

OVERVIEW



The Radar HAT for the Raspberry Pi enables the popular Raspberry Pi to become a motion detector based on radar technology. This simple to use HAT mounts on all versions of the Pi. Example software in Python is provided.

The output of the Pi Radar HAT is a signal that is proportional to the speed of the detected object. An object can be detected at a distance up to 15m depending on the size and reflectivity of the target. The output of the Pi Radar HAT is 70Hz per m/s target velocity. A simple frequency counter algorithm on the Raspberry Pi gives the user the speed of the target.

LED indicators show when the Pi Radar HAT is running, monitoring for movement and has recently seen movement.

RADAR HAT FEATURES

A standard version and a more feature-rich versions are available.

STANDARD VERSION

- High Sensitivity - Sense moving objects up to 12-15 metres away.
- Sensitive in both horizontal and vertical planes.
 - -3dB beamwidth is
 - 72° in horizontal plane
 - 36° in vertical plane
- Utilises a Low-Power X-Band transceiver.
 - Operates in the unlicensed frequency bands.
 - Meets RED and FCC requirements (EN 300 440 v1.6.1 & FCC 15.245)
- Based on Doppler shift
 - Output Frequency proportional to the Speed of Object Detected

FEATURE-RICH VERSION

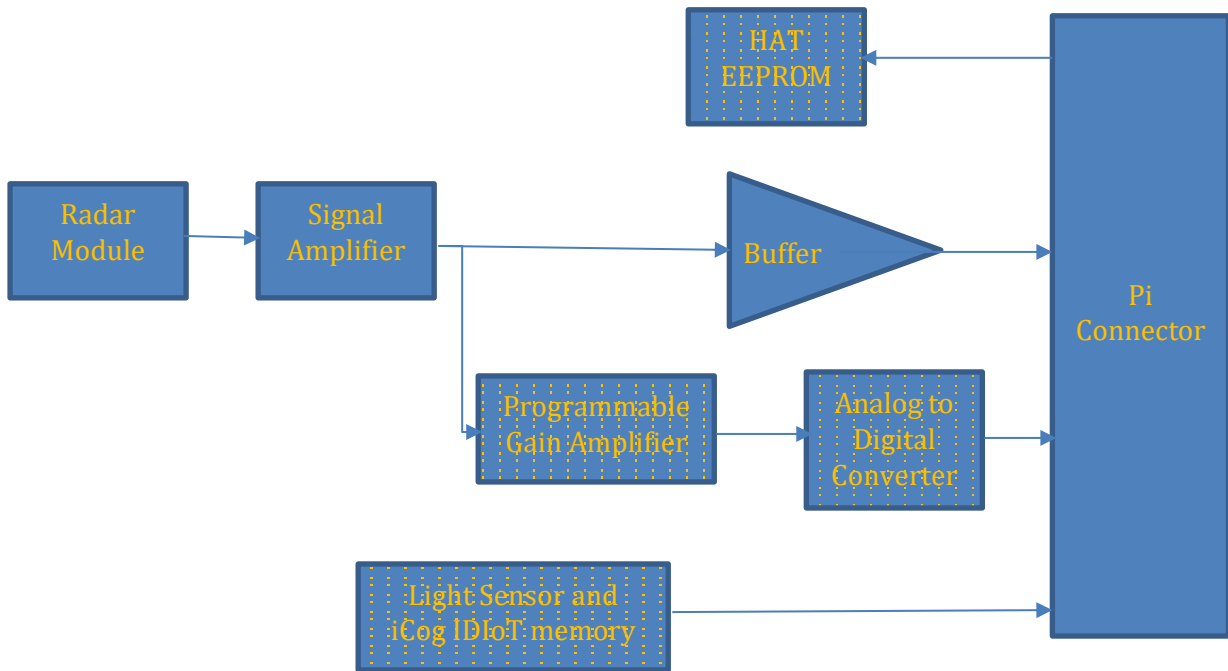
- Programmable Sensitivity.
- Optional Low-Pass Filter to remove noise or slow-moving objects from Detection.
- Sense Digital Signal for Coarse Movement Detection
- Analog-to-Digital Converter enables the Movement Sensing to be Digitised

- Generates the Raw Data Required for DSP Algorithms
- Fully Compliant with Raspberry HAT Specifications
 - Includes HAT Detection EEPROM
- Light Sensor

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FUNCTIONALITY



Note: HAT EEPROM, Programmable Gain Amplifier, Analog to Digital Converter, Light Sensor and iCog IDIoT memory are only available on the Feature-Rich version. These are shown with a dotted background.

