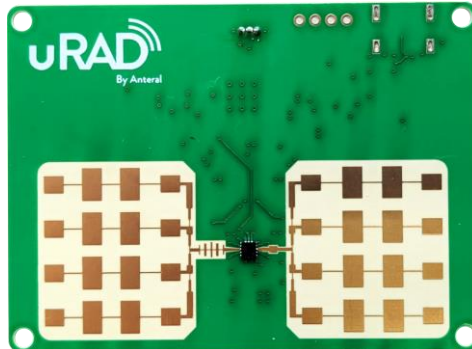


uRAD USB v1.2



Product Overview

uRAD, in its version uRADUSB12, is a tiny printed circuit board which actually is a completely functional microwave radar. Operating in the free emission 24 GHz ISM frequency band, uRAD has four different operation modes that are ease programmed with Python. You will be able to measure distance, velocity and other magnitudes of your surrounding world with great accuracy. Moreover, uRAD connects with any Android device, Windows, MAC or Linux computers, or any device with USB connector. Furthermore, it also has one UART channel accessible as an alternative connection. The Python libraries are open which facilitates the integration with other sensors creating more complete and complex projects. Connect uRAD and unleash the power of radar systems in your hands.

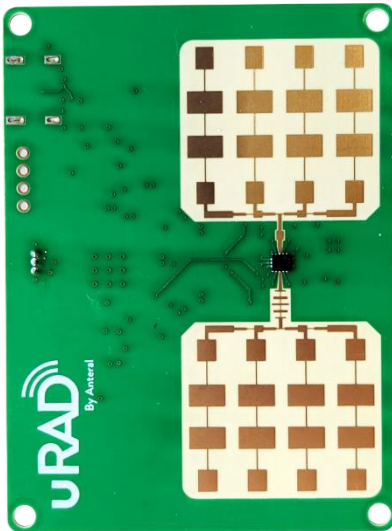
Applications

uRAD is conceived as an evaluation platform to develop new and innovative applications or endowing intelligence to other common objects, supported by the power and ease of Python. Thanks to uRAD, you will be able to develop and create new applications as vibration sensors, distance and speed meters, vital signs controllers, movement sensors, etc.

