

Standard Network AIS Receiver NWD-01 With Decode

User Manual

AvionixTech

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1.Introduction

The NWD-01 is an AIS receiver designed specifically for system integration, shore-based monitoring, and vessel tracking applications. It features a dual-channel parallel receiving architecture and supports both raw AIS message output and JSON-formatted decoded data output, making it particularly suitable for users who require in-depth AIS data processing or secondary development.

With its compact size (220 × 160 × 72 mm) and lightweight design weighing only 1,150 g, the device supports 12 V DC power supply and can also be powered by a power bank. It is suitable for a wide range of deployment scenarios, including portable, fixed, and vehicle-mounted applications.

Typical Applications

Shore-Based AIS Vessel Monitoring System: Connects to VTS (Vessel Traffic Services) systems or port monitoring platforms to obtain real-time vessel traffic information in the surrounding area.

AIS Data Collection and Research:Collects vessel track data for traffic flow analysis, route planning, and vessel behavior research.

Portable Temporary Monitoring Deployment: Enables rapid deployment of AIS monitoring capabilities for large-scale events, emergency response, or temporary operational areas.

Bridge Collision Avoidance and Warning System: Deployed at bridges or critical points along waterways to receive AIS information from passing vessels in real time. Combined with data such as navigational clearance height and channel width, the system can provide warnings for vessels that are excessively high, deviating from the designated channel, or approaching abnormally, providing a reliable source of real-time vessel traffic data for active bridge collision prevention.



Packing List:

No.	Item	Quantity	Remarks
1	NWD-01	1 unit	Included
2	Power Cable	1 Piece	Included
3	AIS Antenna(Long Version) & Clamp	1 Set	Included
4	AIS Antenna Cable	1 Piece (5m)	Included
5	Ethernet Cable	1 Piece	Included

2.Features

- **Multi-Band AIS Signal Reception**

The device supports simultaneous reception of the standard AIS channels, AIS 1 (161.975 MHz) and AIS 2 (162.025 MHz). Optional support for the two extended frequencies, 156.775 MHz and 156.825 MHz, enables the device to cover a broader range of maritime VHF communication frequencies, meeting AIS signal acquisition requirements in specific regions and application scenarios.

- **Dual-Format Data Output for Easier Development**

The device supports two output formats: AIS raw messages (NMEA 0183 format) and JSON plain text. The JSON plain-text output directly provides decoded vessel dynamic data, including MMSI, latitude and longitude, speed, heading, and other information. Users do not need to independently parse the AIS protocol, significantly reducing system development time.

- **Flexible Network Integration**

The device supports both TCP and UDP network transmission protocols and can connect to the user network via either a static IP address or DHCP. The device can be connected directly to a computer or integrated into an existing LAN through a router, without requiring an additional serial server or protocol converter.

- **Signal Strength Output (Optional)**

Optional output of the Received Signal Strength Indicator (RSSI) for each AIS message is available, providing data support for signal coverage analysis, interference troubleshooting, and antenna deployment optimization.

- **Portable, Lightweight, and Plug-and-Play**

The device features a compact and lightweight design and operates on 12 V DC power, with a power adapter included as standard. It can also be powered by a 12 V portable power bank. An AIS antenna and GPS/BeiDou antenna are included as standard, enabling plug-and-play operation right out of the box.

- **Comprehensive Support for Secondary Development**

Clear network communication protocol documentation and data format examples are provided. OpenCPN display software is also included, making it convenient for users to perform functional verification and testing before system integration.

- **Customization Support**

Supports customer-specific OEM customization.

Supports ACARS/ADS-B/AIS integration.

3.Specifications

NWD-01:

No.	Specifications	
1	Power Supply	DC 12V, 2A(adjustable according to actual requirements)
2	Power Consumption	3.6W
3	Receiving Frequency	161.975 MHz, 162.025 MHz 156.775 MHz(Optional) 156.825 MHz(Optional)
4	Sensitivity	$\leq -115\text{dBm @ } 20\% \text{ PER}$
5	Reception Range	>50 km (unobstructed coastal area)
6	Receiving Dynamic Range	-115 dBm to +10 dBm
7	Supported AIS message types	1-27
8	AIS Target Processing Capacity	≥ 600 targets
9	Processing Capability	> 2,500 messages/second
10	Data Format	Raw AIS messages(NMEA 0183) / JSON plaintext
11	Data Interface	RJ45 Ethernet
12	Network Configuration	Static IP or DHCP
13	Network Protocol	TCP/UDP
14	Dimensions	220 × 160 × 72 mm (main unit)
15	Weight	1150g