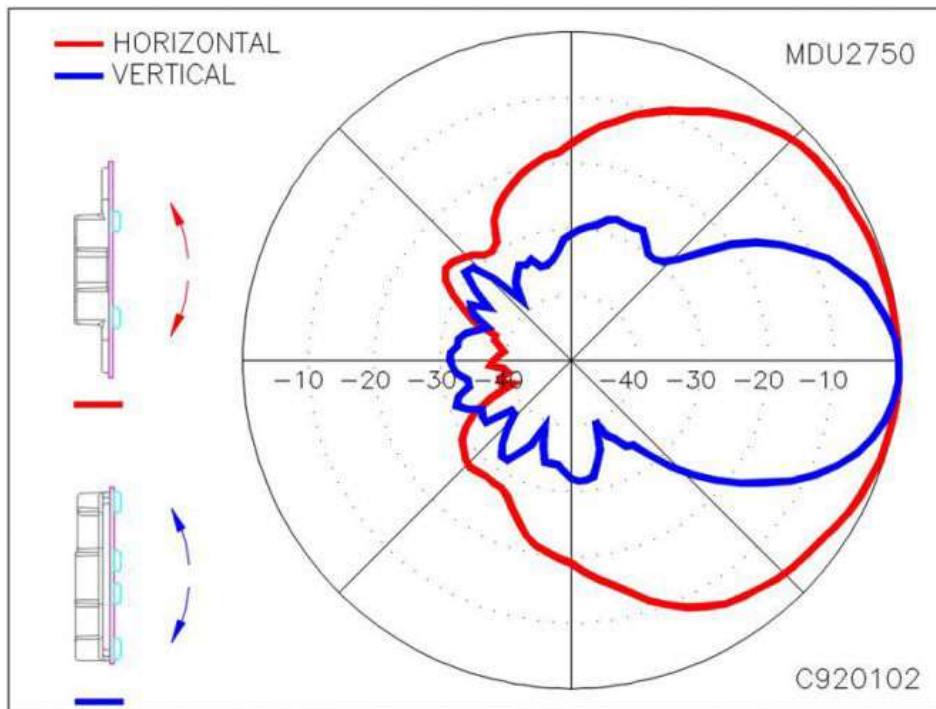
Functions shown with a solid background are available on all options.

SPECIFICATIONS

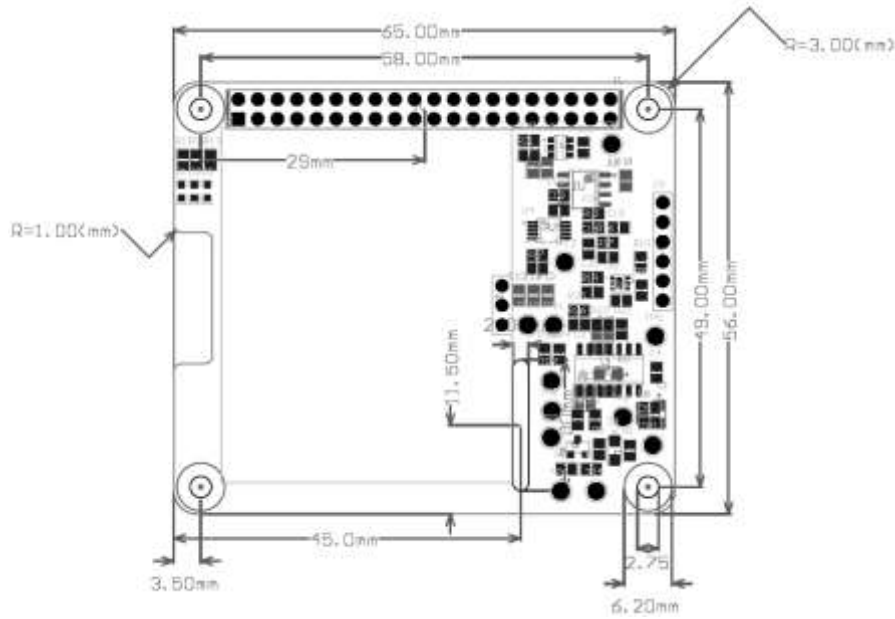
Parameter	Typical Value
Detection Range	10-15m
Output Signal	70Hz per m/s target velocity
Operating Current	50mA
Operating Temperature. Note: The Raspberry Pi may not be suitable for repeating over this temperature range.	-20°C to +55°C
Frequency Setting Accuracy	3MHz
Power Output (min)	
Min	10dBm EIRP
Max	13dBm EIRP

Harmonic Emissions	Less than -30dBm

COVERAGE PATTERN



DIMENSIONS AND PHYSICAL SIZE



ORDERING INFORMATION

There are a number of different frequencies that have been allocated in different parts of the world. To comply the right part number should be ordered for where the units will be operated. Note that units intended to operate in one territory can be used in other territories in a development/laboratory environment.

The radar modules meet various specifications for correct operation in the relevant territory. These are shown in the table below.

Part Number	Description	Comments
PiRadar-1	Radar HAT with operating frequency of 10.587GHz suitable for UK operation.	Meets RE Directive (RED)
PiRadar-2	Radar HAT with operating frequency of 10.525GHZ suitable for operation in Belgium, Netherlands, Italy and USA	Meets RED and FCC Outdoor
PiRadar-3	Radar HAT with operating frequency of 9.90GHz suitable for operation in France and Switzerland	Meets RE Directive (RED)
PiRadar-4	Radar HAT with operating frequency of ???GHz suitable for operation in Germany.	

REVISION HISTORY

Version	Date	Comment
V1.0	Oct 2018	First version.
V1.1	Oct 2018	Added more features of the radar sensor.
V1.2	Nov 2018	More information added to all sections.