

Traffic Microwave Sensor **Sunray HD**

Operation Manual



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1. Introduction

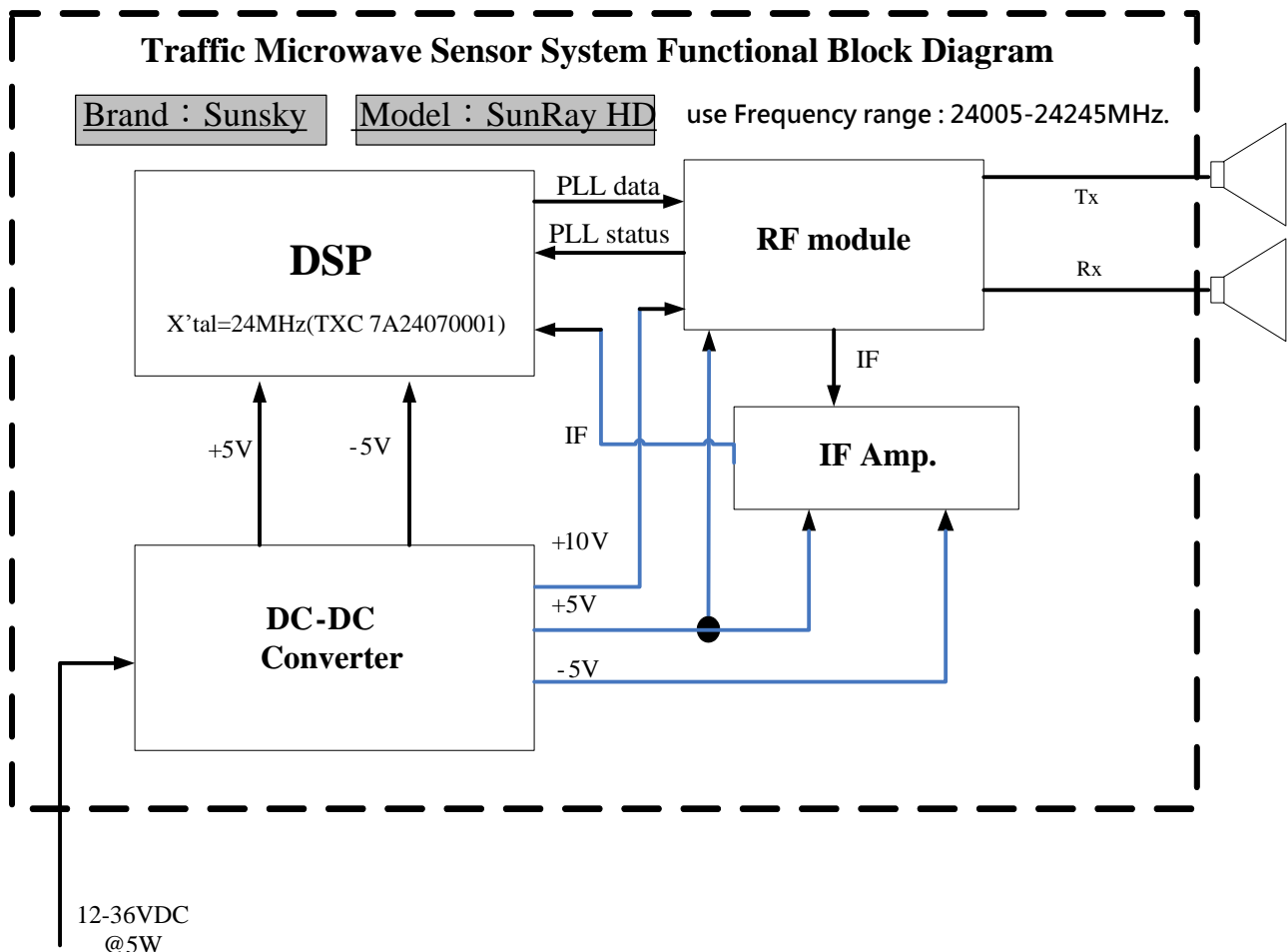
We successfully developed SunRay HD series with FMCW target detection technology. SunRay HD series can not only assist end users to improve measurement reliability but also identify different vehicles within 10 lanes at least. SunRay HD series is designed to measure volume, speed and occupancy. Applications involve red-light running control and intelligence traffic management system in metropolis.

