Classification: none

# RID-BC-001
# User Manual

## January 26, 2024

### Historic Version

| Version | | Date | Description |
|---|---|---|---|
| 1.0 | | 2023.07.11 | Create new document. |
| 1.1 | | 2023.08.21 | Add sample data. |
| 1.2 | | 2024.01.12 | Correct clerical errors. |
| 2.0 | | 2024.01.26 | Add Broadcast Method |
| 2.1 | | 2024.04.30 | Content Modifications |

Contents

# 1 Product Introduction

The RID-BC-001 is a standard Remote ID module that can be integrated inside an Unmanned Aerial Vehicle(UAV). It broadcasts dynamic/static information and operation/emergency status of the UAV through Bluetooth/Wi-Fi, which can also receive configuration/upgrade commands from the UAV. Here are many benefits of the product, such as smaller size, lighter weight and lower energy consumption that can be easier to integrate with UAVs.

**Table 1** List of RID-BC-001

| Parameter Number | Parameter | Index |
|---|---|---|
| 1 | Broadcast Method | BLE Dual-mode<br>Wi-Fi Beacon |
| 2 | Broadcast Period | 1 s |
| 3 | Operating Voltage | 3.8~5.5V |
| 4 | Weight | <3g |
| 5 | Energy Consumption | <500mW |
| 6 | Size | <26mm*16mm*3.5mm |
| 7 | Antenna Interface | IPEX 4 |
| 8 | Power/Communication Interface | SM04B-SURS-TF serial port |
| 9 | Standards | ASTM F3411-22a<br>Japanese Standard "Requirements for Remote ID Devices and Applications"<br>National Standard "Safety Requirements for Civilian UAV Products" Remote ID |

## 1.1 Accessories

Accessories of RID-BC-001 include 2.4GHz Flexible Printed Circuit(FPC) and an SM04B-SURS-TF connector. Here is the list of the FPC.

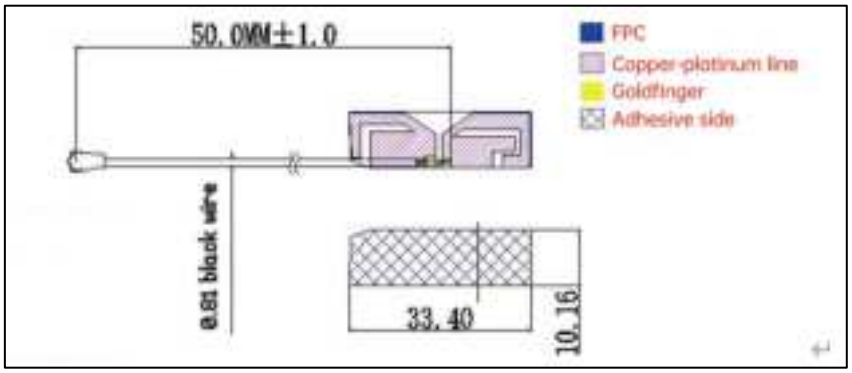


Table 2　List of FPC

| electrical performance indicators | |
|---|---|
| operating frequency range | 2400MHz~2500MHz |
| standing wave ratio | 2400MHz~2500MHz<2.0 |
| antenna gain | 2400MHz~2500MHz:3.97dBi |
| radiation efficiency | 2400MHz~2500MHz>45% |
| impedance | 50 ohm |
| polarization | linear polarization |
| Product Material Description | |
| FPC+ Coaxial wire | Electrolytic copper+PI+0.81 coaxial wire Fourth-generation terminals |
| Product Environment Description | |
| operating temperature | - 30˚C ~ + 85 ˚C |
| storage temperature | - 30˚C ~ + 85 ˚C |