AIS Antenna (Long Version):

No.	Specifications	
1	Frequency Range	156 MHz -166 MHz
2	Antenna Gain	5 dBi
3	Protection Rating	IP67
4	VSWR	≤ 1.5
5	Polarization	Vertical
6	Radiation Pattern	Omnidirectional
7	Input Impedance	50 Ω
8	Power Handling Capacity	50 W
9	Connector Type	N-J
10	Antenna Dimensions	Length: 120 cm, Diameter: 2 cm
11	Antenna Material	Fiberglass (FRP)
12	Total Weight	364 g
13	Operating Humidity	5% ~ 95%
14	Operating Temperature	-40°C ~ +85°C

AIS Antenna (Short Version):

No.	Specifications	
1	Frequency Range	149 MHz -189 MHz
2	Antenna Gain	3 dBi
3	Protection Rating	IP67
4	VSWR	≤ 1.5
5	Polarization	Vertical
6	Radiation Pattern	Omnidirectional
7	Input Impedance	50 Ω
8	Power Handling Capacity	20 W
9	Connector Type	SMA-J
10	Antenna Dimensions	Length: 20 cm

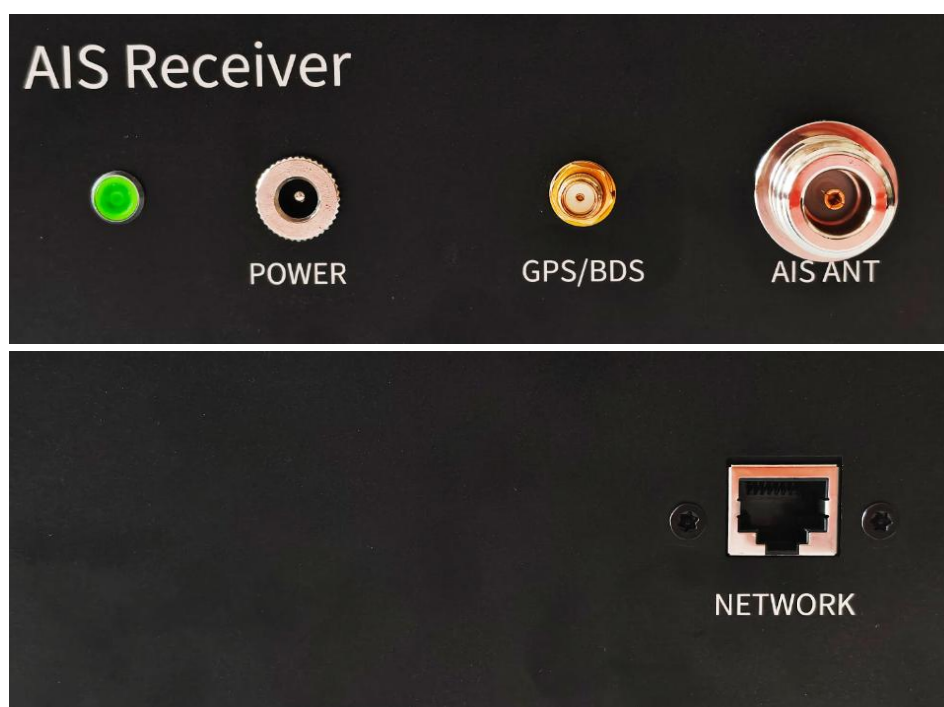
11	Antenna Material	TPEE
12	Operating Humidity	5% ~ 95%
13	Operating Temperature	-30°C ~ +75°C
14	Storage Temperature	-30°C ~ +75°C

Other antennas with different dimensions are also available and can be selected according to specific requirements.