2. Function Overview

- Installed along the roadside or over the road. Detect vehicles running on the 10-lane road instantaneously.
- Available data output: Presence/Count/Classification/Speed of the vehicle and occupancy of the road.
- Target type from trucks to scooters.
- Detection range: 3~80 meter °
- Target speed range : 0~200km/hr °
- Power supply requirement :12-36Vdc@5W.
- Interface: RS-485/RS-422 、 RS232 、 RJ-45

3. Structure Description

System Functional Block diagram



The modules and PCA of SunRay HD are listed as follows :

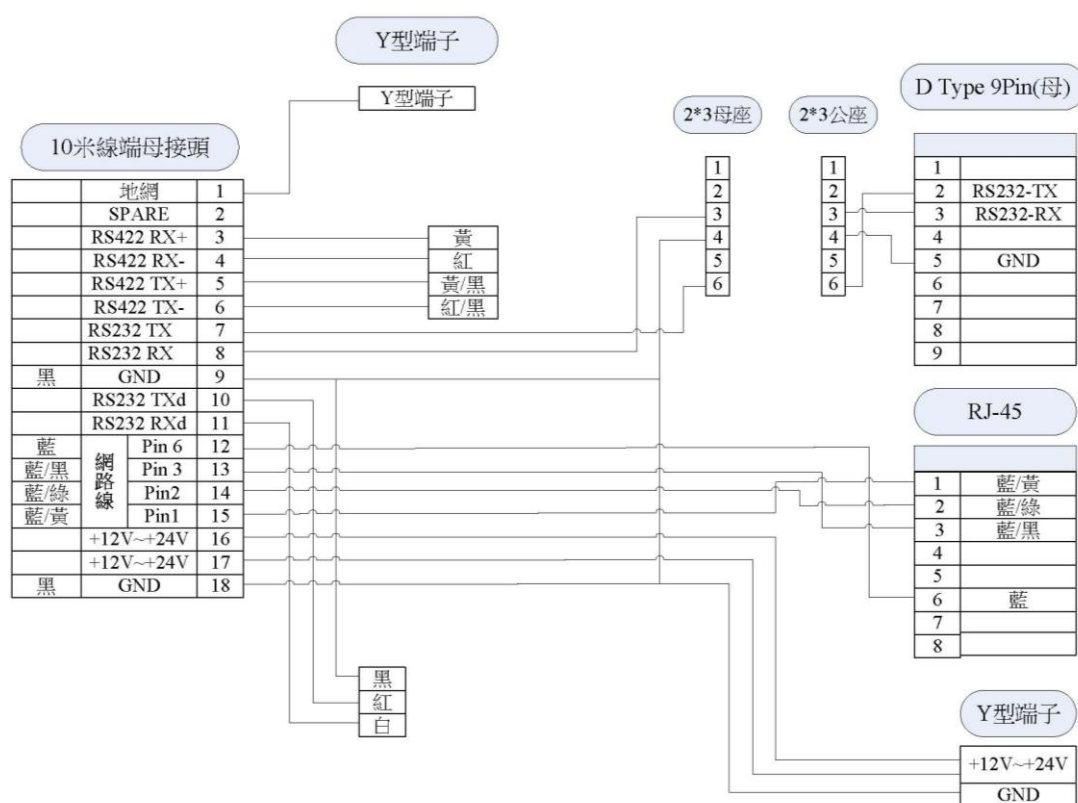
- DC-DC Converter : Convert 12-36VDC@5W DC power to +3V 、+5V and +10V.
- DSP(Digital Signal Processor) :
 - To receive IF signal and make the FFT transformation to get the target range and convert to the traffic information;
 - To generate PLL data and receive PLL status to control Vt and frequency.

- RF Module : Transmit FMCW radio wave to targets and receive the echo of them. Modulate and demodulate carrier signal and generate beat frequency of the carrier.
- IF Amplifier : Amplify and filtering target intermediate frequency.
- Antenna : use the microstrip patch antenna to transmit and receive radio frequency.

4. System Installation

4.1 Connection Interface

The internal interface connector pin assignments are as shown in the figure :