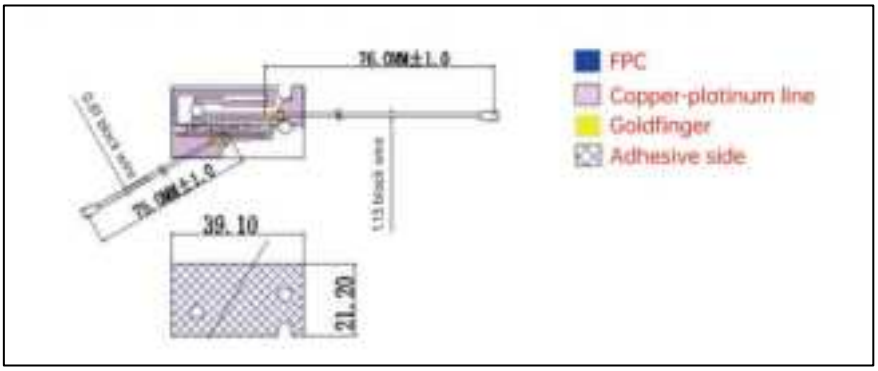


**Table 3**　List of FPC

| Electrical performance indicators |
|---|

| | |
|---|---|
| Operating frequency range | 900~930 MHz 2400~2500MHz |
| standing wave ratio | 900~930 MHz<2.0 2400~2500MHz<2.5 |
| antenna gain | 900~930MHz:1.27dBi<br>2400~2500MHz:4.04dBi |
| radiation efficiency | 900~930 MHz>30%<br>2400~2500MHz>40% |
| impedance | 50 ohm |
| Product Material Description | |
| FPC+ Coaxial wire | Electrolytic copper + PI + 1.13 coaxial wire + first-generation terminals |
| Product Environment Description | |
| operating temperature | - 30˚C ~ + 85 ˚C |
| storage temperature | - 30˚C ~ + 85 ˚C |

# 2 Product Specification

## 2.1 Sketch-map

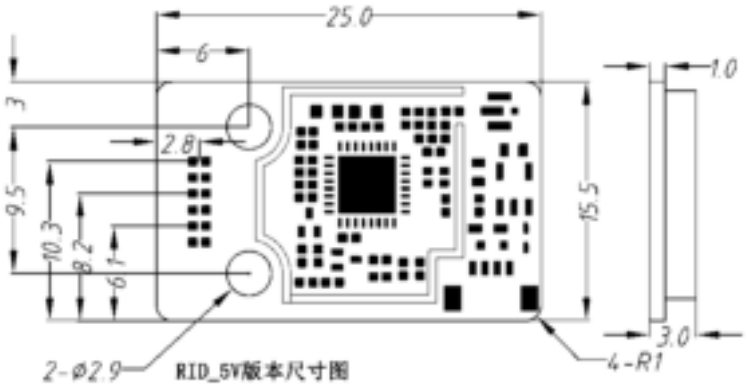


**Fig. 1** Sketch-map for the size of RID-BC-001

## 2.2 Power/Communication Interface Description


**Fig.2** Pin Connection Table for the RID-BC-001

## 2.3 Label and compliance information


# 3 How to Use

## 3.1 Preparation

Before use the Remote ID, please ensure:
1) Remote ID is connected to a 2.4GHz antenna that meets the requirements which is installed normally.
2) Remote ID is correctly installed in the unmanned aircraft and correctly connected to the flight controller.
3) UAV can operate normally, and the electrified Remote ID can normally communication with flight controller.

## 3.2 Communication Protocol

### 3.2.1 Communication Interface Configuration Parameters

TTL Level, Speed(bps): 115200, Data bits: 8, Stop bits: 1, Parity: None.

### 3.2.2 MavLink Protocol

```
<mavlink>
        <version>3</version>
</mavlink>
```

#### 3.2.2.1 Command Protocol Definition

```
#define MAVLINK_MSG_ID_REMOTE_ID_CMD_JPN 162
#define MAVLINK_MSG_ID_REMOTE_ID_CMD_JPN_LEN 5
#define MAVLINK_MSG_ID_REMOTE_ID_CMD_JPN_CRC 229
XML format represents:
<message id="162" name="REMOTE_ID_CMD_JPN">
  <description>Test all field types</description>
  <field type="uint8_t" name="cmd"> remote id cmd </field>
  <field type="uint8_t[4]" name="reserved"> reserved byte </field>
</message>
```

