MicroBrain Intelligent

UAV-H201-1（UART）
Altitude Millimeter Wave Radar
User Manual

Microbrain Intelligent Technology Co., Ltd.

Historic Version

Date	Version	Updates
2024.04.22	1.1	UAV-H201-1 Open source flight controller

Content

1. UAV-H201-1 Introduction

UAV-H201-1 altitude millimeter-wave radar is independently developed by Microbrain Intelligent Technology Co., Ltd., using the 77GHz-81GHz frequency band, 2cm measurement accuracy, compact size, high sensitivity, light weight, and easy to use Integrated and stable in performance. It can detect the distance to vegetation and the ground at the same time, adapt to various complex terrain environments, and meet the flight height guidance of unmanned flying platforms such as agricultural UAV and small express transport UAV.

2. Product Feature

Type：Altitude Radar

Model：UAV-H201-1

Dimensions：76*71.5*19.6mm
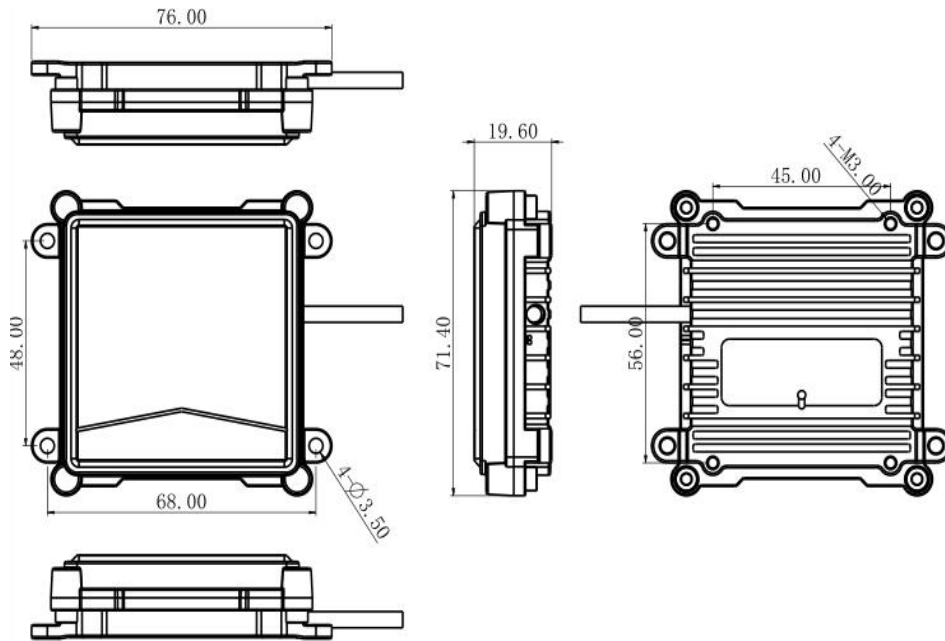
Weight：87g（Including cables）

Protection：IP67

Figure 1 UAV-H201-1 Dimensions

Remark：

Dimensional tolerance:
When ≤10mm, the tolerance is ±0.3mm;
When between (10~50)mm, the tolerance is ±0.5mm;
When ≥50mm, the tolerance is ±0.8mm.

3. Performance parameters

UAV-H201-1 adopts linear frequency modulation continuous wave (FMCW) mode, which can accurately measure the distance between the radar and the ground or water surface within the measurement range.

Table 1 UAV-H201-1 performance parameters

Features	Specification	Parameters
Antenna Feature	Azimuth Angle (3dB)	±15°
	Elevation Angle (3dB)	±4°
	Maximum EIRP (dBm)	30
Radar Feature	Detection Range (m)	0.9-200
	Ranging Accuracy (m)	0.1
	Range Resolution (m)	0.9
	TX Frequency (GHz)	77
	Refresh Rate (Hz)	20
	FM Bandwidth (GHz)	1.5

System Feature	Working Voltage (V)	5~24
	Operating Temperature	-40℃~85℃
	Power Consumption (W)	3W
	Data Interface	UART
	PCB Dimension (mm)	55*52*1.6

4. Packing List

Packing list including：UAV-H201-1 radar sensor ×1

Figure 2 UAV-H201-1 physical picture of delivery

5. Installation

The radar should be installed directly below the drone, with the wiring harness facing ahead.

Figure 3 UAV-H201-1 installation diagram

6. Quick Guidance

● Pin definition

Table 2 UAV-H201-1 Pin Interface Definition

Pin	Definition	Voltage Range
1	POWER_IN（Red）	5~24V DC
2	GND（Black）	-
3	TX（Green）	0~3.3V
4	RX（White）	0~3.3V

● Debugging

The test software provided by Microbrain Intelligent Technology can acquire and analyze UAV-H201-1 sensor data and intuitively display the observation results.

The testing method using UART protocol is as follows:

First, download UAV-H201-1 test software and user manual from Microbrain Intelligent customer service or the official website. Then install and configure the test software according to the user manual.

