
Portable ADS-B Ground Receiver ADSB-RE1090

User Manual

AvionixTech

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1. Introduction

The ADSB-RE1090 is a standard ADS-B ground receiver compliant with the RTCA DO-260B/DO-260C standards. Integrated with ADS-B signal processing module, ADSB-RE1090 is capable of simultaneously outputting ADS-B raw messages, CSV plaintext data and JSON plaintext track data via RJ45 network. This ADS-B receiver supports both BeiDou and GPS, providing users with ADS-B data reception, processing, and display services. It can be applied in civil aviation flight tracking, airport management, general aviation aircrafts surveillance, Detect-and-Avoid (DAA) subsystem, ADS-B IN capability for UAS situational awareness, radar calibration, academic research and education.



Our equipment is designed for information and surveillance purposes in industrial environments and must not be used for air traffic control, navigation, life-critical and military applications.



Packing List:

No.	Item	Quantity	Remarks
1	ADSB-RE1090	1 unit	Included
2	Power Cable	1 piece	Included
3	ADS-B Antenna and Bracket	1 set	Included
4	ADS-B Antenna Cable	1 piece (10 meters)	Included
5	Network Cable	1 piece	Included
6	GPS/BDS Antenna	1 set (includes 3-meter cable)	Included

2. Specifications

ADSB-RE1090:

No.	Specifications	
1	Power Supply	DC12V 2A
2	Power Consumption	3.6W
3	Receiving Frequency	1090MHz
4	Sensitivity	$\leq -95\text{dBm}$
5	Receiving Range	> 350km(no interference, unobstructed)
6	Dynamic Range	$\geq 80\text{dB}$

7	Update Rate	$\geq 1\text{Hz}$
8	Target Capacity	> 600 targets
9	Processing Capability	$> 3,500$ messages/s
10	Data Format	DF 17/18/19 and other DF raw message CSV plain text \ JSON plain text JSON plain text track data
11	Data Interface	RJ45 network port
12	Network Connection	Static IP or DHCP
13	Network Protocol	TCP/UDP/HTTP
14	ADS-B Antenna Interface	N female
15	GPS/BDS Antenna Interface	SMA female
16	Dimensions	220*160*72mm (main body)
17	Weight	1250g
18	Operating Temperature	$-10^{\circ}\text{C} \sim +55^{\circ}\text{C}$
19	Storage Temperature	$-15^{\circ}\text{C} \sim +60^{\circ}\text{C}$
20	Storage Humidity	10% ~ 80%

ADS-B Antenna:

No.	Specifications	
1	Frequency Range	1089-1091MHz
2	Bandwidth	60MHz
3	Gain	6dBi
4	VSWR	≤ 1.5
5	Direction Type	Omnidirectional
6	Polarization	Vertical polarization
7	Length	60cm
8	Weight	0.6kg
9	Connector Type	N female
10	Mounting Type	Mast mount
11	Waterproof Rating	IP67
12	Operating Temperature	$-15^{\circ}\text{C} \sim +55^{\circ}\text{C}$

GPS/BDS Antenna:

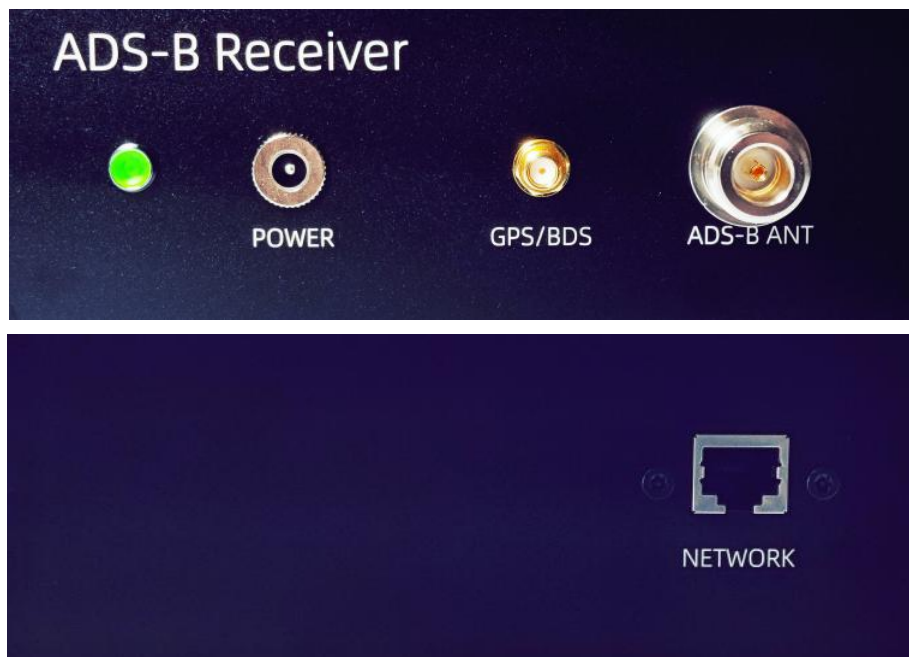
No.	Specifications	
1	Frequency Range	1550 – 1580MHz (covering GPS \ BDS)
2	Gain	28dBi(including LNA)
3	Impedance	50Ω
4	Polarization	RHCP
5	Noise Figure	≤1.5dB
6	DC Supply Voltage	3~5V
7	Supply Current	20mA
8	Cable Length	3m
9	Connector	SMA Male
10	Mounting Method	Magnetic Absorption

3. Features

- Easy for secondary development, supporting multiple message format outputs: decoded plaintext, JSON track data, and DF17/DF18/DF19 raw messages.
- Supports BeiDou system.
- Data transmission via Ethernet port.
- IP address can be configured directly, allowing the SVL-302 to be connected to the customer's network without a switch (a switch can also be used if preferred).
- Supports both Static IP and DHCP for IP acquisition.
- A single receiver can simultaneously deliver data to multiple client terminals.
- Messages include timestamps.
- Compact size, light weight, and easy to carry for field operations.
- Standard display software included (supports Chinese display and offline maps).
- Optional remote data transmission via 4G/5G module (UDP protocol only).
- Optional remote data transmission via 4G/5G module + VPN (supports UDP/TCP/HTTP protocols with encrypted transmission).

