HS-MX1203GT
User Manual

Version 1.4

(Sep2025)

HS-MX1203GT

High Performance Embedded Class B & B+ AIS Transceiver Module

Version 1.4

1. Product Overview

The HS-MX1203GT is our company's next-generation, low-cost, low-power, high-performance embedded B and B+ class AIS solution. It incorporates domestically developed, independently controlled core technologies specifically designed to meet the onboard safety recreational craft, inland watercraft, and unmanned vessels. This next-generation, low-cost, low-power, high-performance embedded AIS Class B and Class B+ transceiver module incorporates domestically developed core technologies, providing critical collision avoidance alerts, route monitoring and management, and essential navigation and communication support for vessel operators. The module employs a dedicated AIS signal processor chip based on the latest generation of compact, low-power, low-cost embedded SDR (Software-Defined Radio) architecture. It supports both Class B (2W CSTDMA) and Class B+ (5W SOTDMA) operating modes, effectively meeting diverse application scenarios, installation/integration environments, and the AIS transceiver requirements of small-to-medium vessels for customers worldwide.

The HS-MX1203GT delivers exceptional reliability, ultra-low power consumption, and a compact form factor, making it suitable for shipborne

black box terminals and land-based compact portable base stations. It supports AIS data sensing, collection, management, and services, meeting application requirements for unmanned vessels, smart vessels, and maritime vessel IoT systems.

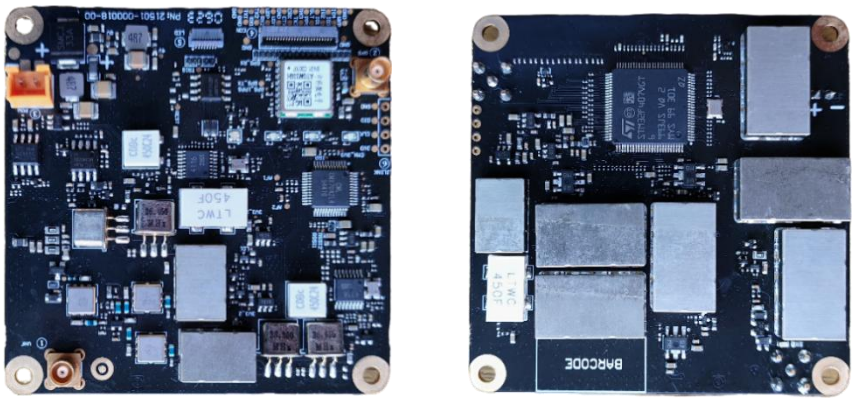


Figure 1 Physical Diagram

2. Features and Specifications

- Utilizes a dedicated low-power processor chip supporting full Class B AIS protocol
- Integrates full-stack baseband processing and RF transceiver functionality
- Meets ultra-high sensitivity reception requirements down to -119dBm
- Supports software upgrades and device control via TTL serial port
- Support automatic reception and processing of AIS information from other vessels or VTS shore stations
- Supports multiple data format interfaces including NMEA2000, NMEA0183, and GNSS
- Can extract position, heading, speed, and other information, encapsulating it according to the standard format of AIS messages
- Capable of connecting to and transmitting data to shipboard multifunction displays and other naval equipment, enabling ship-to-ship and ship-to-shore interconnection and collaboration
- Complies with IEC 60945, IEC 62287-1/2, IEC61162-1/2, IEC61108-1, ITU-R

M1371-5 and NMEA2000 @ Edition2.20 standards

- Ultra-compact dimensions: 70mm x 70mm x 14mm
- Suitable for general marine navigation and communication systems, shore-based portable base stations, inland waterway and offshore navigation buoys, offshore platforms, marine buoys, offshore wind farm electronic fences, inland electric vessels, unmanned vessels, and bridge collision avoidance warning systems.

3. Electrical Characteristics

Parameters	Specification	Remarks
AIS1	161.975MHz	
AIS2	162.025MHz	
Rx Sensitivity	≤-119dBm @ 20% PER	
Co-channel Rejection	0~-10dB	
Adjacent Channel Selectivity	≥70dB	
Spurious Emission Rejection	≥70dB	
Intermodulation	≥65dB	
Blocking	≥-23dBm	
Communication Ports	3.3V TTL/NMEA0183; NMEA2000	NMEA0183(38400bps); NMEA2000(250kbps)
Baud Rate	38400bps	
Operating Voltage	9V~36V DC	
Frequency Range	156.025MHz~162.025MHz	
Frequency Deviation	≤±0.5KHz	
Output Power	2W(CSTDMA)、5W(SOTDMA)	
Tx Spurious Emissions	≤0.25uW	
Operating Temperature	-20℃~60℃	