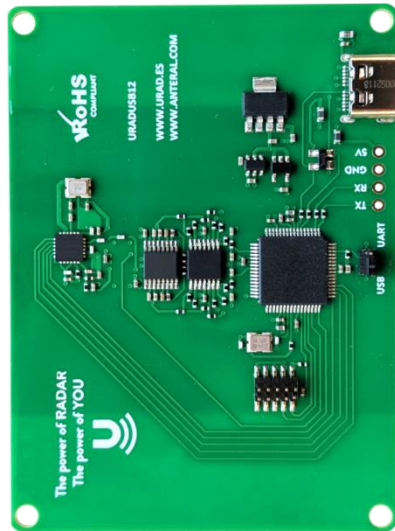


Technical Specifications

Finish



Top view

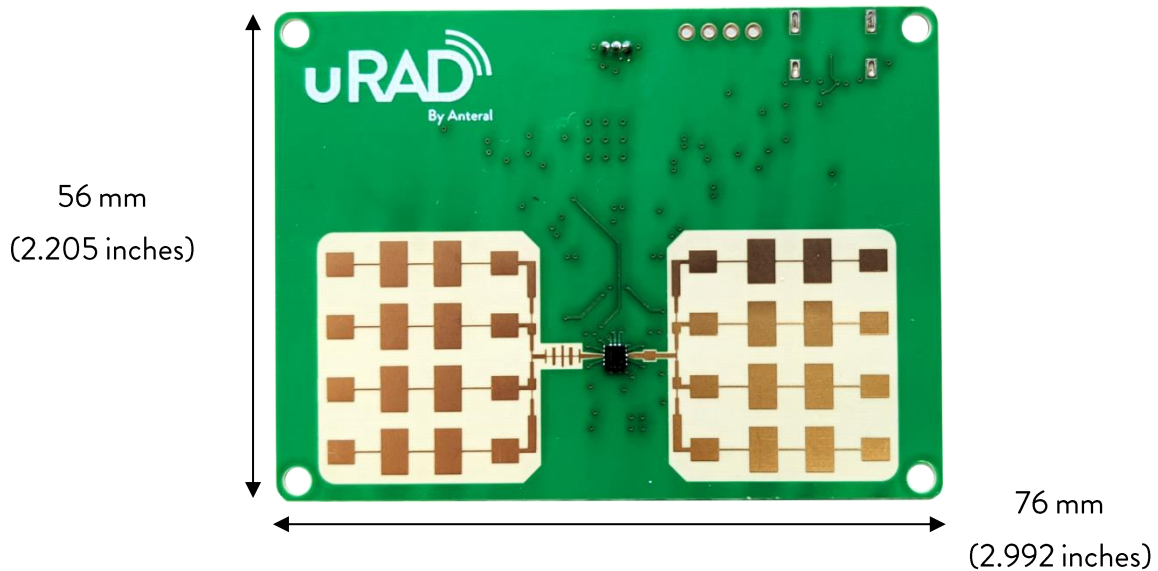


Bottom view



Side view

Size and Weight



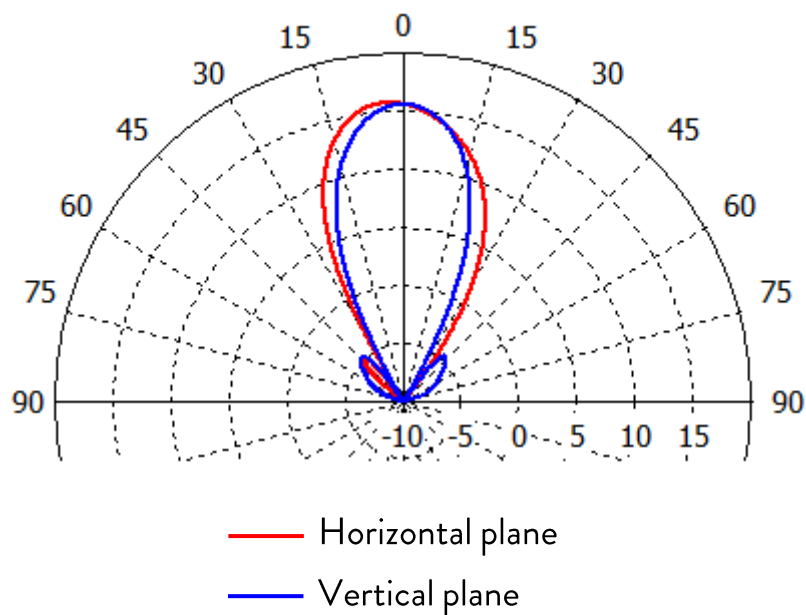
Thickness: 5 mm (0.197 inches)

Weight: 8 grams (0.282 ounces)

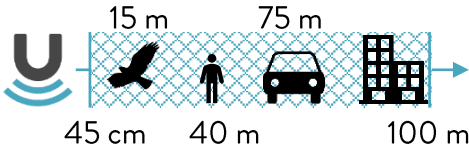

Characteristics

Parameter	Min.	Typ.	Max.	Unit	Notes
Operating conditions					
Supply voltage	3.5	5	10	V	5V powered by USB
Supply current		170		mA	
Operating temperature	-20		+65	°C	
RF Parameters					
Frequency bandwidth	24.005		24.245	GHz	ISM frequency band
Output power	16	18	20	dBm	EIRP (including antenna gain)
Antenna Gain		16.6		dB	4 x 4 array
Field of view		30 x 30		deg	
Side lobe levels	-19.8		-21.3	dB	

Antenna Radiation Pattern



General

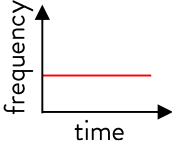
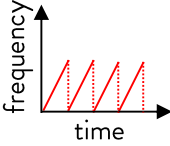
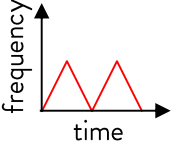

Range:	0.45 m up to 100 m (distance)	0 m/s up to ± 75 m/s (velocity)
		
Accuracy:	max. ± 0.04 m or 0.3% (distance)	± 0.05 m/s (velocity)
Update rate:	up to 38 measurements per second (depend on the mode)	
Modes of operation:	Doppler and Frequency Modulated Continuous Wave*	
Number of targets:	Up to 5 different targets can be detected	
Output data:	Distance, Velocity, SNR, Movement detector and RAW data*	
Compatible with:	Android devices, Windows, MAC, Linux computers any device with USB connector. Any controller with UART communication.	
Connector used:	USB-C female, 4-pins UART	
Communication:	via USB or UART	

* Further information available in the White Paper and the User Manual

Other

uRAD offers ad-hoc designs with different antenna patterns and making use of powerful microcontrollers or digital signal processors to comply with more demanding applications covering this way all the client/user requirements. Contact us at contact@urad.es if you want to know more about these additional services.