- Optional data filtering by range.
- Optional IQ data output.
- Optional data transmission via WiFi.
- Optional outdoor waterproof unit version.

4. Interface Description



Interfaces:

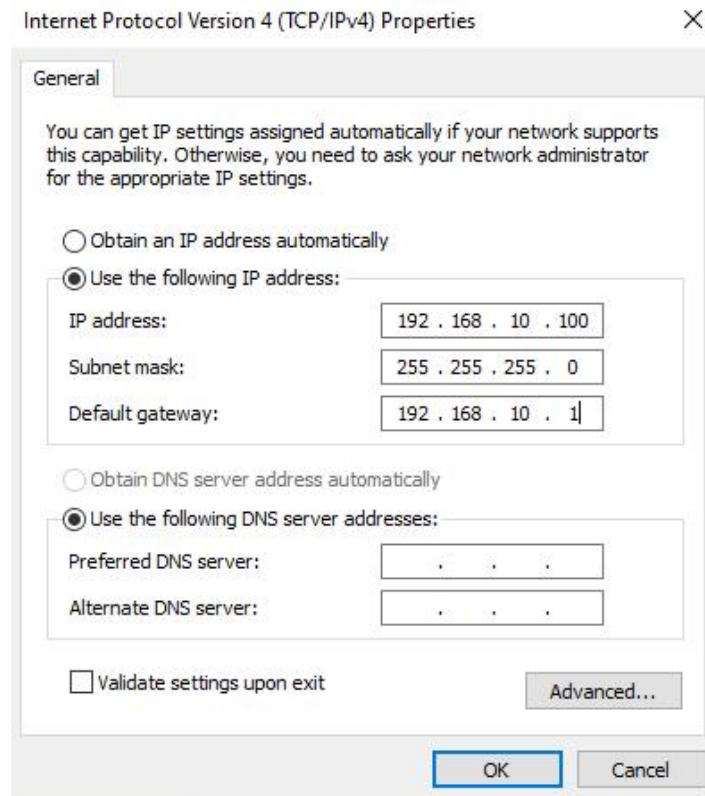
No.	Interface Name	Function
1	POWER	Power supply interface for main unit, DC 12V 2A
2	GPS/BDS	GPS/BDS antenna interface, SMA female
3	ADS-B ANT	ADS-B antenna interface, N female
4	NETWORK	Data Interface, RJ45

5. Connection

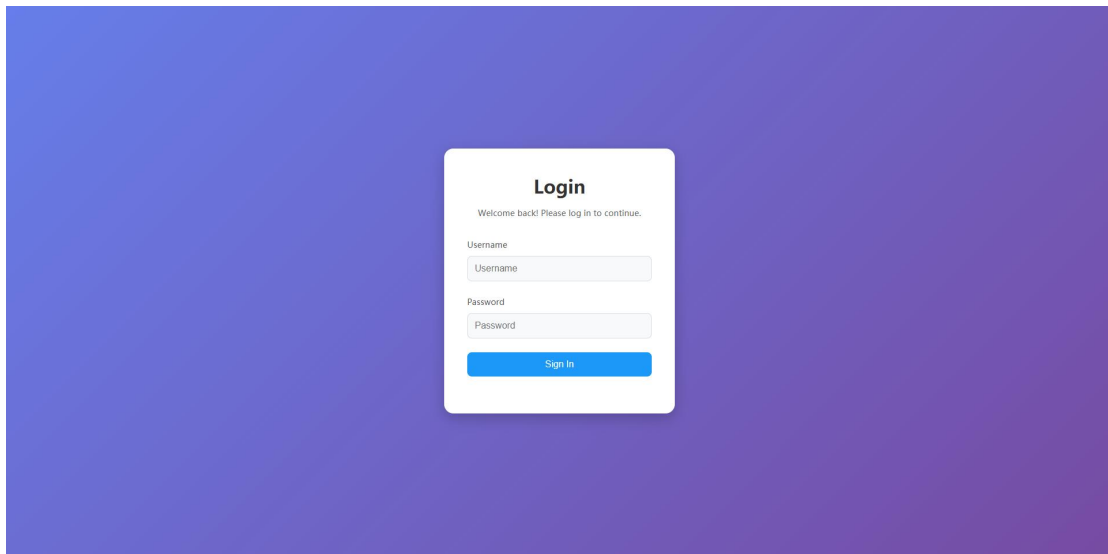
The default IP address of the ADSB-RE1090 is 192.168.10.10. It must be connected to a computer via the network port, either directly or through a router.

Direct Connection:

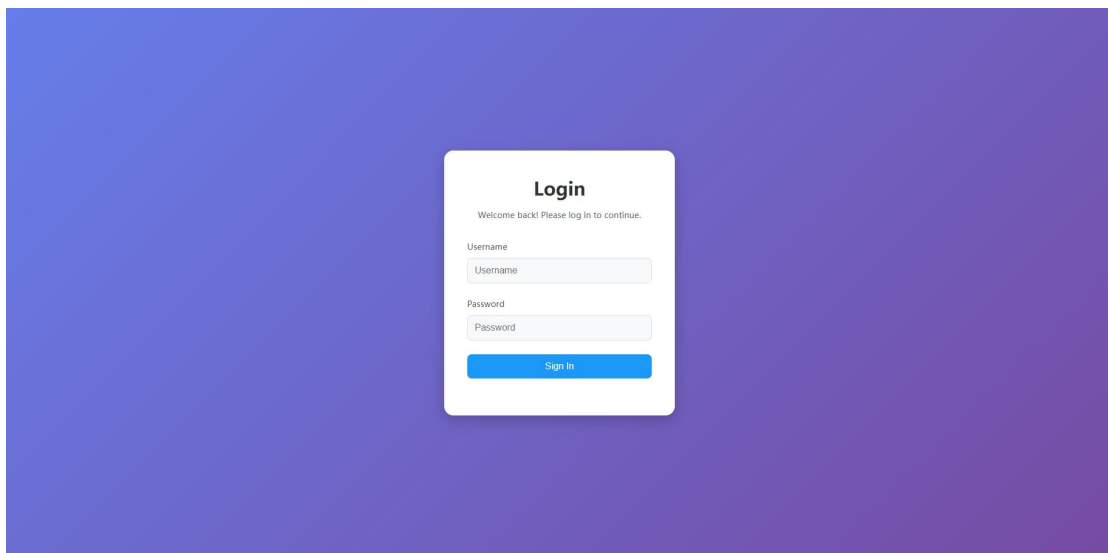
- (1) Connect the ADSB-RE1090 directly to the computer's network port using a network cable (or via a USB-to-RJ45 adapter).
- (2) Open the network connection settings on the computer, locate the network adapter connected to the ADSB-RE1090, and configure its IP address to be in the same subnet as the ADSB-RE1090 (the static IP address of the ADSB-RE1090 is 192.168.10.10).



- (3) Open a web browser, enter 192.168.10.10 in the address bar, and press Enter. If the following interface appears, the device is successfully connected.

**Router Connection Method:**

- (1) Connect the ADSB-RE1090 to the same router as the computer using a network cable (ensure the router's gateway is 192.168.10.1).
- (2) Open a web browser, enter 192.168.10.101 in the address bar, and press Enter. If the following interface appears, the device is successfully connected.



6. Data Format

1. Raw Message

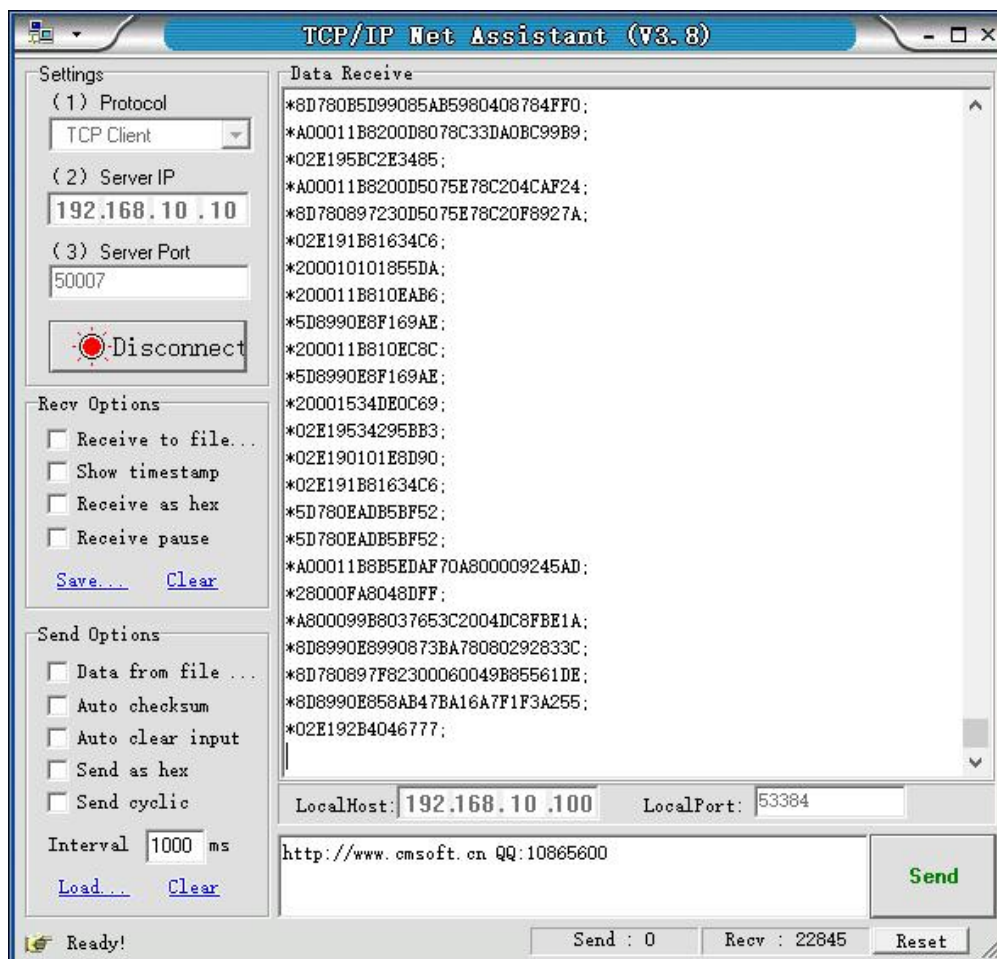
You can receive ADS-B raw message information via TCP. To configure this, open the

network debugging tool and set it as follows:

Protocol Type: TCP Client

Server IP Address: 192.168.10.10 (the IP address of the ADSB-RE1090)

Server Port: 50007 (the TCP port set in the data interface configuration).