GNSS Antenna:

No.	Specifications	
1	Gain	5 dBi
2	VSWR	≤ 1.5
3	LNA Gain	28 dBi
4	Noise Figure	< 1.0
5	Connector Type	SMA Male
6	Cable Length	3 m
7	Mounting Type	Magnetic

4.Interface Description



Main Unit Interfaces::

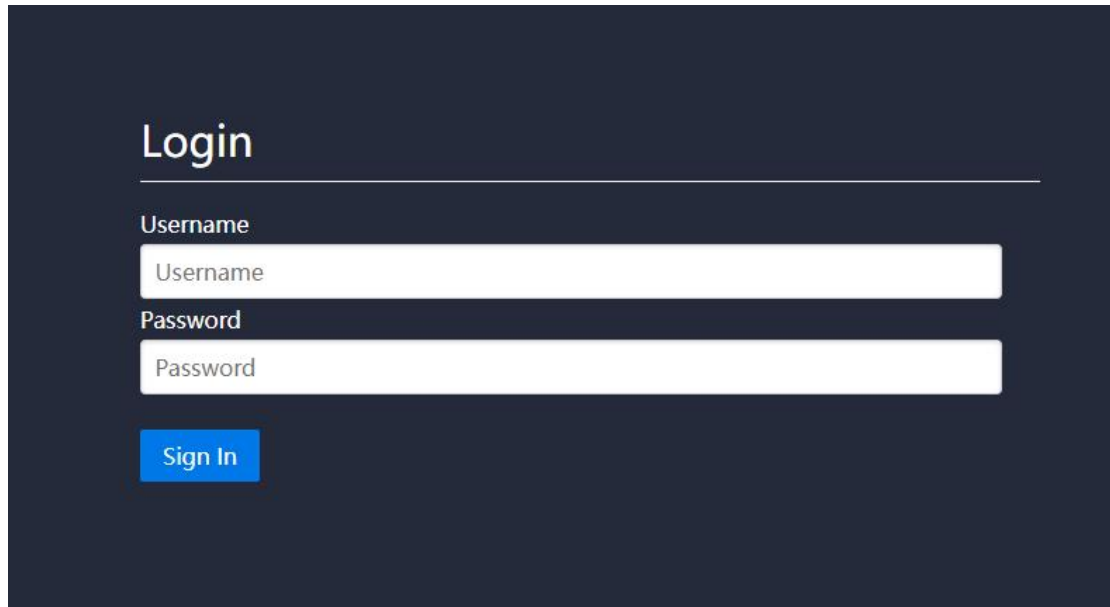
No.	Interface Name	Function
1	POWER	Main unit power supply interface, DC 12V 2A
2	GPS/BDS	GPS/BDS antenna interface, SMA Female
3	AIS ANT	AIS antenna interface, N-Type Female
4	NETWORK	Data interface, RJ45 connector

5.Device Connection

The default IP address of the NWD-01 is 192.168.10.33. It must be connected to a computer via the Ethernet port. This can be done either by a direct connection to the computer or through a router.

Direct Connection Method:

- Connect the NWD-01 directly to the computer's Ethernet port using a network cable (or via a USB to RJ45 adapter).
- Open the Network Connections interface on your computer, locate the network adapter connected to the NWD-01, and configure its IP address to be on the same subnet as the NWD-01 device (the static IP address of the NWD-01 is 192.168.10.33).
- Open a web browser, enter 192.168.10.33 in the address bar, and press Enter. The following interface will appear, confirming that the connection to the device is successful.



Login

Username

Username

Password

Password

Sign In

Router Connection Method:

- Connect the NWD-01 via an Ethernet cable to the router that your computer is connected to (ensure the router's gateway is 192.168.10.1).
- Open a web browser, enter 192.168.10.33 in the address bar, and press Enter.
The following interface will appear, confirming that the connection to the device is successful.



Login

Username

Username

Password

Password

Sign In

6.Device Configuration

1. Login to the Web Interface

After connecting the device, enter the device's IP address in a web browser and press Enter. You will be prompted to enter the login credentials for device configuration management.

Username: admin

Password: aaareceiver

2. Configuration Interface Home Page

Dashboard

Service	Process running
Cable	Manual(Static IP)
IP	192.168.10.33
Netmask	255.255.255.0
Default Gateway	192.168.10.1
WIFI	Automatic(DHCP)
Reboot System	<button>Reboot</button> <button>Shutdown</button>

Note: The status under <Service> should show <Process running>. If not, please click "Process start".