Table 1 Electrical Characteristics

4. Dimensions (unit: mm)

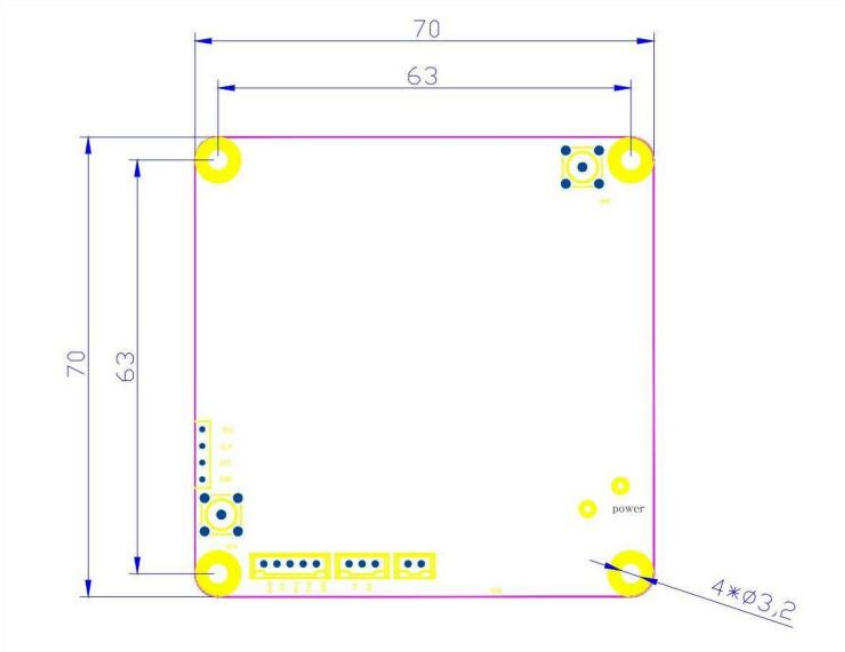


Figure 2 Module size diagram (70 mm x 70mm x 14mm)

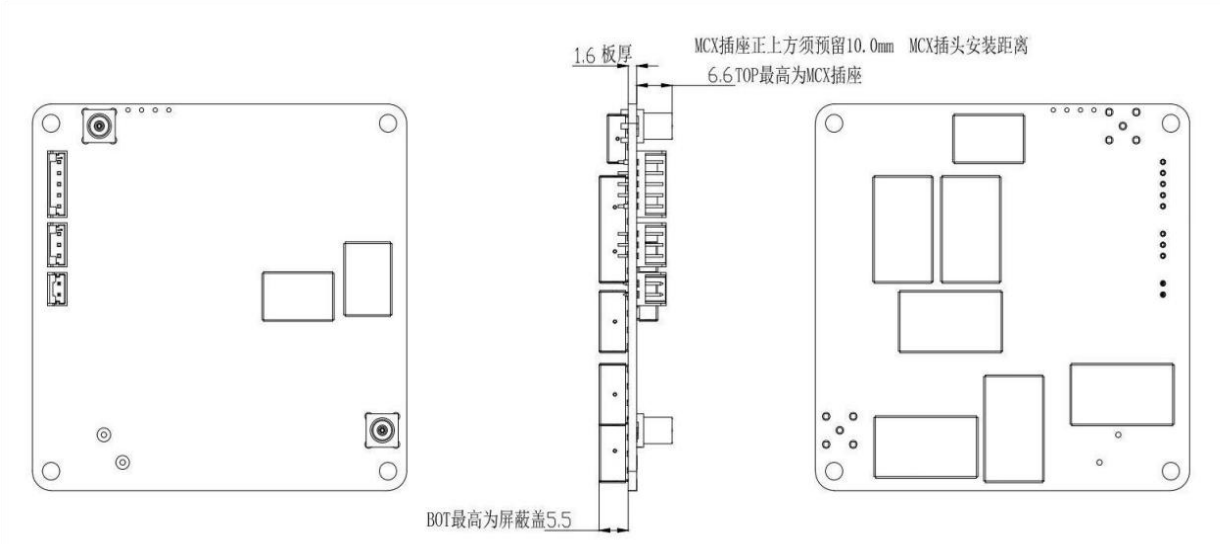


Figure 3 HS-MX1203GT 3D Height Limit Diagram

5. Interface Definitions

Connector ①			
Serial Number	Definition	Connection Instructions	Remarks
①	VHF	Connect to AIS Antenna	MCX(Female)

Connector ②			
Serial Number	Definition	Connection Instructions	Remarks
②	GPS	Connect to GPS/BeiDou Antenna	MCX(Female)

Connector ③			
Serial Number	Definition	Connection Instructions	Remarks
③	–	Power Supply, Negative	
	+	Power Supply, Positive,_12V DC	

Connector ④			
Serial Number	Definition	Connection Instructions	Remarks
1	GND	Ground	
2	TX1	TTL1 Serial Port Signal Output	
3	RX1	TTL1 Serial Port Signal Input	
4	GND	Ground	
5	TX2	TTL2 Serial Port Signal Output	
6	RX2	TTL2 Serial Port Signal Input	
7	GND	Ground	
8	NC	Floating	
9	NC	Floating	
10	GND	Ground	
11	CTX	CAN Signal Output	
12	CRX	CAN Signal Input	
13	GND	Ground	
14	TX3	External GPS Signal Output	
15	RX3	External GPS Signal Input	
16	PPS	External GPS UTC Input	
17	GND	Ground	