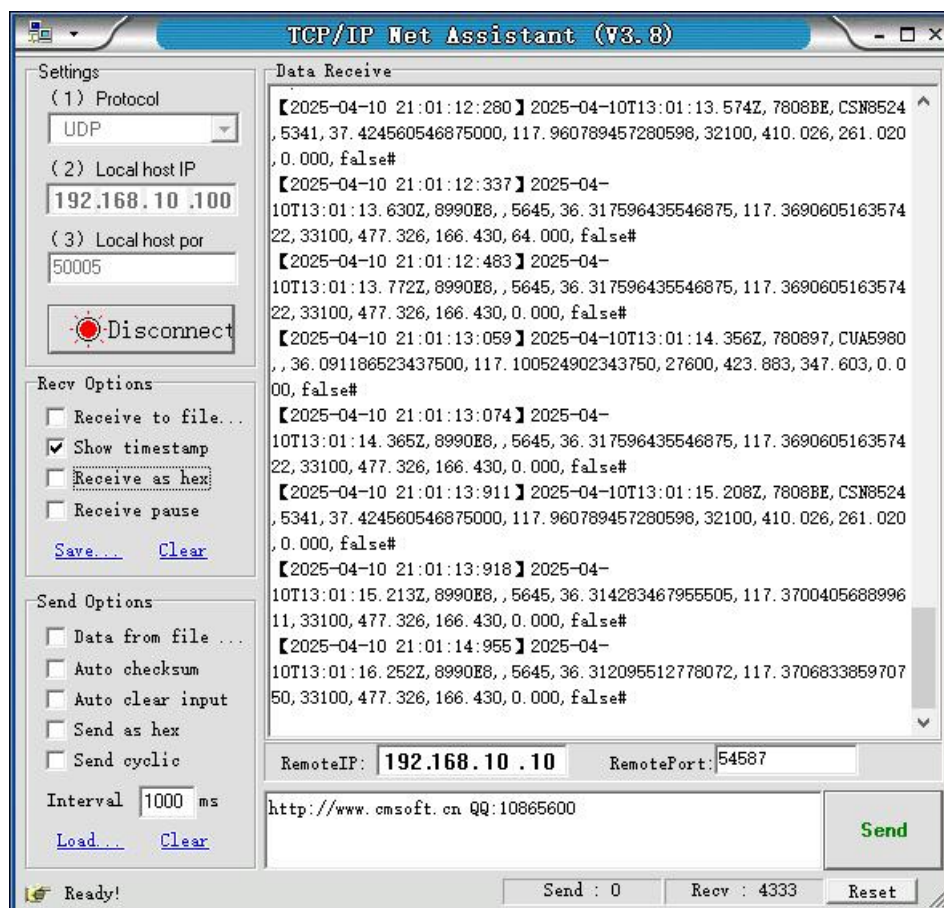


Raw Message Data Example:

```
*5D780CD7AB6A2D;
*5D7BB0F9D35532;
*8D78151CEA38E866033C08E21D45;
*8D7815CB587B8406F1171F42B050;
```

CSV Plaintext Data

To receive the decoded plaintext via UDP, open the network debugging tool and configure it as follows:



Decoded CSV Plaintext Data Example:

```
2025-01-23T06:23:04.006Z,780BA5,CSN5849,5673,36.009475708007812,117.01738357543
9453,25600,391.175,351.621,64.000,false#
2025-01-23T06:23:04.144Z,780EF1,CHB6279,6276,36.855422973632812,118.87224562624
6681,24600,444.933,96.582,0.000,false#
```

Data Description:

Data	Description	Remarks
2025-01-23T 06:23:04.006Z	Time	The time is the system device's time (reference format: ISO 8601), format: yyyy-MM-ddTHH:mm:ss.zzzZ
780BA5	ICAO 24-bit Address	6-digit hexadecimal format data
CSN5849	Call Sign	8 characters output
5673	Secondary Code	4-digit octal format number
36.009475708007812	Latitude	Latitude in decimal degrees, North is positive, South is negative
117.01738357543945 3	Longitude	Longitude in decimal degrees, East is positive, West is negative

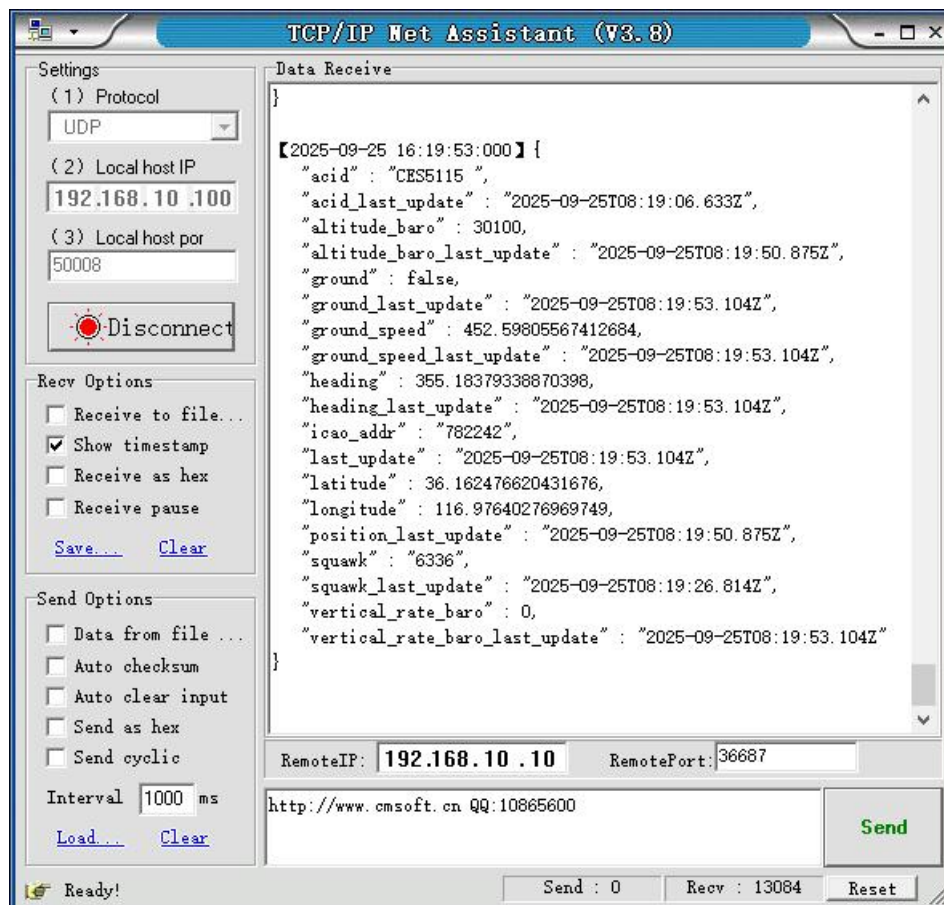
25600	Pressure Altitude	Feet
391.175	Ground Speed	Knots per hour
351.621	Heading Angle	Decimal, in degrees
64.000	Pressure Vertical Rate	Meters per minute, negative for descent, positive for ascent
false	Air/Ground Indicator	true indicates ground, false indicates air

Note: If data is missing, the value will be left empty and will not be output.