Dashboard

Service	Process start
Cable	Manual(Static IP)
IP	192.168.10.33
Netmask	255.255.255.0
Default Gateway	192.168.10.1
WIFI	Automatic(DHCP)
Reboot System	Reboot Shutdown

3. Network Configuration

Two modes are available: Automatic (DHCP) and Manual (Static IP).

Click on Network Configuration > Wired, enter the desired IP address, Subnet Mask, and Gateway, then click Modify Network Configuration.

Network Setting

IP Address Assignment

[Cable](#) [WIFI](#)

☐ Automatic(DHCP)

☒ Manual(Static IP)

IP
192.168.10.33

Netmask
255.255.255.0

Default Gateway
192.168.10.1

[Change Network Settings](#) [Cancel](#)

To use automatic mode, select Automatic (DHCP), click Modify Network

Configuration, and then restart the device for the changes to take effect.

Network Setting

IP Address Assignment

Network configuration successfully, please reboot the system

Reboot

Cable WIFI

☐ Automatic(DHCP)
☒ Manual(Static IP)

IP
192.168.10.33

Netmask
255.255.255.0

Default Gateway
192.168.10.1

Change Network Settings Cancel

Note: After switching to Automatic mode, the device must be connected to a router with DHCP enabled; otherwise, you will not be able to access the device.

Note: Wireless configuration is disabled in the current version.

4. Data Interface Configuration

Click on Data Interface Configuration to access the data interface settings. When outputting data externally, the NWD-01 acts as a UDP client.

Raw Messages: Standard AIS messages with signal strength and timestamp.

Plaintext: Decoded AIS data with signal strength and timestamp.

Dataport Setting

Message output IP

Message output port

Plaintext output IP

Plaintext output port

5.NTPD Status

The NTPD Status is used for AIS receivers with timestamp output. The current receiver does not require this function.

6. GNSS Status

The GNSS Status is used for AIS receivers with timestamp output. The current receiver does not require this function.

7.Clock Status

The Clock Status is used for AIS receivers with timestamp output. The current receiver does not require this function.

7.Data Format

1. Raw Messages

Raw Message Example:

```
AIVDM,1,1,,A,1000h>A00:5GDb0Igh1Ggvt1Url,0*35
AIVDM,1,1,,B,1000h>A00:5GDb0Igh1Ggvt1Url,0*36
```

Raw Message Example with Optional RSSI Output

The following example shows a message with RSSI output enabled. The RSSI value and the message are separated by an underscore “_”. The first field before the underscore contains the RSSI value, while the second field contains the AIS message.

```
Radio1 Channel=A RSSI=-33dBm MsgType=1 MMSI=12345_!AIVDM,1,1,,A,1000h>A00:5GDb0Igh1Ggvt1Url,0*35
Radio2 Channel=B RSSI=-34dBm MsgType=1 MMSI=12345_!AIVDM,1,1,,B,1000h>A00:5GDb0Igh1Ggvt1Url,0*36
```

RSSI Description

RSSI indicates the received signal strength of the AIS signal. The unit is dBm.

2. JSON Plaintext

JSON Plaintext Example:

The following example shows the plaintext output with a timestamp. A time field is added to the original plaintext data to provide the timestamp information.

```
{
  "msg_type": 1,
  "repeat": 0,
  "mmsi": 12345,
  "status": 1,
  "turn": 0.0,
  "speed": 1.0,
  "accuracy": false,
  "lon": 75.0,
  "lat": 45.0,
  "course": 35.0,
  "heading": 511,
```

```
"second": 30,  
"maneuver": 0,  
"raim": false,  
"radio": 417460,  
}
```

JSON Plaintext Example with Optional RSSI Output:

