

Table of Contents

1. Introduction	6
1.1 What is NB-IoT Microwave Radar distance Sensor	6
1.2 Features	6
1.3 Specification	6
1.4 Applications	7
1.5 Installation	8
1.6 Sleep mode and working mode	8
1.7 Button & LEDs	9
1.8 BLE connection	10
1.9 Pin Definitions , Switch & SIM Direction	10
1.9.1 Jumper JP2	10
1.9.2 BOOT MODE / SW1	10
1.9.3 Reset Button	11
1.9.4 SIM Card Direction	11
1.10 Mechanical	11
1.10.1 for NB version	11
1.10.2 for NS version	12
1.11 Measure starting point	12

2. Use MR-03/12/25-NB/NS to communicate with IoT Server	12
2.1 Send data to IoT server via NB-IoT network	13
2.2 Payload Types	14
2.2.1 General Json Format(Type=5)	15
2.2.2 HEX format Payload(Type=0)	16
2.2.3 ThingsBoard Payload(Type=3)	19
2.2.4 ThingSpeak Payload(Type=1)	19
2.3 Test Uplink and Change Update Interval	20
2.4 Set Alarm Distance	21
2.5 Set Interrupt Mode(0x06)	21
2.6 Clock logging	22
2.7 Datalog Function	23
2.7.1 Unix TimeStamp	23
2.7.2 Poll sensor value	24
2.7.3 Datalog Uplink payload	24
2.8 Example Query saved historical records	25
2.9 Uplink log query	26
2.10 Scheduled domain name resolution	27
2.11 Set the QoS level	27
2.12 Set the downlink debugging mode	28
2.13 Domain name resolution settings	28
2.14 Set CoAP option	29
2.15 Calibration Command	30
2.16 Print last few data entries	30
2.17 Print data entries base on page	31
2.18 Clear Flash Record	32
3. Configure MR-03/12/25-NB/NS	33
3.1 Configure Methods	33
3.2 Serial Access Password	33
3.3 AT Commands Set	36
4. Battery & Power Consumption	37
5. Firmware update	37

6. FAQ	38
6.1 How can I access t BC660K-GL AT Commands?	38
6.2 How to configure the certificate?	38
6.3 Why is there no LED response when I press the button on the solar panel model?	38
7. Order Info	38
8. Packing Info	38
9. Support	39



Table of Contents:

- [1. Introduction](#)
 - [1.1 What is NB-IoT Microwave Radar distance Sensor](#)
 - [1.2 Features](#)
 - [1.3 Specification](#)
 - [1.4 Applications](#)
 - [1.5 Installation](#)
 - [1.6 Sleep mode and working mode](#)
 - [1.7 Button & LEDs](#)
 - [1.8 BLE connection](#)
 - [1.9 Pin Definitions , Switch & SIM Direction](#)
 - [1.9.1 Jumper JP2](#)
 - [1.9.2 BOOT MODE / SW1](#)
 - [1.9.3 Reset Button](#)
 - [1.9.4 SIM Card Direction](#)

- [1.10 Mechanical](#)
 - [1.10.1 for NB version](#)
 - [1.10.2 for NS version](#)
- [1.11 Measure starting point](#)
- [2. Use MR-03/12/25-NB/NS to communicate with IoT Server](#)
 - [2.1 Send data to IoT server via NB-IoT network](#)
 - [2.2 Payload Types](#)
 - [2.2.1 General Json Format\(Type=5\)](#)
 - [2.2.2 HEX format Payload\(Type=0\)](#)
 - [2.2.3 ThingsBoard Payload\(Type=3\)](#)
 - [2.2.4 ThingSpeak Payload\(Type=1\)](#)
 - [2.3 Test Uplink and Change Update Interval](#)
 - [2.4 Set Alarm Distance](#)
 - [2.5 Set Interrupt Mode\(0x06\)](#)
 - [2.6 Clock logging](#)
 - [2.7 Datalog Function](#)
 - [2.7.1 Unix TimeStamp](#)
 - [2.7.2 Poll sensor value](#)
 - [2.7.3 Datalog Uplink payload](#)
 - [2.8 Example Query saved historical records](#)
 - [2.9 Uplink log query](#)
 - [2.10 Scheduled domain name resolution](#)
 - [2.11 Set the QoS level](#)
 - [2.12 Set the downlink debugging mode](#)
 - [2.13 Domain name resolution settings](#)
 - [2.14 Set CoAP option](#)
 - [2.15 Calibration Command](#)
 - [2.16 Print last few data entries](#)
 - [2.17 Print data entries base on page](#)
 - [2.18 Clear Flash Record](#)
- [3. Configure MR-03/12/25-NB/NS](#)
 - [3.1 Configure Methods](#)
 - [3.2 Serial Access Password](#)
 - [3.3 AT Commands Set](#)
- [4. Battery & Power Consumption](#)
- [5. Firmware update](#)
- [6. FAQ](#)
 - [6.1 How can I access t BC660K-GL AT Commands?](#)
 - [6.2 How to configure the certificate?](#)
 - [6.3 Why is there no LED response when I press the button on the solar panel model?](#)
- [7. Order Info](#)
- [8. Packing Info](#)
- [9. Support](#)