JSON Plaintext Data

JSON plaintext data is received via UDP and outputs standard JSON-formatted data.

Open the Network Debug Assistant and configure it as follows:



Decoded JSON Data Example:

```
{
  "acid" : "CUA5978 ",
  "acid_last_update" : "2025-08-02T01:49:45.386Z",
  "altitude_baro" : 27600,
```

```

"altitude_baro_last_update" : "2025-08-02T01:49:38.648Z",
"ground" : false,
"ground_last_update" : "2025-08-02T01:49:42.957Z",
"ground_speed" : 414.56603816521198,
"ground_speed_last_update" : "2025-08-02T01:49:42.957Z",
"heading" : 355.01828648354956,
"heading_last_update" : "2025-08-02T01:49:42.957Z",
"icao_addr" : "7810A0",
"last_update" : "2025-08-02T01:49:45.386Z",
"squawk" : "5051",
"squawk_last_update" : "2025-08-02T01:49:42.958Z",
"vertical_rate_baro" : 0,
"vertical_rate_baro_last_update" : "2025-08-02T01:49:42.957Z"
}
{
  "acid" : "CSN8976 ",
  "acid_last_update" : "2025-08-02T01:48:37.492Z",
  "altitude_baro" : 27600,
  "altitude_baro_last_update" : "2025-08-02T01:49:45.387Z",
  "ground" : false,
  "ground_last_update" : "2025-08-02T01:49:45.387Z",
  "ground_speed" : 451.7842405396629,
  "ground_speed_last_update" : "2025-08-02T01:48:31.466Z",
  "heading" : 350.05813916085731,
  "heading_last_update" : "2025-08-02T01:48:31.466Z",
  "icao_addr" : "782209",
  "last_update" : "2025-08-02T01:49:45.387Z",
  "squawk" : "5041",
  "squawk_last_update" : "2025-08-02T01:48:38.735Z",
  "vertical_rate_baro" : 0,
  "vertical_rate_baro_last_update" : "2025-08-02T01:48:31.466Z"
}

```

Data Description:

Data Items	Example Data	Descriptions
acid	CDG2230	Callsign
acid_last_update	2025-01-23T06:36:46.170Z	Last Updated Time of Callsign
altitude_baro	20700	Pressure Altitude (feet)
altitude_baro_last_update	2025-01-23T06:37:15.406Z	Last Updated Time of Pressure Altitude

ground	false	Ground Indicator, true indicates on the ground, false indicates in the air
ground_last_update	2025-01-23T06:37:15.406Z	Last Updated Time of Ground Indicator
ground_speed	438.308110807911	Ground Speed (knots)
ground_speed_last_update	2025-01-23T06:37:14.160Z	Last Updated Time of Ground Speed
heading	130.55875881014302	Heading Angle (degrees)
heading_last_update	2025-01-23T06:37:14.160Z	Last Updated Time of Heading Angle
icao_addr	7809A2	ICAO 24-bit Address
last_update	2025-01-23T06:37:15.406Z	Last Updated Time of Track
latitude	36.25309753417969	Latitude (degrees)
longitude	117.35332489013672	Longitude (degrees)
position_last_update	2025-01-23T06:37:15.406Z	Last Updated Time of Position
squawk	0052	Secondary Code
squawk_last_update	2025-01-23T06:37:01.379Z	Last Updated Time of Secondary Code
vertial_rate_baro	0	Vertical Rate (feet/minute)
vertial_rate_baro_last_update	2025-01-23T06:37:14.160Z	Last Updated Time of Vertical Rate

JSON Plaintext Track Data

To receive JSON plaintext track data, use the HTTP service. The data is output in standard JSON format.

To access the data, enter the following URL in your browser:

<http://192.168.10.10:8888>

(Note: Replace 192.168.10.10 with the IP address of your ADSB-RE1090 device.)