Table 3 Tools used for product testing

No.	Device/Software	Qty
1	UAV-H201-1 Radar Sensor	1
2	PC	1
3	TTL-USB Module	1
4	5~24V Power Adapter	1

5	Test Software	1

1) Connect the PC and UAV-H201-1 radar sensor through the TTL-USB module. The connection diagram is as follows:
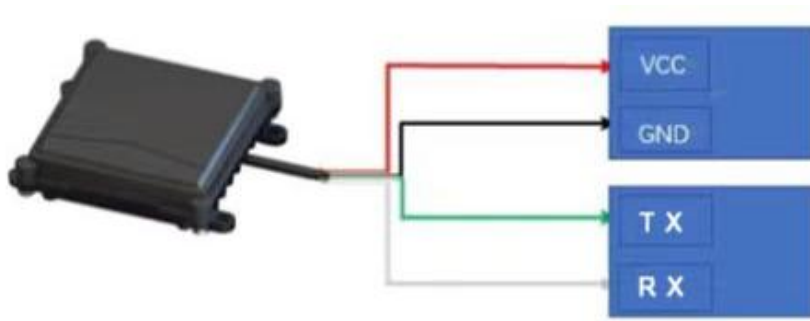

Figure 4 Serial cable connection diagram

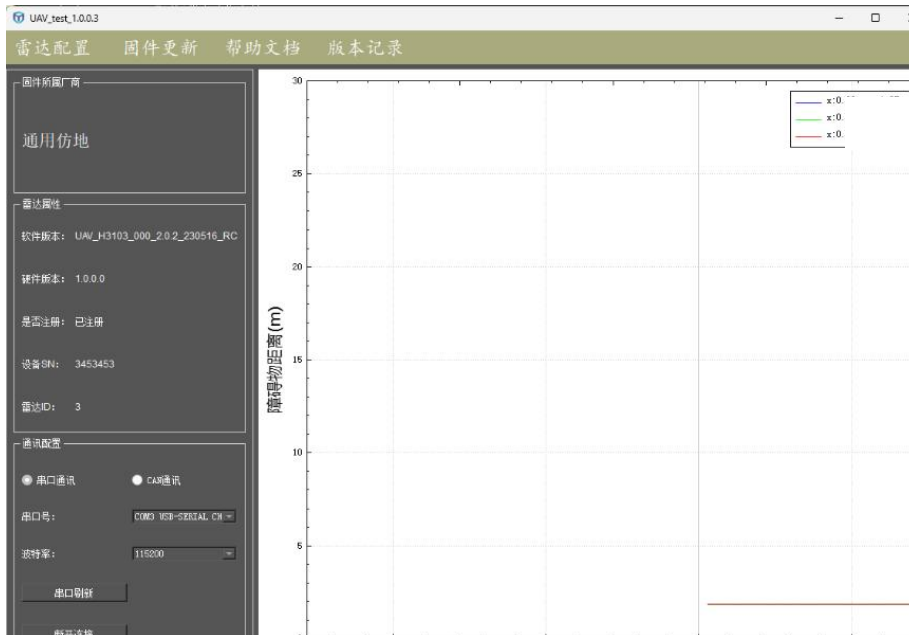2) Open the software, and click Start. The test results are as shown in the figure.

Figure 5 Test Software Window

7. **Serial Port Data Analysis**

The UAV-H201-1 radar sensor uses the UART-TTL interface and the preset

default transmission rate is 115200bit/s. UAV-H201-1 radar sensor data message format is defined in the following table:

Table 4 UAV-H201-1 data message format definition

The radar altimeter outputs data through the serial port, 115200bps, 8N1. It will only send if there is data. If there is no data, it will not send. The specific protocol format is as follows：

Data type	Byte	Instructions
HEAD	1Byte	Stable，0x48
Altimeter data	2Bytes	The low 8 bits come first, the high 8 bits come last; unit cm; signed integer, the highest bit of each byte should be discarded when acquiring data;

Radar Altimeter 3 Byte Protocol：0x48，DataL，DataH；In order to adapt to open source flight control, the following method is used to calculate the actual distance：

Actual distance（cm）= [(DataH&0x7F)*128 + (DataL&0x7F)]*2.5。

8. Precautions for product use

● The power pin needs to be connected to a separate external 5~24V DC regulated power supply;

● Use 4 M4 screws to fix UAV-H201-1;

● Please keep the radar cover surface clean during installation. To clean the cover surface, wipe it with a soft damp cloth and then let it dry naturally;

● Please pay attention to the shape of the radar when installing, ensure that the installed radar is not deformed, and do not squeeze, bump, or hit;

● When installing, make sure the radar is complete and do not disassemble or assemble it by yourself.

If you encounter problems that cannot be solved during the installation process, please contact the customer service staff of Microbrain Intelligent Technology Co., Ltd. We will serve you wholeheartedly!

9. FAQ

1) What is the height accuracy of UAV-H201-1?

   The height accuracy of UAV-H201-1 is 10cm.

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