18	SLT	SILENT MODE (Active Low)	
19	NC	Floating	
20	NC	Floating	
21	NC	Floating	
22	NC	Floating	
23	WKP	Floating	
24	GND	Ground	

Connector ⑤ (LED indicator)			
Serial Number	Definition	Connection Instructions	Remarks
1	GND	Ground	
2	LED ERRO	Device Error Indicator	
3	LED GPS	GPS Status Indicator	
4	LED RX	Device Rx Status Indicator	
5	LED TX	Device Tx Status Indicator	
6	LED OTHER	Device Other Status Indicator	
7	3V3 IN	3.3V Voltage Input	
8	GND	Ground	
9	GND	Ground	
10	GND	Ground	

Table 2 Interface Definitions

6. Connections

6.1 Power Supply

The module's power supply is connected to pin ③ on the board via a 12VDC regulated power supply. Ensure correct polarity is maintained.

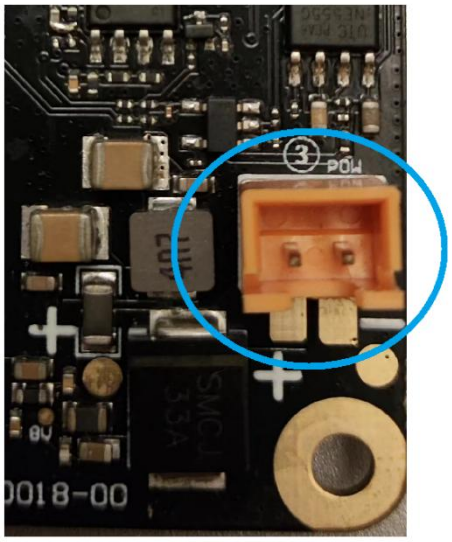


Figure 4 Power Interface

6.2 Data and Communication Interface

The module's external data communication and control ports must be connected to the 24-pin composite communication interface on pin ④ of the board. Refer to Table 1 for pin definitions.

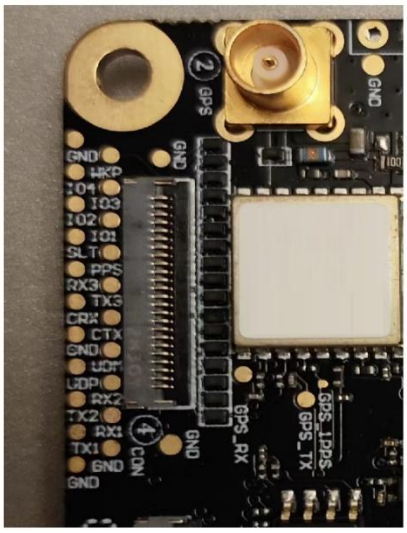
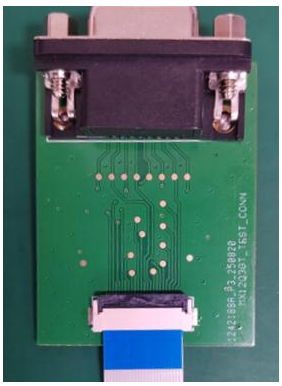
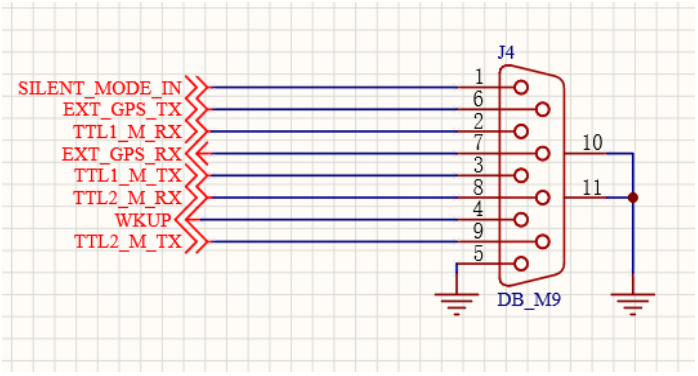


Figure 5 Composite Data Communication Interface





Pin	Function	Description	Remarks
1	SILENT_MODE_IN	Silent Mode Input	Active low
2	TTL1_M_RX	Serial Port 1 Data Input	3.3V TTL
3	TTL1_M_TX	Serial Port 1 Data Output	3.3V TTL
4	WKUP	WKUP function	Software not supported
5	GND	Ground	
6	EXT_GPS_TX	External GPS Data Output	When using external GPS
7	EXT_GPS_RX	External GPS data input	When using external GPS
8	TTL2_M_RX	Serial Port2 Data Input	This port is currently disabled
9	TTL2_M_TX	Serial Port2 Data Output	This port is currently disabled

Figure 6 External Communication Serial Port Adapter Board and Definitions

6.3 AIS and GPS Antenna Connections

The external AIS antenna connects via the board's VHF port ①, while the GPS antenna connects via the board's GPS port ②. Never power on the module without both AIS and GPS antennas connected.