The fixed request port is 8888.

```

1 [
2 {
3   "acid": "CH7664",
4   "acid_last_update": "2025-01-23T06:36:22.712Z",
5   "altitude_baro": 23600,
6   "altitude_baro_last_update": "2025-01-23T06:36:24.554Z",
7   "ground": false,
8   "ground_last_update": "2025-01-23T06:36:24.554Z",
9   "ground_speed": 382.558960722527,
10  "ground_speed_last_update": "2025-01-23T06:36:04.441Z",
11  "heading": 276.811392244995,
12  "heading_last_update": "2025-01-23T06:36:04.441Z",
13  "icao_addr": "780688",
14  "last_update": "2025-01-23T06:36:24.554Z",
15  "vertical_rate_baro": 0,
16  "vertical_rate_baro_last_update": "2025-01-23T06:36:04.441Z"
17 },
18 {
19   "acid": "T071507",
20   "acid_last_update": "2025-01-23T06:35:46.538Z",
21   "altitude_baro": 20700,
22   "altitude_baro_last_update": "2025-01-23T06:36:16.623Z",
23   "ground": false,
24   "ground_last_update": "2025-01-23T06:36:25.135Z",
25   "ground_speed": 408.8275920238261,
26   "ground_speed_last_update": "2025-01-23T06:36:25.135Z",
27   "heading": 96.74256860639846,
28   "heading_last_update": "2025-01-23T06:36:25.135Z",
29   "icao_addr": "781B7F",
30   "last_update": "2025-01-23T06:36:25.206Z",
31   "latitude": 36.84544372558594,
32   "longitude": 119.02273178100586,
33   "position_last_update": "2025-01-23T06:36:16.623Z",
34   "vertical_rate_baro": 0,
35   "vertical_rate_baro_last_update": "2025-01-23T06:36:25.135Z"
36 },
37 {
38   "acid": "CDG2203",
39   "acid_last_update": "2025-01-23T06:35:39.846Z",
40   "altitude_baro": 31100,
41   "altitude_baro_last_update": "2025-01-23T06:36:23.300Z",
42   "ground": false,
43   "ground_last_update": "2025-01-23T06:36:24.354Z",
44   "ground_speed": 460.2195128414266,
45   "ground_speed_last_update": "2025-01-23T06:36:24.354Z",
46   "heading": 167.3226530108672,
47   "heading_last_update": "2025-01-23T06:36:24.354Z",
48   "icao_addr": "780D0A",
49   "last_update": "2025-01-23T06:36:24.354Z",
50   "latitude": 36.43657619670286,
51   "longitude": 117.32743932845746,
52   "position_last_update": "2025-01-23T06:36:23.300Z",
53   "vertical_rate_baro": -64,
54   "vertical_rate_baro_last_update": "2025-01-23T06:36:24.354Z"
55 },
56 {
57   "acid": "CH6261",
58   "acid_last_update": "2025-01-23T06:36:16.103Z",
59   "altitude_baro": 32100,
60   "altitude_baro_last_update": "2025-01-23T06:36:24.158Z",
61   "ground": false,
62   "ground_last_update": "2025-01-23T06:36:24.607Z",
63   "ground_speed": 373.68703482994985,
64   "ground_speed_last_update": "2025-01-23T06:36:24.607Z",
65   "heading": 260.9157790756205,
66   "heading_last_update": "2025-01-23T06:36:24.607Z",
67   "icao_addr": "780B19",
68   "last_update": "2025-01-23T06:36:24.607Z",
69   "latitude": 37.42418192200741,
70   "longitude": 117.95763762100883,

```

Decoded JSON Track Data Example:

```

{
  "altitude_baro": 22600,
  "altitude_baro_last_update": "2025-01-23T06:37:14.213Z",
  "ground": false,
  "ground_last_update": "2025-01-23T06:37:14.485Z",
  "ground_speed": 396.50472884948044,
  "ground_speed_last_update": "2025-01-23T06:37:14.485Z",
  "heading": 182.89126959679598,
  "heading_last_update": "2025-01-23T06:37:14.485Z",
  "icao_addr": "7820E2",
  "last_update": "2025-01-23T06:37:14.485Z",
  "latitude": 36.20709228515625,
  "longitude": 117.28546142578125,
  "position_last_update": "2025-01-23T06:37:14.213Z",
  "squawk": "4136",
  "squawk_last_update": "2025-01-23T06:37:02.356Z",
  "vertical_rate_baro": 0,
  "vertical_rate_baro_last_update": "2025-01-23T06:37:14.485Z"
},
{
  "acid": "CDG2230",

```

```

"acid_last_update": "2025-01-23T06:36:46.170Z",
"altitude_baro": 20700,
"altitude_baro_last_update": "2025-01-23T06:37:15.406Z",
"ground": false,
"ground_last_update": "2025-01-23T06:37:15.406Z",
"ground_speed": 438.308110807911,
"ground_speed_last_update": "2025-01-23T06:37:14.160Z",
"heading": 130.55875881014302,
"heading_last_update": "2025-01-23T06:37:14.160Z",
"icao_addr": "7809A2",
"last_update": "2025-01-23T06:37:15.406Z",
"latitude": 36.25309753417969,
"longitude": 117.35332489013672,
"position_last_update": "2025-01-23T06:37:15.406Z",
"squawk": "0052",
"squawk_last_update": "2025-01-23T06:37:01.379Z",
"vertical_rate_baro": 0,
"vertical_rate_baro_last_update": "2025-01-23T06:37:14.160Z"
},

```

Data Description:

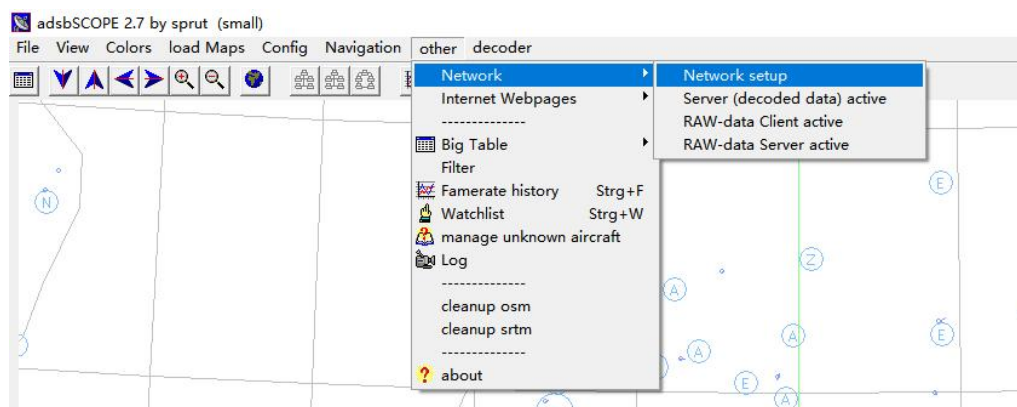
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altitude_baro_last_update	2025-01-23T06:37:15.406Z	Last Updated Time of Pressure Altitude
ground	false	Ground Indicator, true indicates on the ground, false indicates in the air
ground_last_update	2025-01-23T06:37:15.406Z	Last Updated Time of Ground Indicator
ground_speed	438.308110807911	Ground Speed (knots)
ground_speed_last_update	2025-01-23T06:37:14.160Z	Last Updated Time of Ground Speed
heading	130.55875881014302	Heading Angle (degrees)
heading_last_update	2025-01-23T06:37:14.160Z	Last Updated Time of Heading Angle
icao_addr	7809A2	ICAO 24-bit Address