#### 3.2.2.2 Command Information

```
typedef enum CMD_RID
{
    CMD_RID_NONE=0, /* NULL */
    CMD_RID_TX_ON=1, /* turn on remote id radio | */
    CMD_RID_TX_OFF=2, /* turn off remote id radio | */
    CMD_RID_CFG_MODE=3, /* remote id config mode-update | */
    CMD_RID_REBOOT=4, /* remote id reboot | */
    CMD_RID_ENUM_END=5, /*    | */
} CMD_RID;
XML format represents：
<enums>
  <enum name="CMD_RID">
  <description>Command Message contents</description>
    <entry value="0" name="CMD_RID_NONE">
```

```
        <description>NULL</description>
      </entry>
      <entry value="1" name="CMD_RID_TX_ON">
        <description>turn on remote id radio</description>
      </entry>
      <entry value="2" name="CMD_RID_TX_OFF">
        <description>turn off remote id radio</description>
      </entry>
      <entry value="3" name="CMD_RID_CFG_MODE">
        <description>remote id config mode</description>
      </entry>
      <entry value="4" name="CMD_RID_REBOOT">
        <description>remote id reboot</description>
      </entry>
    </enum>
</enums>
```

## 3.3 Enable Broadcasting Process

Broadcasting can be enabled after preparing the Remote ID(see 3.1 for details). The communication process of broadcasting as shown in Fig.3:

1) Electrify and run the flight controller;

2) The Flight controller sends a restart command to Remote ID and waits for message from the Remote ID;

3) After receiving the message that the Remote ID has restarted successfully, the flight controller sends configuration information to the Remote ID and waits for message from the Remote ID;

4) After receiving the message that the Remote ID has configured successfully, the flight controller sends a package of flight information and then sends an command to enable broadcasting function;

5) The flight controller sends packages of flight information to the Remote ID periodically after receiving the message that the Remote ID has enabled broadcasting function.

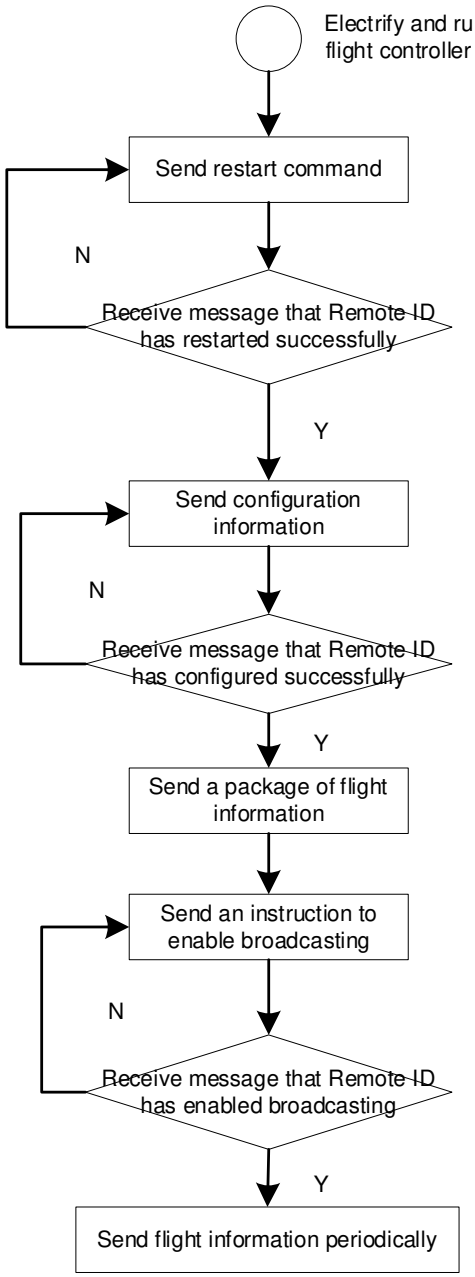


Fig.3 Flight controller work (broadcasting) process reference

## 3.5 Sample Data

The following examples could be used to test Remote ID.

## 3.5.1 Command

1） Restart

FE 05 03 01 01 A2 04 00 00 00 00 EE 31

2） Enable broadcasting

*Enable BLE Dual-mode broadcasting command:*

FE 05 01 01 01 A2 01 01 00 00 00 63 76

*Enable Wi-Fi Beacon broadcasting command:*

FE 05 02 01 01 A2 01 02 00 00 00 C6 1F

*Enable BLE Dual-mode + Wi-Fi Beacon broadcasting command:*

FE 05 03 01 01 A2 01 03 00 00 00 A5 38

3） Disable broadcasting

FE 05 01 01 01 A2 02 00 00 00 00 5A 71

4） Upgrade

FE 05 02 01 01 A2 03 00 00 00 00 18 01

## 3.5.2 Protocol Frame Format for Return Data

| Header | Len | Data1 | Data2 | Data3 | … | DataN | CRC16 | |
|---|---|---|---|---|---|---|---|---|
| 2B | 1B | 1B | 1B | 1B | | | 1B | 1B |
| 0x68<br>0x67 | | msgId | cmd | 1:success<br>0:failed | | | Crc_L | Crc_H |

*msgId* is divided into two categories:

(1) command(see 3.2.2.1 for details), (2)configuration(see 3.2.2.4 for details).