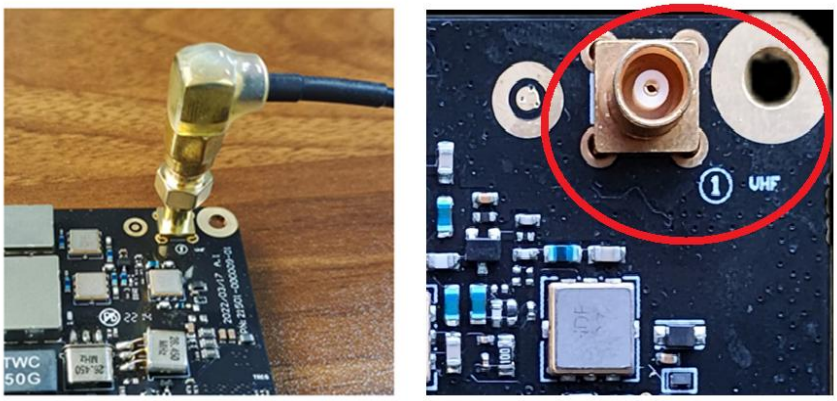


Figure 7 VHF Antenna Connection

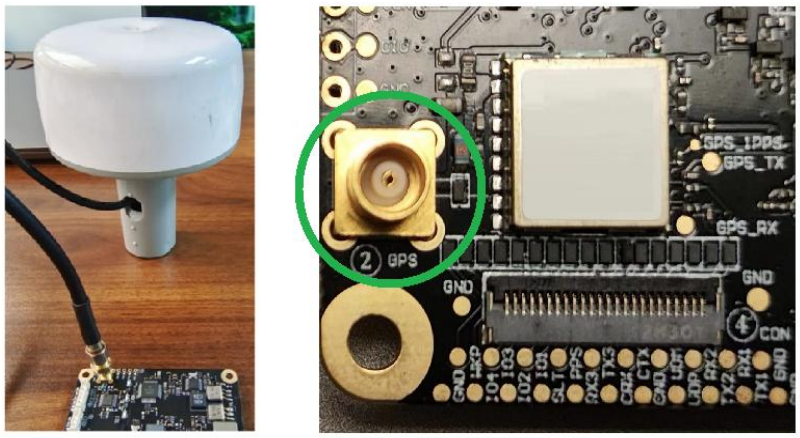


Figure 8 GPS Antenna Connection

6.4 LED Status Indicators

Operating and status indicators are defined in Table 2 under Interface ⑤.

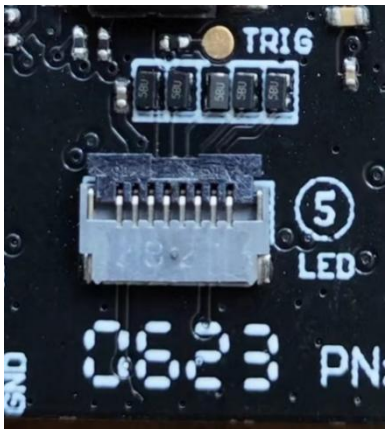


Figure 9 Operating and Status Indicator Interface

7. Application Notes

7.1. The HS-MX1203GT accepts 12V or 24V DC power input. After power-up,allow 1 second for initialization before normal operation begins.

7.2 The UART1 is a standard 3.3V TTL serial port data output with baud rate of 38400bps.

7.3 The UART2 is reserved for serial port and has no data output.

7.4 Module Configuration MMSI needs to be configured, and the output is the source data of AIS message, which needs to be systematically parsed.

7.5 When the vessel has a power cut-off controller, HS-MX1203GT power

supply requires external control as shown in Figure 10.