last_update	2025-01-23T06:37:15.406Z	Last Updated Time of Track
latitude	36.25309753417969	Latitude (degrees)
longitude	117.35332489013672	Longitude (degrees)
position_last_update	2025-01-23T06:37:15.406Z	Last Updated Time of Position
squawk	0052	Secondary Code
squawk_last_update	2025-01-23T06:37:01.379Z	Last Updated Time of Secondary Code
vertial_rate_baro	0	Vertical Rate (feet/minute)
vertial_rate_baro_last_update	2025-01-23T06:37:14.160Z	Last Updated Time of Vertical Rate

7. Software Connection

The ADSB-RE1090 can be connected to the display software adsbScope. The detailed steps are as follows:

- (1) Open the display software adsbScope, such as adsbscope27_256.exe.
- (2) In the top menu, go to Other, then select Network and Network Setup.



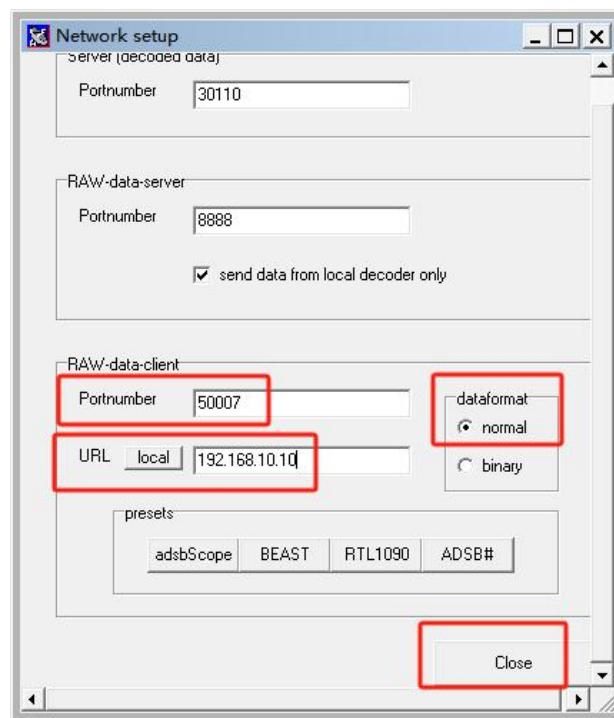
- (3) In the pop-up window, enter the following:

Port number: Fill in the TCP port used in the ADSB-RE1090 raw message.

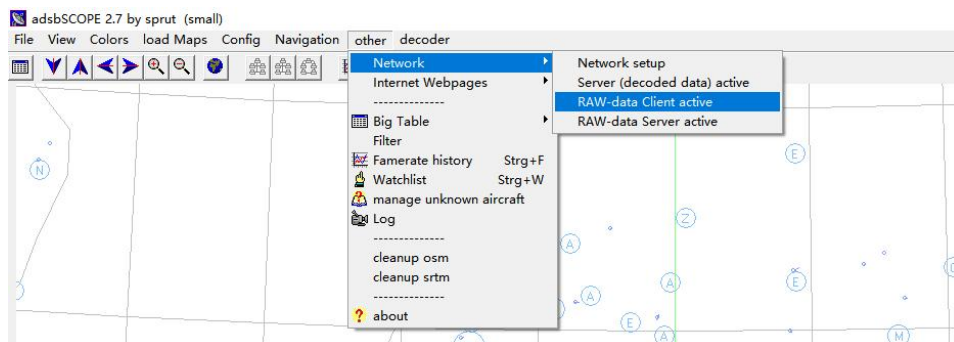
URL: Enter the device IP address.

Data format: Select Normal.

Click the Close button.

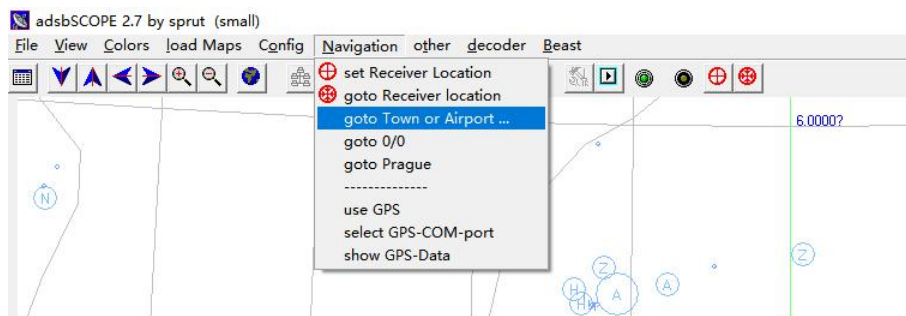


(4) Then, click Network in the top menu again, and select RAW-data Client Active.



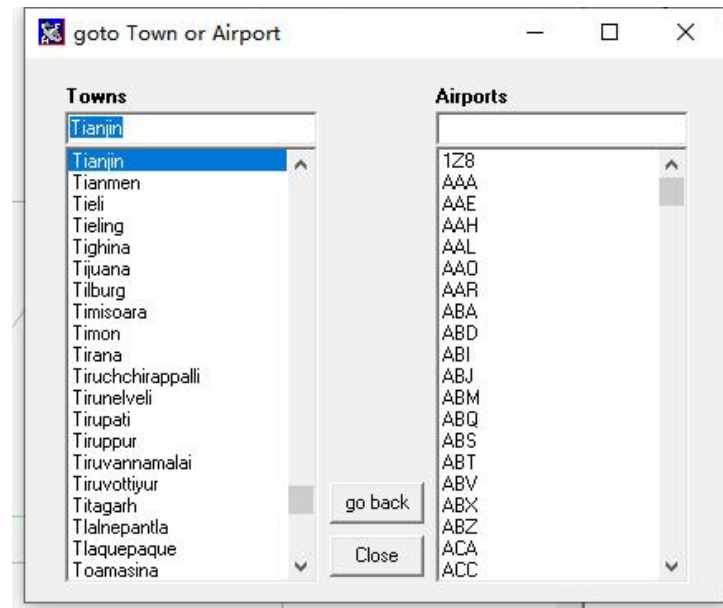
(5) At this point, you should see the received data on the right side of the software.