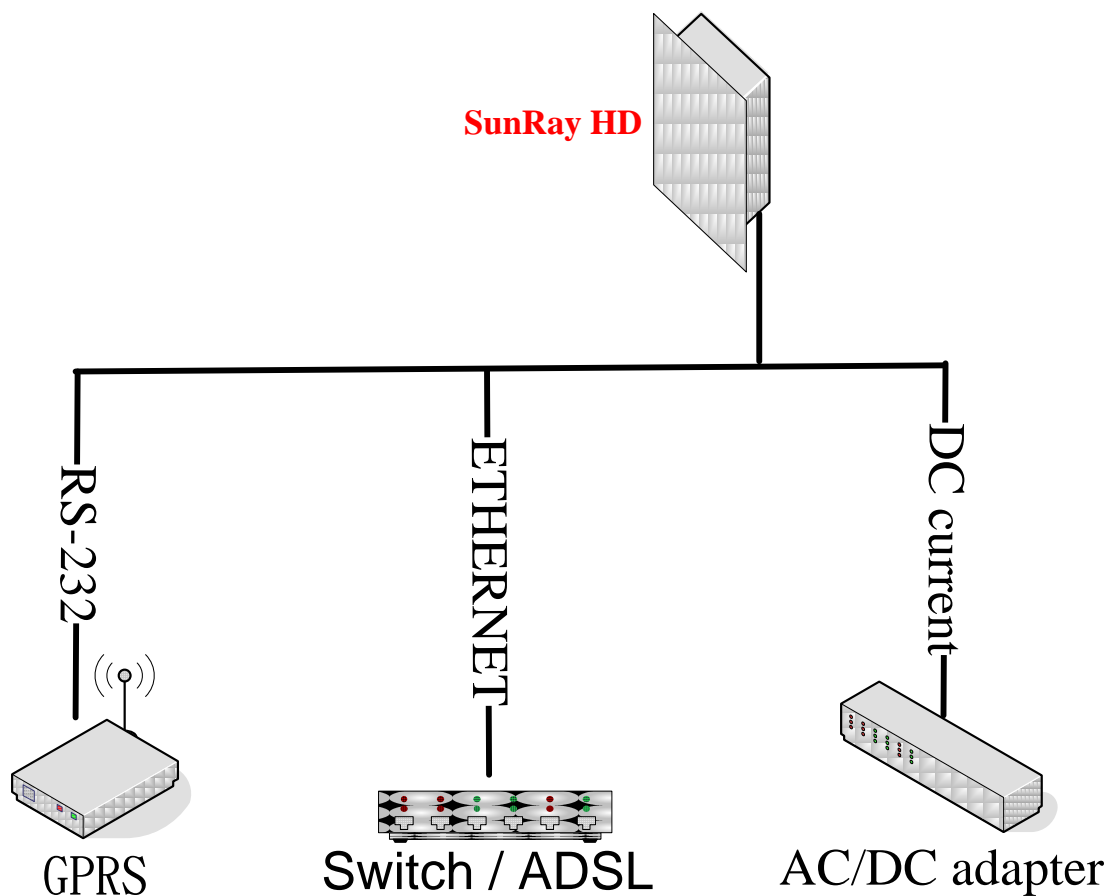
4.2 Interface Setup

The system output includes : power 、 RJ-45 、 D-Type and

RS-422/RS-485 connector :

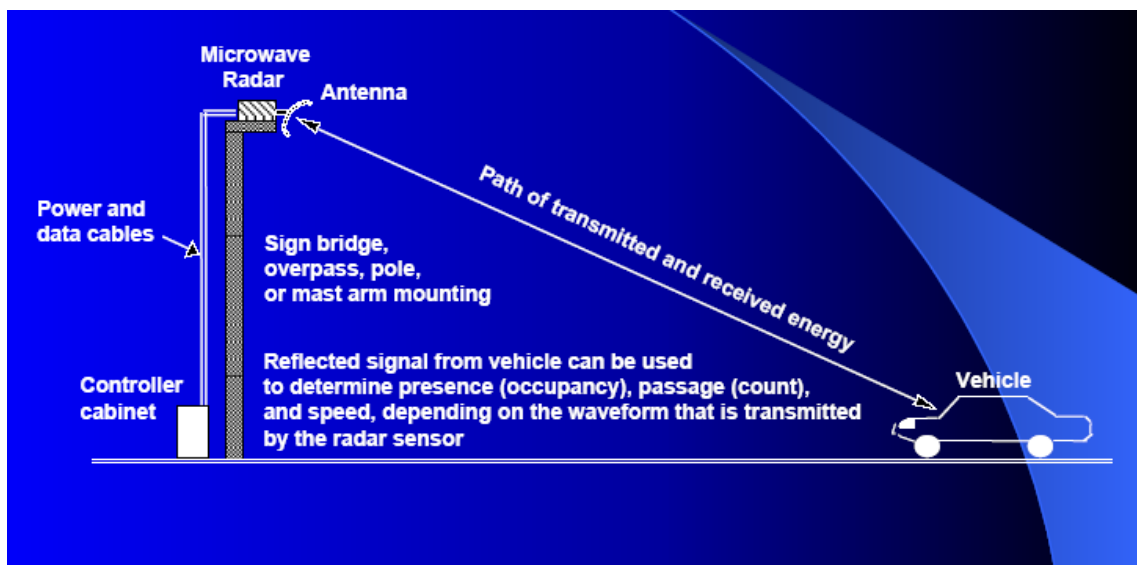
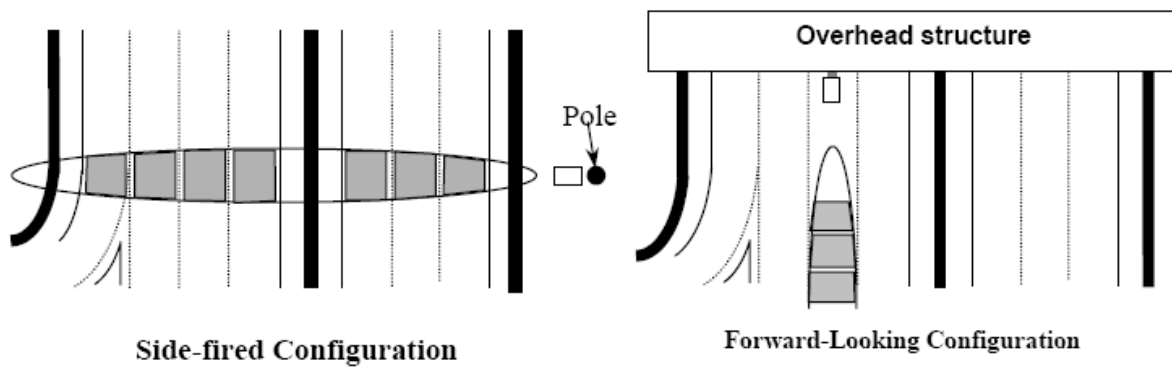
- **Power Connector :** Input DC voltage ranges from 12 to 36 volt s and support direct current power to microwave detector.

