

# **UMFR**

**(Universal Microwave FMCW Radar)**

## **manual**



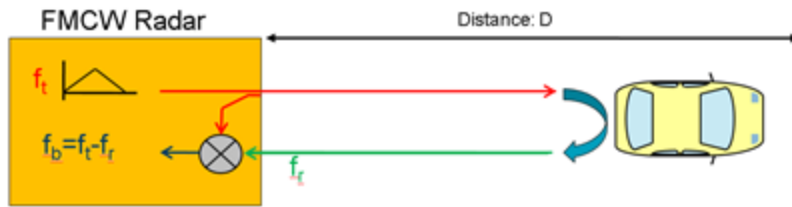
### **1. Product description :**

UMFR Universal Microwave FM Radar is a non-contact microwave detector with FM Continuous Wave (FMCW) technology and not affected by weathers. Therefore it is suitable for various environment and good for various detection application, such as traffic, security, electronic fence, hydrology, mudflow and so on.

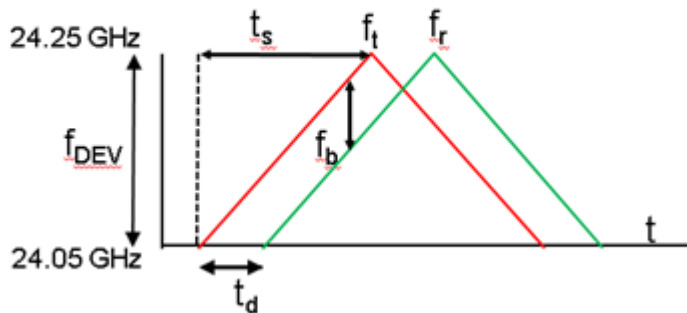
By transmitting linear FMCW signal toward targets through Tx antenna and receiving echo through Rx antenna, then the radar's processor estimate the background change and calculate the target distance. The radar has many advantages such as high detection precision, all-weather operation, easy to install, no road reconstruction, easy maintenance and many others.

## 2. Function Description :

1. FMCW basic principles: following two formulas shown in the equation (1) and equation(2), the target distance D (in meters) can be calculated.



$$f_b = f_t - f_r \quad t_d = \frac{2D}{c} \quad (1)$$



$$\frac{f_b}{t_d} = \frac{f_{DEV}}{t_s} \quad D = \frac{f_b * c * t_s}{2 * f_{DEV}} \quad (2)$$

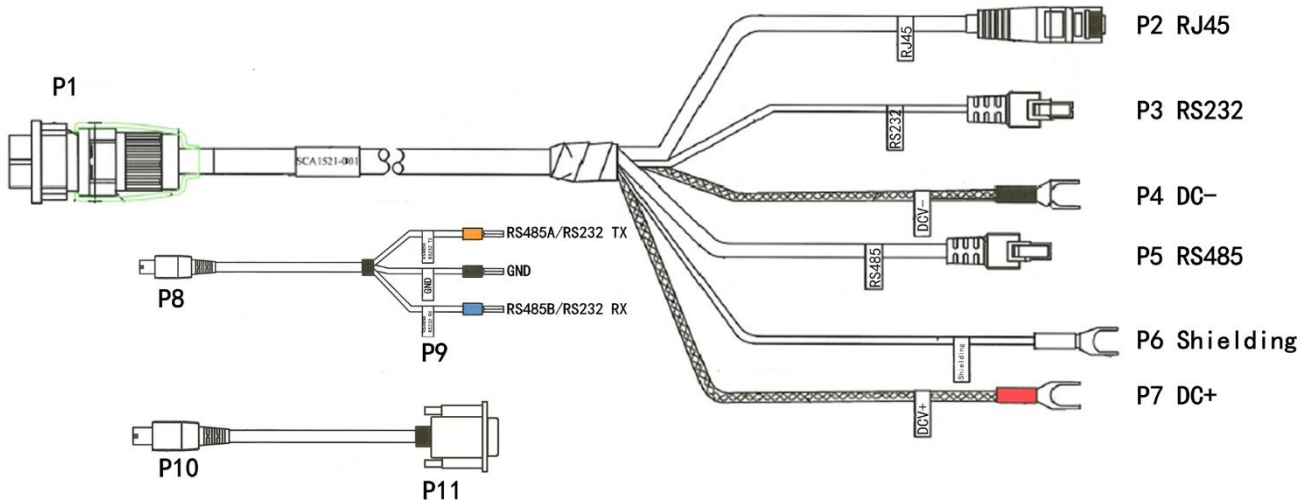
2. FMCW functional application: FMCW principle applies for any target detection of interest, is capable of calculating target distance, is suitable for a variety of application.