(6) Next, select Navigation in the menu and then Goto Town or Airport....



(7) In the pop-up window, type the name of the nearest airport (in English) in the Towns input box. Select the airport from the query list below, then click Close at the

top right corner.



(8) The display software will now show the aircraft's location properly.

8. Customization

All our products can be supplied tailored to your specific needs and customized with your brand and logo. We tailor designs, enclosures, features, and data formats to meet your specifications. Our OEM services empower you to launch unique products swiftly and risk-free.

9. Why Choose Us

- Comprehensive product range to meet users' needs for various levels of ADS-B ground station systems.
- Easy installation and use, with no complex configuration or high technical/business requirements—simple and user-friendly.
- Complete after-sales service, providing technical support for ADS-B products and services to help users maximize product benefits.
- Support for remote upgrades, assisting users in accessing the latest product features.

- Independent product development with customization options based on user requirements, including appearance, logo, software, hardware, performance, and functionality.

10. Frequently Asked Questions

Can multiple computers receive data from one ADSB-RE1090 simultaneously?

Yes.

Multiple computers or client devices can receive ADS-B data from the same ADSB-RE1090 over the network, making it suitable for multi-user monitoring and distributed surveillance systems.

What is the difference between ADSB-RE1090 and SDR USB ADS-B receivers?

ADSB-RE1090 is a professional standalone ADS-B ground receiver, while SDR USB receivers require a separate computer for signal processing.

Compared with SDR-based solutions, ADSB-RE1090 provides:

- Dedicated ADS-B signal processing
- Better receiving performance
- Stable 24/7 operation
- Native Ethernet connectivity
- Multiple decoded data formats
- Built-in web configuration
- Easy deployment without additional software

It is designed for professional aviation surveillance and system integration rather than hobby use.

Can the ADSB-RE1090 filter ADS-B data before output?

Yes. ADS-B data filtering is available as an optional feature.

The ADSB-RE1090 can filter received aircraft data before output based on

configurable criteria. Supported filtering options include:

- Distance (range) filtering – output only aircraft within a specified radius from the receiver.
- Altitude filtering – output only aircraft within a specified altitude range.

Only the filtered data is transmitted to the output interface, which can:

- Reduce data traffic.
- Minimize the processing load on the host system.
- Improve overall system efficiency.
- Allow applications to focus only on aircraft within the area of interest.

The filtering function is performed inside the receiver, so the host system receives only the filtered data without requiring additional software processing.

This feature is optional and can be customized according to specific project requirements.

Can ADSB-RE1090 transmit data over a 4G or 5G network?

Yes.

ADSB-RE1090 can transmit ADS-B data through 4G or 5G cellular networks when connected to a compatible industrial cellular router or gateway via Ethernet.

This enables deployment in locations where wired Internet is unavailable, allowing real-time aircraft surveillance data to be transmitted to remote servers, control centers, or cloud platforms.

Typical deployment scenarios include:

- Remote ADS-B ground stations
- Airport and heliport surveillance
- Mobile or portable monitoring systems
- Temporary flight test sites
- Mountain, island, or offshore installations
- UAV and UTM monitoring networks

Because the receiver uses standard Ethernet networking, it can communicate

through LAN, fiber, 4G, 5G, VPN, or private APN networks without requiring any hardware modification.

This provides a flexible solution for building distributed ADS-B surveillance networks in virtually any deployment environment.

Can ADSB-RE1090 transmit ADS-B data through an encrypted connection?

Yes. Secure data transmission is available as an optional feature.

ADSB-RE1090 can support encrypted data transmission through VPN connections to ensure secure communication between the ADS-B receiver and the remote server or monitoring platform.

When deployed at remote locations, the receiver can transmit ADS-B surveillance data through secure network channels, helping protect data communication from unauthorized access or interception.

VPN-based encrypted transmission is suitable for applications that require enhanced network security, including:

- Remote ADS-B ground stations
- Airport and airfield surveillance systems
- Distributed ADS-B sensor networks
- Government and aviation authority projects
- Enterprise private networks
- Remote monitoring and cloud-based platforms

The VPN solution can work together with various communication methods, including:

- Ethernet networks
- Fiber networks
- 4G/5G cellular networks
- Private APN networks

With encrypted communication, ADSB-RE1090 provides a secure and reliable solution for deploying remote ADS-B monitoring stations over public or private

networks.

Can ADSB-RE1090 transmit data via WiFi?

Yes. WiFi data transmission is available as an optional feature.

ADSB-RE1090 can support wireless data transmission through WiFi, allowing received ADS-B data to be delivered to monitoring systems, servers, or applications without a physical Ethernet connection.

The WiFi option improves deployment flexibility and is particularly useful for portable ADS-B ground stations, temporary monitoring sites, and remote field applications where network cabling is difficult or unavailable.

Typical applications include:

- Portable ADS-B receiver deployments
- Temporary aviation surveillance systems
- Flight tracking demonstrations
- UAV/drone monitoring
- Aviation research and field tests
- Remote ADS-B data collection stations

The receiver can connect to existing wireless networks and work together with other communication methods such as Ethernet, fiber, 4G/5G cellular networks, and VPN encrypted connections, providing flexible networking options for different ADS-B surveillance scenarios.