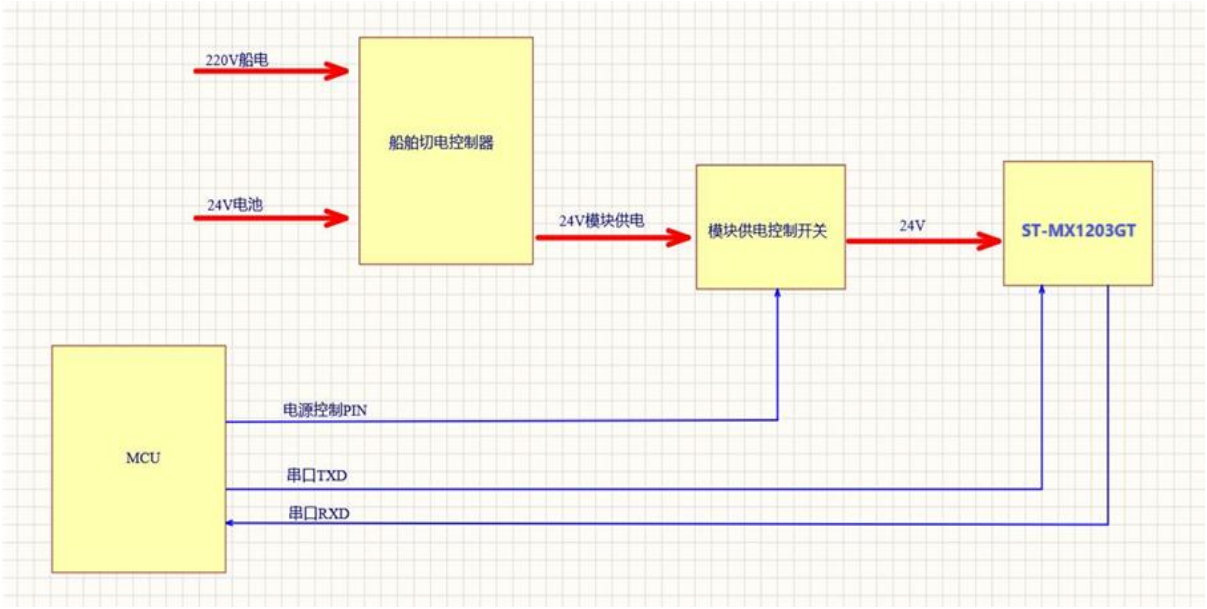


Figure 10 HS-MX1203GT Power Control Recommendation

8. Software Configurations

8.1 Power Settings

The default power setting of the module factory is 2W. The high, medium and low power setting commands are as follows:

1) 5W, $PAIS,CMD,7,CFG,TX_POWER,H,0*40
2) 2W, $PAIS,CMD,7,CFG,TX_POWER,M,0*45
3) 1W, $PAIS,CMD,7,CFG,TX_POWER,L,0*44

8.2 Other configurations

Please refer to the HS-MX1203GT Configuration Command Guide.

9. Application FAQs

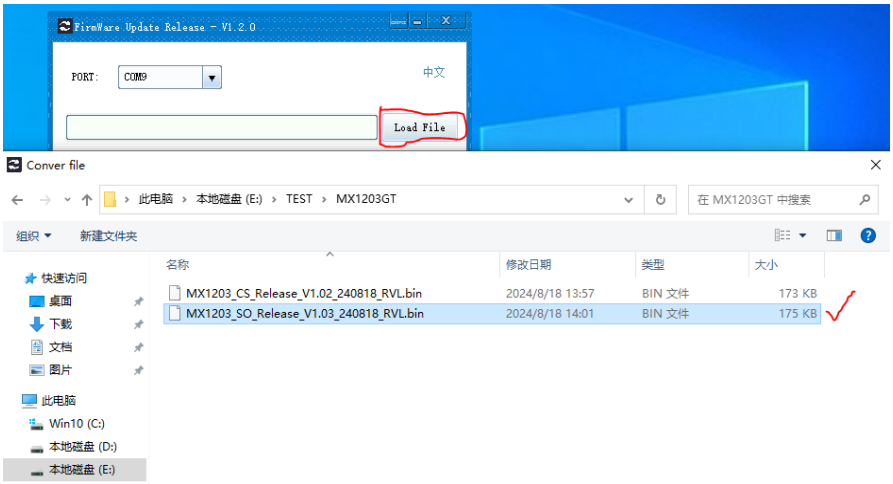
Q1:

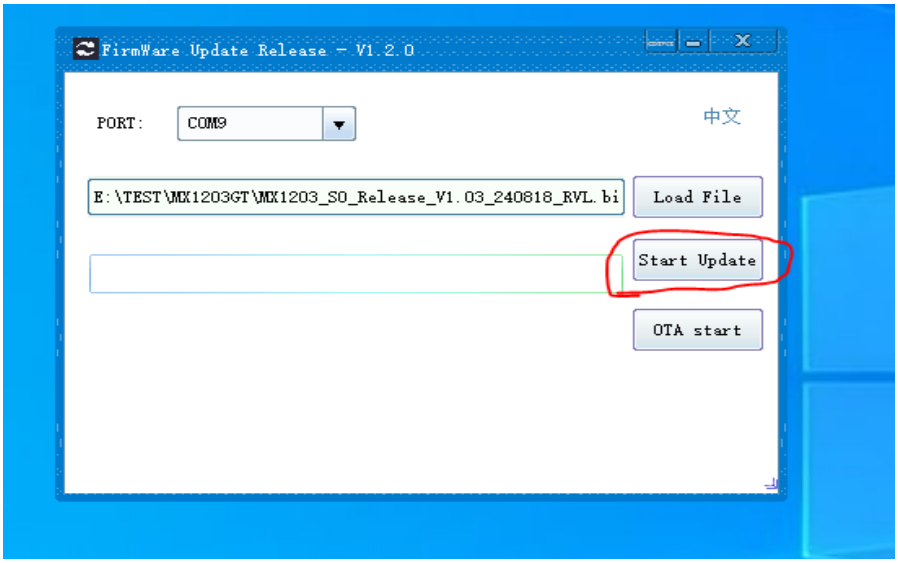
- Occasional absence of CR in GSV statements
- Invalid alarm ID 000 (for mess $AIALR, 092806,000, A, V, AIS: Antenna fault*0D)
- Alarm ID 000 is invalid (for mess $AIALR, 100833,000, A, V, Position lost*52)
- NMEA command checksum is invalid (for mess $BDGSV and $GPGSV)