*cmd* is divided into configuration (0x00), enable broadcasting (0x01), disable broadcasting(0x02), upgrade (0x03) and restart (0x04) (see 3.2.2.2 for details).

1） Reply to restart command

Successful:

68 67 03 A2 04 01 C5 94

Failure:

68 67 03 A2 04 00 E4 84

2） Reply to enable broadcasting

Successful:

68 67 03 A2 01 01 30 6B

Failure:

68 67 03 A2 01 00 11 7 B

3） Reply to disable broadcasting

Successful:

68 67 03 A2 02 01 63 3E

Failure:

68 67 03 A2 02 00 42 2E

4） Reply to upgrade

Get into upgrade status successfully:

68 67 03 A2 03 01 52 0D

Get into upgrade status failed:

68 67 03 A2 03 00 73 1D

5） Reply to configure

Successful:

68 67 03 A4 00 01 A1 EA

Failure:

68 67 03 A4 00 00 80 F A

# FCC Caution.

## 2.2 List of applicable FCC rules

FCC standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247
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.
Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
Note: 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 or more 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.
We will retain control over the final installation of the modular such that compliance of the end product is assured. In such cases, an operating condition on the limit modular approval for the module must be only approved for use when installed in devices produced by a specific manufacturer. If any hardware modify or RF control software modify will be made by host manufacturer,C2PC or new certificate should be apply to get approval,if those change and modification made by host manufacturer not expressly approved by the party responsible for compliance ,then it is illegal.
FCC Radiation Exposure Statement
The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device.This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.
If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains Transmitter Module FCC ID:2ALYR-RIDBC001”
When the module is installed inside another device, the user manual of the host must contain below warning statements;
1. 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.
(2) This device must accept any interference received, including interference that may cause undesired operation.
Note: 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 or more 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.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Any company of the host device which install this modular with modular approval should perform the test of radiated & conducted emission and spurious emission,etc. according to FCC part 15C：15.247 and 15.209 & 15.207 ,15B Class B requirement, Only if the test result comply with FCC part 15C：15.247 and 15.209 & 15.207 ,15B Class B requirement，then the host can be sold legally.

## 2.3 Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer’s instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: The EUT adapts to two specific antennas, see the specifications for details, and is not allowed to be replaced in the process of use

## 2.4 Limited module procedures

If a modular transmitter is approved as a “limited module,” then the module manufacturer is responsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting
conditions.A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.

Explanation: The Module is not a limited module.

## 2.5 Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ –

Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.
a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna);
b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered);
c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout;
d) Appropriate parts by manufacturer and specifications;
e) Test procedures for design verification; and
f) Production test procedures for ensuring compliance.
The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

Explanation: Yes, the two specific antennas are not allowed to be replaced, Please refer to the antenna specification book for antenna dimension.

## 2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person’s body); and (2) additional text

needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

Explanation: Transmitter meets MPE calculation of 47 CFR 1.1307 and KDB 447498. Refer to MPE Reports

## 2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an “omni-directional antenna” is not considered to be a specific “antenna type”)). For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product. The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: The EUT adapts to two specific antennas, see the specifications for details, and is not allowed to be replaced in the process of use

## 2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This includes advising host product manufacturers that they need to provide a physical or e-label stating “Contains FCC ID” with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The modular has a fixed label, and below statement was listed in the User Manual ;The host device must be labeled to display the FCC ID of the module “Contains FCC ID: 2ALYR-RIDBC001”

## 2.9 Information on test modes and additional testing requirements

Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host. Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer’s determination that a module as installed in a host complies with FCC requirements.

Explanation: The module comply with all specific rules applicable to the transmitter including all the conditions provided in the integration instructions by the grantee, Refer to test report

## 2.10 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Explanation: The module without unintentional-radiator digital circuity, so the module does not require an evaluation by FCC Part 15 Subpart B. The host shoule be evaluated by the FCC Subpart B.