Performance Characteristics

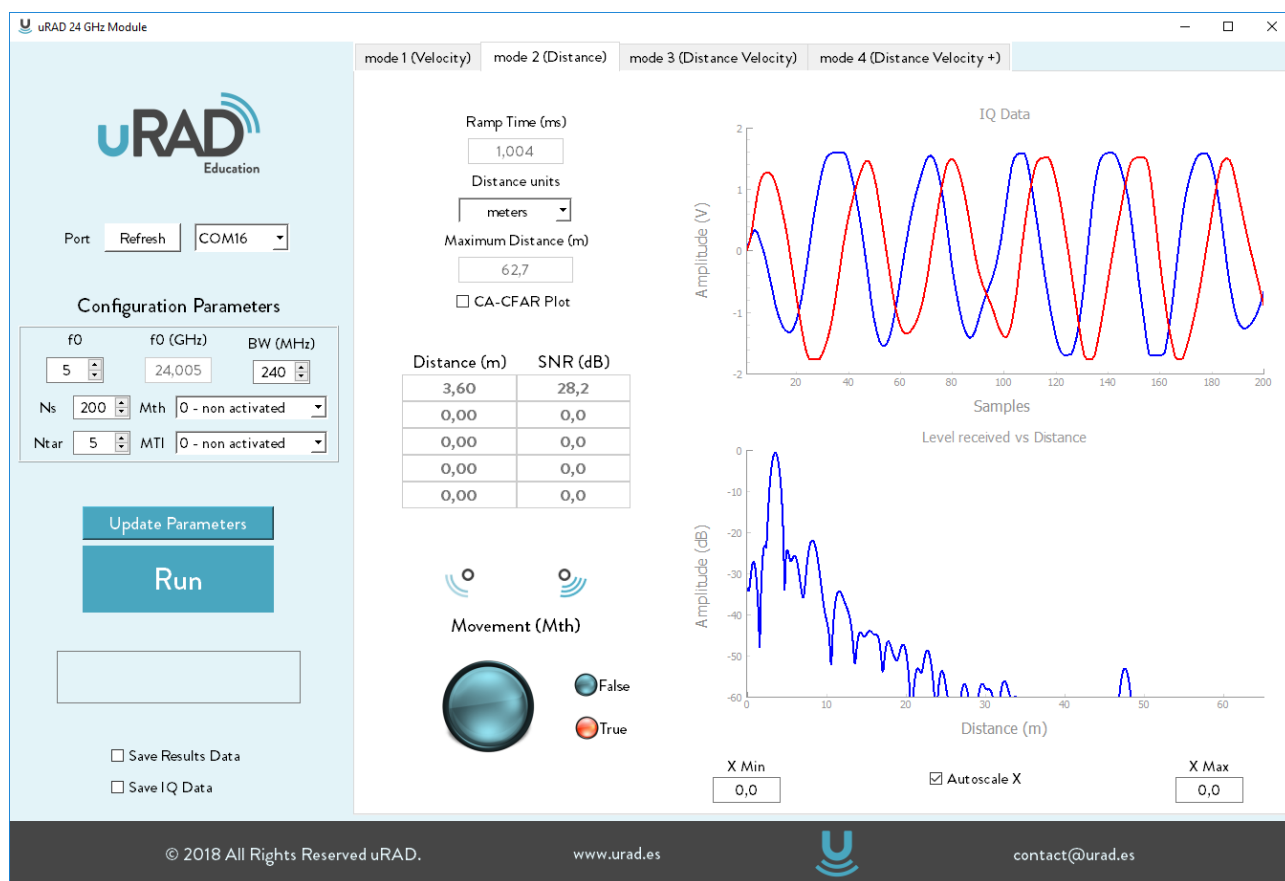
Mode	1	2	3	4
Name	CW	Sawtooth	Triangular	Dual Rate
Waveform				
Measured parameters	Velocity	Distance	Distance Velocity	Distance Velocity
Movement detector	YES	YES	YES	YES
Distance range (m)	0.45 to 60	0.45 to 100	0.45 to 100	0.45 to 75
Distance accuracy (m)	-	Max: $\pm 0.3\%$ ± 0.04	Max: $\pm 0.3\%$ ± 0.04	Max: $\pm 0.3\%$ ± 0.04
Distance resolution* (m)	-	1.5	Different velocity or 1.5	Different velocity or 1.5
Velocity range (m/s)	± 0.7 to ± 75	-	± 0.2 to ± 75	± 0.2 to ± 75
Velocity accuracy (m/s)	± 0.05	-	± 0.25	± 0.25
Velocity resolution* (m/s)	3	-	Different distance or 3	Different distance or 3
Update rate max. (samples/second)	103	69	39	20

* Distance or velocity resolution indicates the minimum distance or velocity that two targets with similar reflectivity must be separated to be discerned as a single target each one.

Libraries and Graphical User Interface

uRAD is controlled and configured in an easy and simple way through Python. Together with the shield, modules and libraries are distributed for the programming environments that facilitate the configuration and the obtaining of results. The user only needs to use two simple functions to configure and get the results. Example of use are also delivered. From these libraries and their functions, the user can create their own more complex applications.

In addition, uRAD comes with a graphical interface that allows the user to visualize in real time, not only the results of velocity, distance, movement and SNR, but also the total signal received in phase and quadrature and its frequency spectrum.



The graphical user interface also allows saving results and IQ signals (IF signals) in real time in order to process the results later.

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