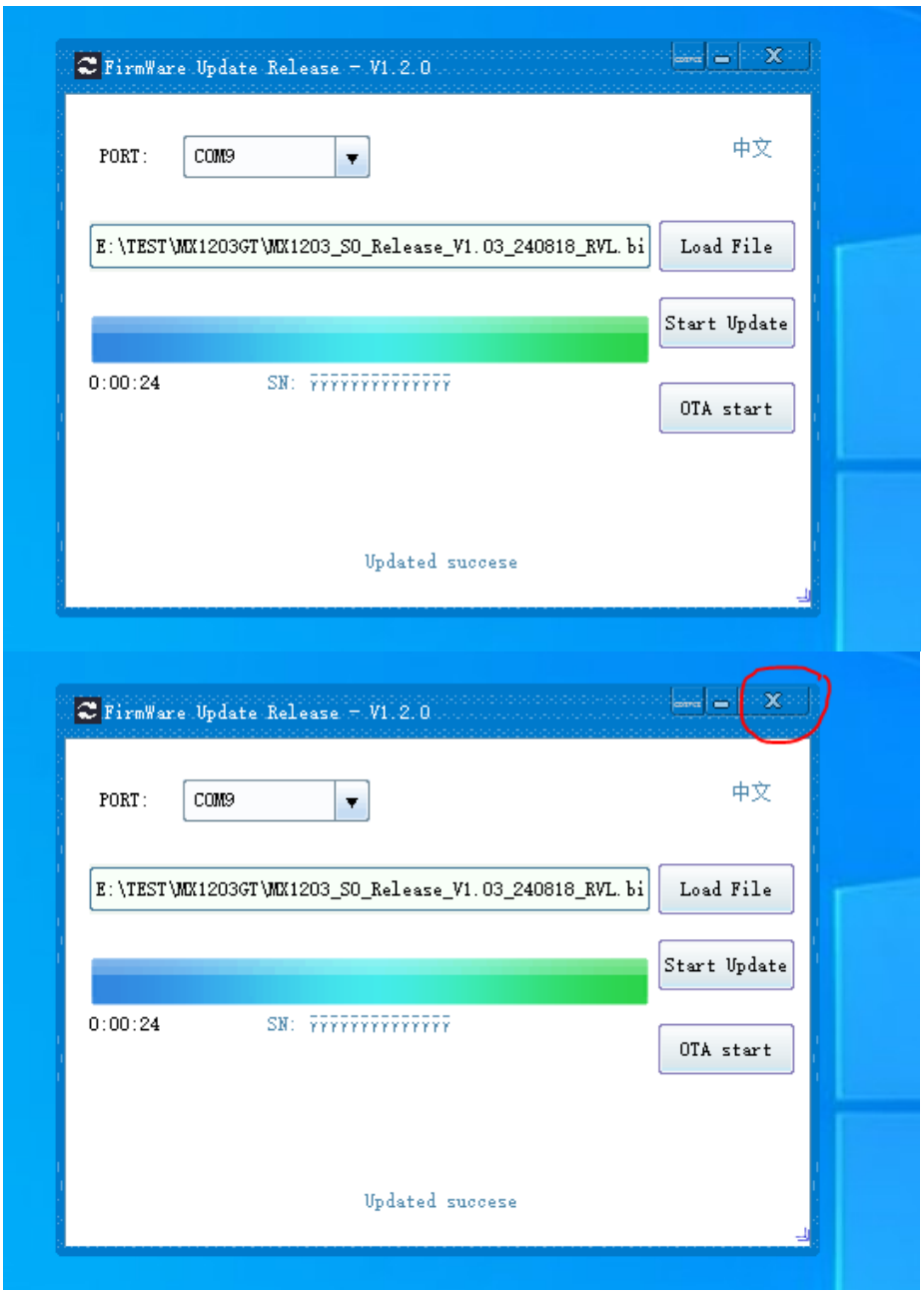
A1:

This can be addressed by upgrading to an updated firmware version using the software tool. The following is a step-by-step firmware upgrade process through the software tool.