- RJ-45 Connector : To transfer interface data by internet. For different users, RJ-45 Connector can connect to Switch Hub, ADSL or computer.
- D-Type 9P Connector : To transfer interface data by RS-232, For different users, this connector can connect to GPRS modem or computer.
- RS-422/RS-485 : Provide RS-422 or RS-485 connection.



5. Installation Description

The system can be installed along the roadside or on overhead structure to detect vehicles running on the road. It monitors the presence/count/classification/speed of vehicle and occupancy of the road.



SunRay HD Installation

6. Sunray HD application

To improve traffic problems in urban area and promote traffic manipulation intelligence and efficiency. Utilize intelligent microwave traffic sensor, SunRay HD, to integrate original facilities. So that utility rate of roads can be raised and travel time of user can be cut down.

Therefore, we can accomplish the goal of improving traffic conditions and enhance the government's achievements. The main applications are list below:

- Inspect real-time traffic parameters, such as presence, count, classification, speed and occupancy to regard as the analysis foundation of traffic improvement or management.
- Integrate system such as CMS, CCTV and so forth to provide real-time information. Through internet, count information from SunRay HD will be delivered to roadside changeable signs to offer drivers the road condition ahead so that all users can respond timely.
- Combine interaction signs to optimize the control of road network. Through SunRay HD installed in every intersection of road network, observe count variation of critical pathways and dynamically control signs.
- Integrate branch lines or entries parking lots to promote efficiency of main branches.
- Integrate speed monitors to decrease traffic accidents. Through Sunray HD installed in each line, it will inspect speed of running cars and show whether drivers exceed the speed limit or not by speed monitors.

7. Specification

Transceiver :

- Modulation : FMCW
- Frequency : 24.125GHz
- Bandwidth : ± 120 MHz
- Output power :
9-11dBm(8~12.6mW)
- Antenna beam width :
 - Azimuth : 9°
 - Elevation : 65°
- Range : 3 ~ 80m
- zones : 10 at least

Environment :

- Temperature : $-20^{\circ}\text{C} \sim +75^{\circ}\text{C}$
- Humidity : 95%RH
- Vibration : 2g rms. up to 200Hz
- Shock : 5g @10ms Swept sine
- Wind up to 150km/h will not
degrade performance
- Precipitation (rain or snow) up to
100mm/h

Power :

- 12~36 DC @ 5W

Mechanical :

- dimension : 21*26*12cm
- Weight : 2.5Kg
- Waterproofing : IP-65

FCC Statement:

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 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.

8. Service

Sunsy International LTD.

**Add : 3F., No.3, Aly. 6, Ln. 45, Baoxing Rd., Xindian Dist., New Taipei
City 23145, Taiwan**

Tel : 886-2-2911-6623 Fax : 886-2-2912-3257

<http://www.sunsky.com.tw/>