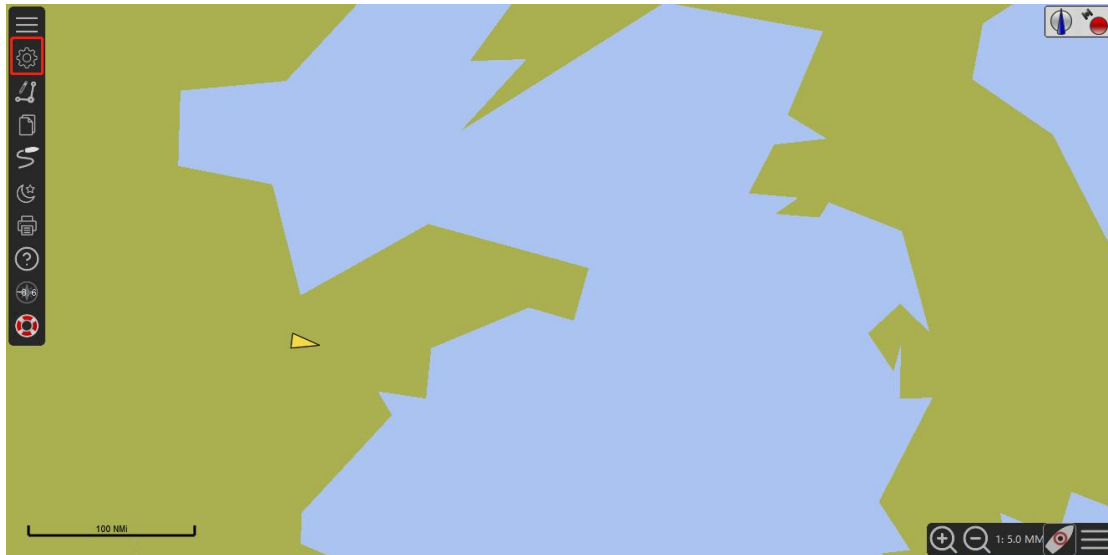
The following example shows the decoded data with RSSI information added. Based on the original decoded data, an additional “rssi” field is included to indicate the received signal strength.

```
{  
  "msg_type": 1,  
  "repeat": 0,  
  "mmsi": 12345,  
  "status": 1,  
  "turn": 0.0,  
  "speed": 1.0,  
  "accuracy": false,  
  "lon": 75.0,  
  "lat": 45.0,  
  "course": 35.0,  
  "heading": 511,  
  "second": 30,  
  "maneuver": 0,  
  "raim": false,  
  "radio": 417460,  
  "rssi": "-36dBm"  
}
```