1. Upgrade software tools: FirmwareUpdate_Release_V1.2.0_
2. firmware version: MX1203_SO_Release_V1.03_240818_RVL





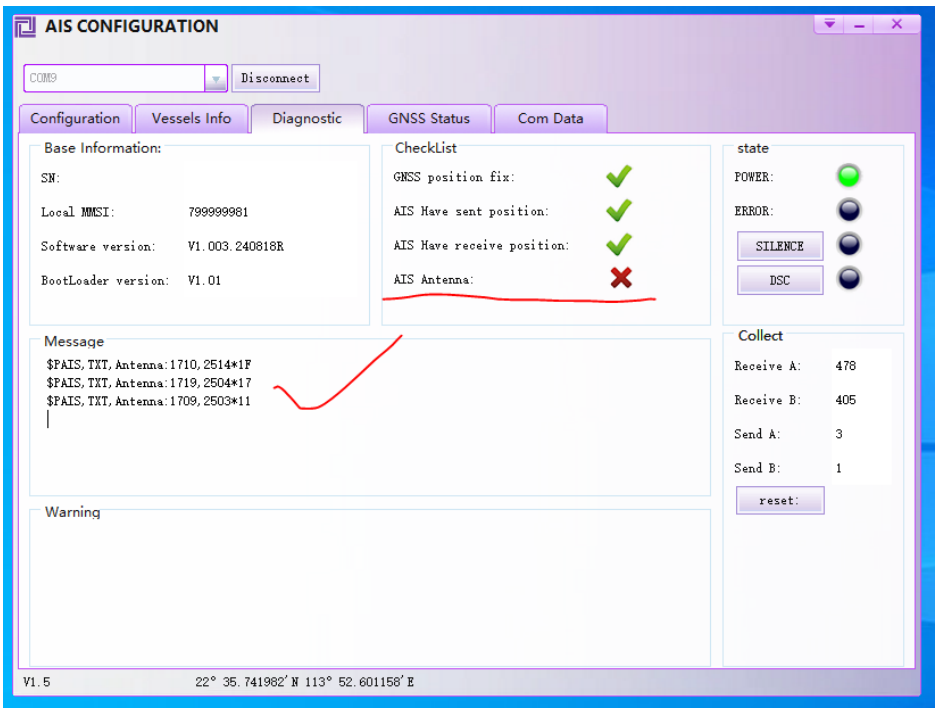


Q2:

-Why is the antenna fault alarm always active?

A2:

The error was caused by a version compatibility issue between the AIS hardware device, configuration tool (AIS CONFIGURATION), and Windows. The latest hardware version V1.2 The problem has been resolved and the configuration tool (AIS CONFIGURATION) is now guaranteed to be compatible with all versions of Windows.



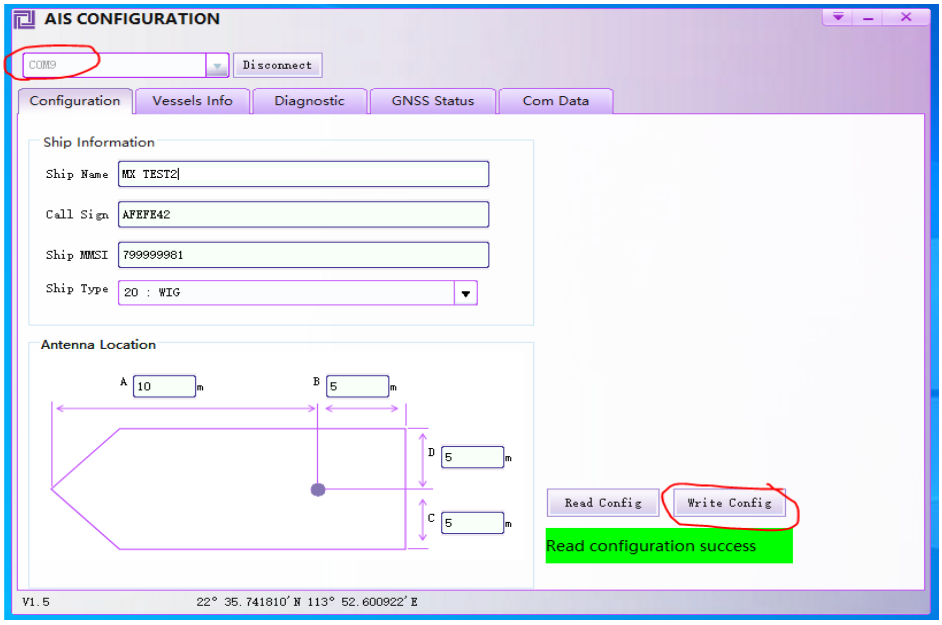
Q3:

- How to configure HS-MX1203GT?
- How to configure static data (i.e., MMSI, name, etc.) for message 18/24?

A3:

Use our configuration tool (AIS CONFIGURATION) to follow the following steps:

After the configuration is complete, the device will automatically generate 18 and 24 AIS messages.