### 3. System structure

This UMFR Radar are assembly by following part: such as RF Module、IF Amplifier、DSP Module、DC to DC power supply、Antenna and Connected Cable.

#### (1) Connection cable :





## 4. Specifications

### A. Transceiver :

- (1) Radar : FMCW
- (2) Center Frequency : 24.125GHz
- (3) Sweep Bandwidth : 240 MHz
- (4) Transmit power : 8dBm
- (5) Detection distance : 1-150m

### B. Antenna :

- (1) Frequency range 24.000 - 24.250GHz
- (2) Gain  $25 \pm 1$  dBi
- (3) VSWR 2.0: 1 (max.)
- (4) Polarization Linear, Vertical
- (5) Horizontal BW 3dB  $5 \pm 0.5^\circ$
- (6) Vertical BW 3dB  $11 \pm 0.5^\circ$

- (7) Side lobe level-19 dB (max.)
- (8) Front-to-back ratio -38 dB (max.)
- (9) Isolation 50 dB (min.)
- (10) Input impedance 50 Ohm
- (11) Connector K type female x 2
- (12) Power handling 1 W (cw)

C. Power Supply :

- (1) 12 to 36 DC @ 5W

D. Mechanicals:

- (1) Size : 213 x 253 x 124 mm
- (2) Weight : 2.5Kg

E. Environment:

- (1) temperature : -40°C~ +70°C
- (2) humidity : 95%RH
- (3) vibration : 2.8 g rms. up to 432Hz
- (4) impact : 10g @ 6 ms (half sinusoidal)
- (5) wind speed : maximum150km/h
- (6) waterproof specifications : IP-66

## 5. Product applications

- (1) Traffic

(2) Security

(3) Hydrology

(4) Others

## 6. Communication connection :

(1) RS-485 : Provide RS-485 interface for data transmission.

(2) RS-232 : Provide RS-232 interface for data transmission.

(3) RJ-45 : Provide Internet IP for data transmission.

## 7. Installation method :



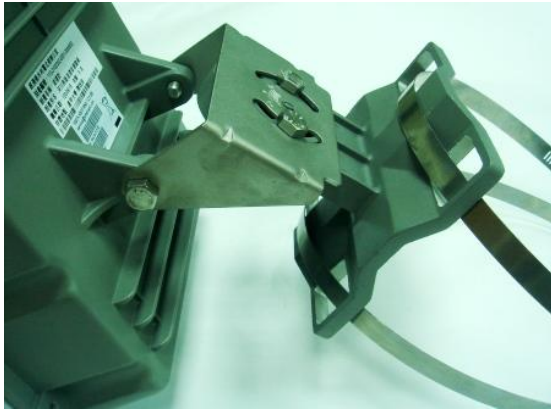
Finish installation

Front view

Back view

T-type fixed frame      a waterproof plastic strips.  
U-shaped bracket      4 set of 6 angle fixing screws





## **8. Product service**

U&U Engineering. Inc. (<http://www.uuei.com.tw>)

### **Service Address :**

No. 15, Gao-Yang South Road, Lung-Tan, Taoyuan, Taiwan, R.O.C.

TEL : 886-3-411-6025 FAX : 886-3-411-6020

## **9. Federal Communication Commission Interference Statement**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.



# Professional installation instruction

## 1. Installation personal

This product is designed for specific application and needs to be installed by a qualified personal who has RF and related rule knowledge. The general user shall not attempt to install or change the setting.

## 2. Installation location

The product shall be installed at a location where the radiating antenna can be kept 20cm from nearby person in normal operation condition to meet regulatory RF exposure requirement.

## 3. External antenna

Use only the antennas which have been approved by the applicant. The non-approved antenna(s) may produce unwanted spurious or excessive RF transmitting power which may lead to the violation of FCC limit and is prohibited.

## 4. Installation procedure

Please refer to user's manual for the detail.

## 5. Warning

Please carefully select the installation position and make sure that the final output power does not exceed the limit set force in relevant rules. The violation of the rule could lead to serious federal penalty.