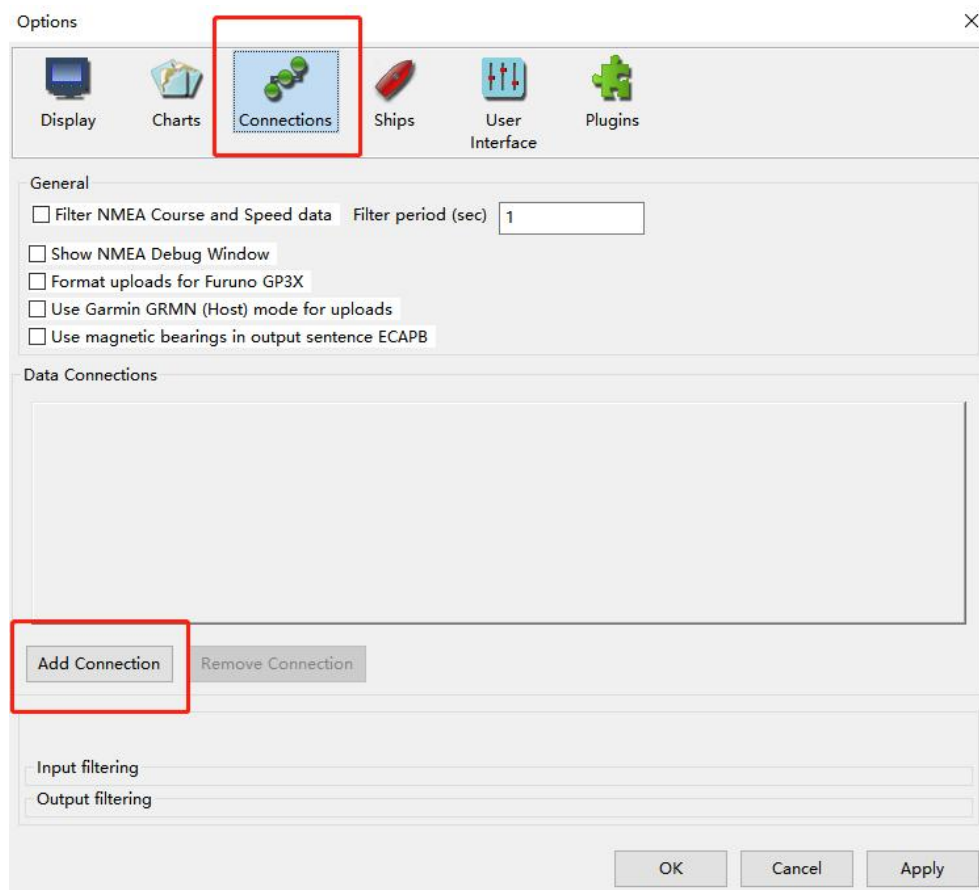
8.Works with OpenCPN

NWD-01 can work with OpenCPN

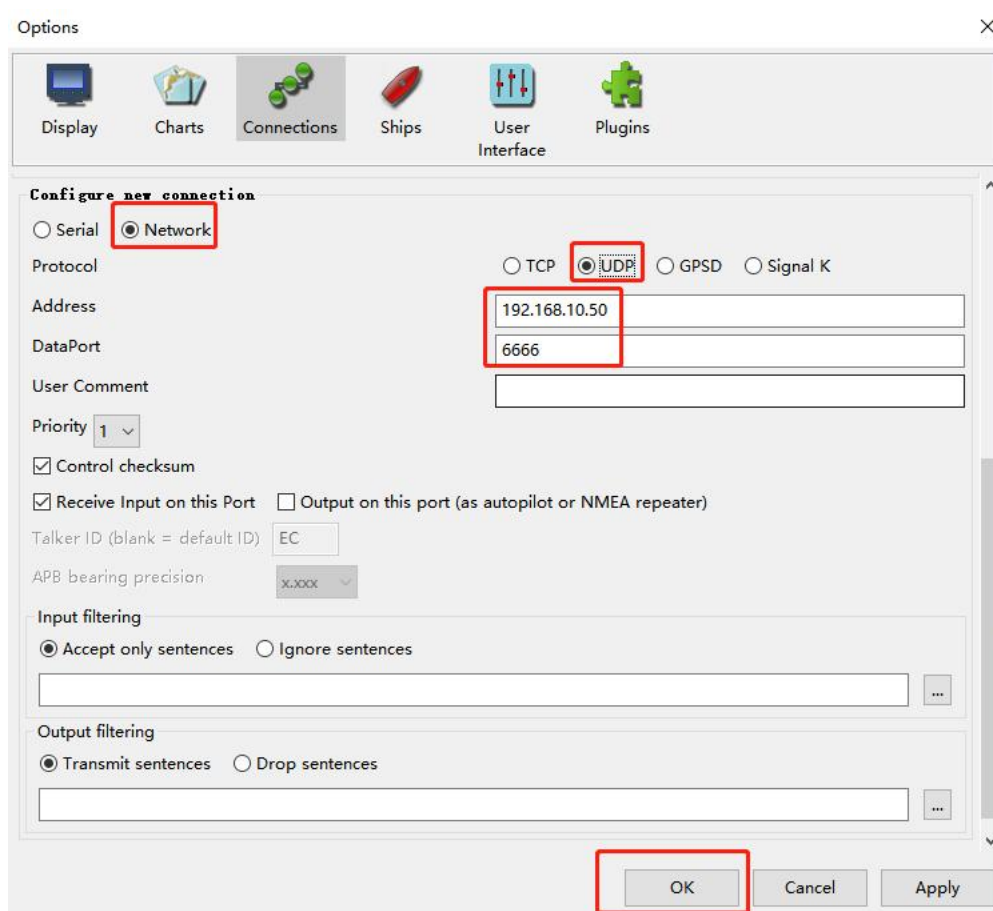
Open OpenCPN, click set



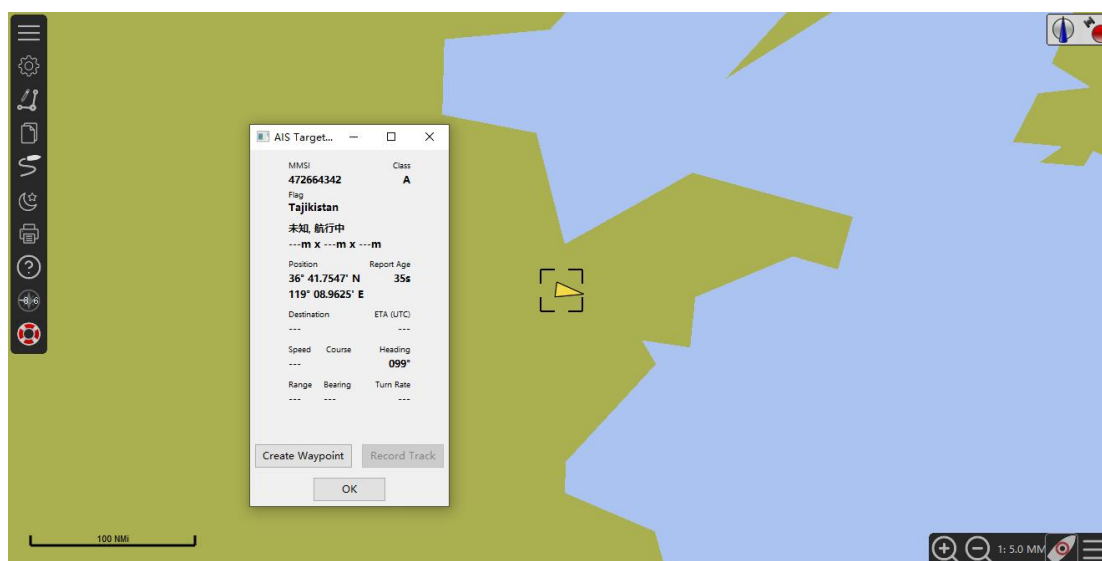
Click Connections, and then click Add Connection



Select Network, UDP. In the Address area, input the NWD-01 message output IP (usually this is your computer IP). In DataPort area, input the message output port (in this manual example it's 6666), click OK.



Done!



9.OEM, ODM, White Label & Customization

We offer flexible OEM, ODM, white-label, and customization solutions for our ADS-B, AIS, ACARS, and other aviation and surveillance products.

Our products can be tailored to your specific technical and commercial requirements and customized with your own brand and logo. Depending on your requirements, we can customize product designs, enclosures, hardware and software features, interfaces, and data formats.

Whether you need a ready-to-brand white-label product, an OEM solution, or a fully customized product for a specific application, our experienced team can help you bring your product to market efficiently while reducing development time and risk.

Our products are constantly evolving. New features, improvements, and capabilities are being added over time. Something that wasn't possible before may be possible today.

Contact us to discuss your specific requirements and explore the most suitable solution for your business.

10.Important Note

Please note:

Our device must not and shall not be used for military or illegal purposes under any circumstances.

11. Why Choose Us

- Comprehensive product range to meet users' needs for various levels of AIS receiver systems.