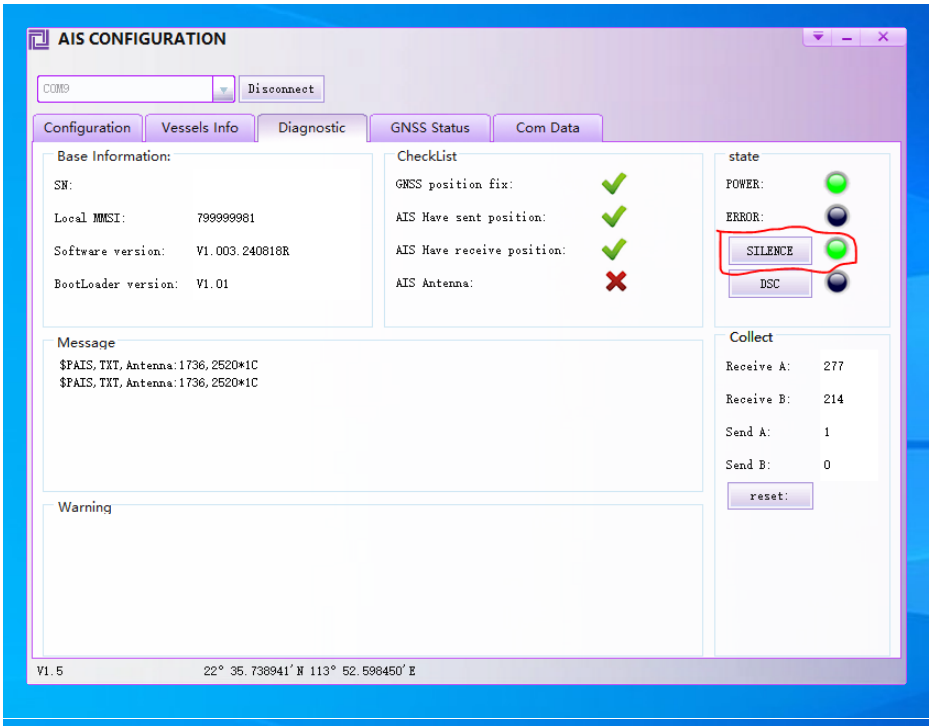


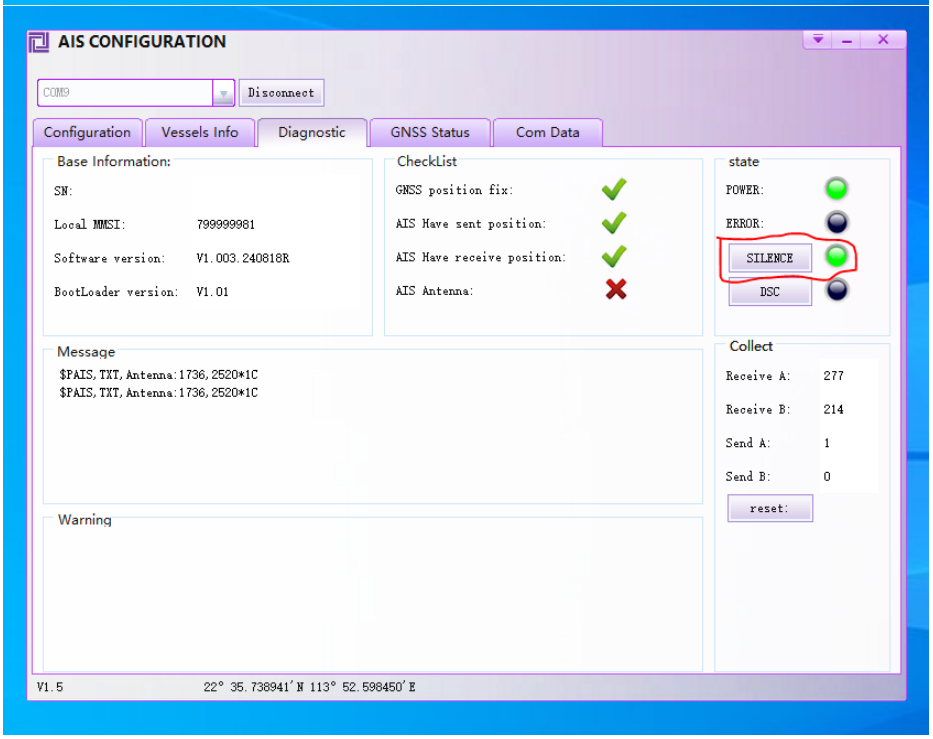
Q4:

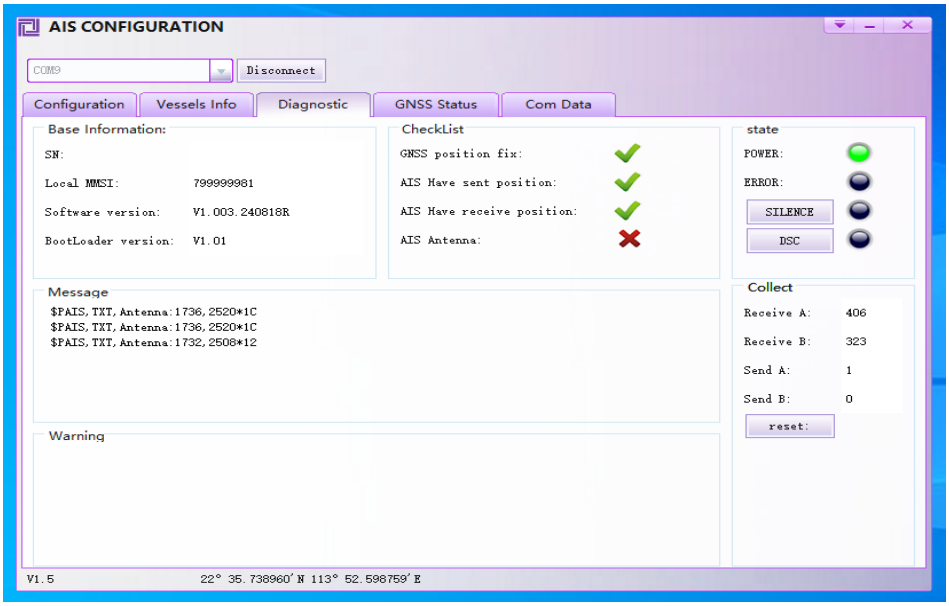
- How to turn off AIS transmission?

A4:

Enter the diagnosis interface, click the mute button, the green LED indicator shows that the device is in mute mode, at this time the AIS device only receives mode, click the button again and cancel.







The following test results have been obtained after the configuration of HS-MX1203GT.