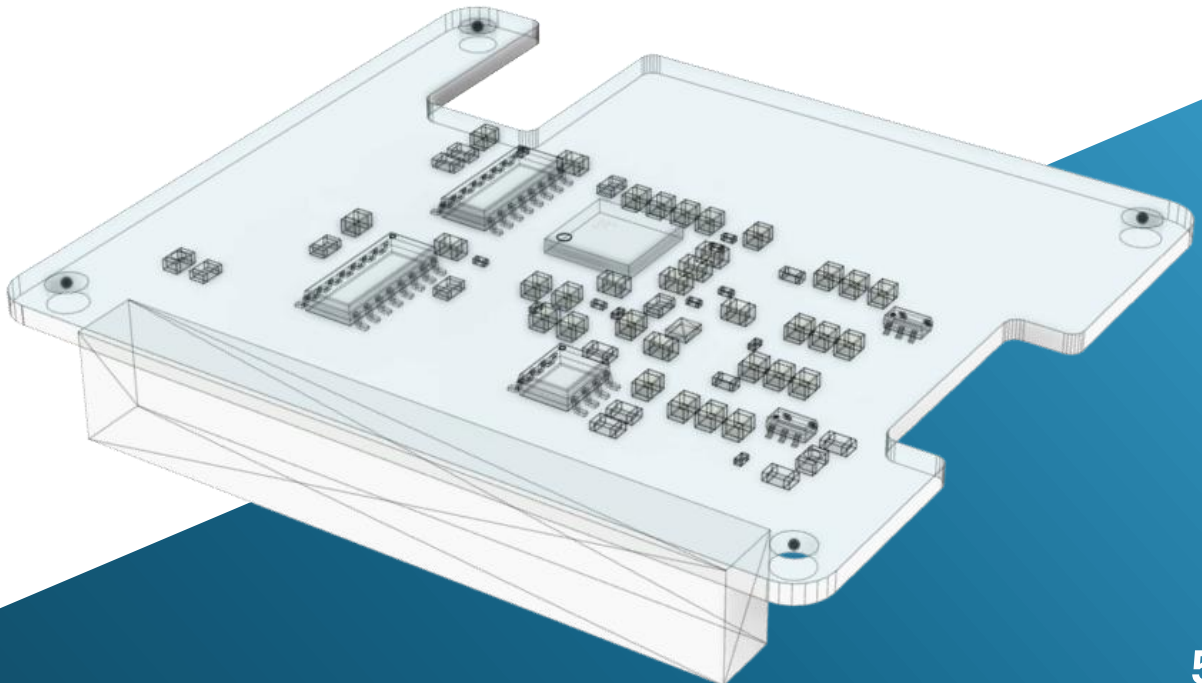
- **Use of Official Accessories**

  To ensure stable performance and avoid potential compatibility issues, please use official Raspberry Pi accessories. This includes, but is not limited to, power adapters, HDMI cables, keyboards, and mice.

Safety Instructions

To avoid malfunction or damage to this product, please observe the following:

- Do not expose to water or moisture, or place on a conductive surface whilst in operation.
- Do not expose to heat from any source; Raspberry Pi computers and the DreamHAT+ are designed for reliable operation at normal ambient temperatures.
- Take care whilst handling to avoid mechanical or electrical damage to the printed circuit board and connectors.
- Whilst it is powered, avoid handling the printed circuit board, or only handle it by the corners to minimise the risk of electrostatic discharge damage.



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