- Easy installation and use, with no complex configuration or high technical requirements for engineers. Simple and user-friendly.
- Complete after-sales service, providing technical support 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 form factors, logo, software, hardware, performance, and functionality.

12. Frequently Asked Questions

Can the NWD-01 be used for secondary development?

Yes. The NWD-01 is specifically designed to facilitate secondary development and system integration. AIS data is provided through the Ethernet interface, and users can select raw AIS messages or decoded JSON data according to their application requirements.

Can the NWD-01 be used for portable or field deployment?

Yes. The NWD-01 has a compact and lightweight design and can be powered by a 12V power bank. This makes it suitable for portable AIS monitoring, field surveys, temporary deployments, maritime research and other applications where mains power may not be readily available.

What is the main advantage of the NWD-01 compared with a basic AIS receiver?

A key advantage of the NWD-01 is that it combines AIS reception, decoding and network data transmission in one device. Instead of receiving only raw AIS messages through a serial interface, the NWD-01 can provide decoded AIS data in JSON format through Ethernet, while still supporting raw AIS output when required. This reduces software development work and makes the receiver easier to integrate into network-based surveillance and data-processing systems.

13.Related Products

If you're looking for a standard network AIS receiver, please check



Network AIS Receiver AIS-RN02

If you're looking for an AIS receiver that can output AIS messages and decoded data with timestamp, please check



Network AIS Receiver NWD-01T with WiFi+decode+timestamp