1. Introduction

1.1 What is NB-IoT Microwave Radar distance Sensor

The Dragino MR-03/12/25-NB/NS is a **NB-IoT Microwave Radar distance Sensor** for Internet of Things solution. It uses **80Ghz Microwave** to detect the **distance between sensor and diferent objects**. Diferent from ultrosonic or Lidar measurement. Microwave Radar is more reliable for **condensation / dusty environment**. It can sense correct distance even there is water or think dust on top of the sensor.

The MR-03/12/25-NB/NS can be applied to scenarios such as horizontal distance measurement, parking management system, object proximity and presence detection, intelligent trash can management system, robot obstacle avoidance, automatic control, sewer, etc.

MR-03/12/25-NB/NS supports different uplink methods including **MQTT, MQTTs, UDP, TCP & COAP** for different application requirement, and support uplinks to various IoT Servers.

MR-03/12/25-NB/NS **supports BLE configure** and **OTA update** which make user easy to use.

MR-03/12/25-NB/NS is powered by **8500mAh Li-SOCI2 battery or solar powered + Li-ion battery** , it is designed for long-term use up to several years.

MR-03/12/25-NB/NS has optional built-in SIM card and default IoT server connection version. Which makes it works with simple configuration.

1.2 Features

- NB-IoT Bands: B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B28/B66/B70/B85 @H-FDD
- Ultra-low power consumption
- 80GHz Microwave Radar for distance detection
- Measure Range : 3m: 200 ~ 3000mm; 12m: 200 ~ 12000mm; 25m: 200 ~ 25000mm
- Accuracy: $\pm 20\text{mm}$
- Resolution: 1mm
- Measurement Angle : 7.6 degrees horizontal and 7.6 degrees vertical
- Multiply Sampling and one uplink
- Support Bluetooth v5.1 remote configure and update firmware
- Uplink on periodically
- Downlink to change configure
- 8500mAh Li/SOCI2 Battery (MR-XX-NB)
- Solar panel + 3000mAh Li-ion battery (MR-XX-NS)

1.3 Specification

Common DC Characteristics:

- Supply Voltage: 2.5v ~ 3.6v
- Operating Temperature: -40 ~ 85°C

Radar probe Spec:

- Measuring Method: FMCW
- Frequency: 80 GHz
- Measure Range : 3m: 200 ~ 3000mm; 12m: 200 ~ 12000mm; 25m: 200 ~ 25000mm
- Accuracy: $\pm 20\text{mm}$
- Resolution: 1mm
- Measurement Angle : 7.6 degrees horizontal and 7.6 degrees vertical

NB-IoT Spec:

NB-IoT Module: BC660K-GL

Support Bands:

- B1 @H-FDD: 2100MHz
- B2 @H-FDD: 1900MHz
- B3 @H-FDD: 1800MHz
- B4 @H-FDD: 2100MHz
- B5 @H-FDD: 860MHz
- B8 @H-FDD: 900MHz
- B12 @H-FDD: 720MHz
- B13 @H-FDD: 740MHz
- B17 @H-FDD: 730MHz
- B18 @H-FDD: 870MHz
- B19 @H-FDD: 870MHz
- B20 @H-FDD: 790MHz
- B25 @H-FDD: 1900MHz
- B28 @H-FDD: 750MHz
- B66 @H-FDD: 2000MHz
- B70 @H-FDD: 2000MHz
- B85 @H-FDD: 700MHz

Battery:

- Li/SOCI2 un-chargeable battery
- Capacity: 8500mAh
- Self Discharge: $<1\%$ / Year @ 25°C
- Max continuously current: 130mA
- Max boost current: 2A, 1 second

Power Consumption:

- STOP Mode: 10uA @ 3.3v
- Max transmit power: 350mA@3.3v

1.4 Applications

- Horizontal distance measurement
- Liquid level measurement
- Parking management system
- Object proximity and presence detection
- Intelligent trash can management system
- Robot obstacle avoidance

- Automatic control
- Sewer
- Bottom water level monitoring

1.5 Installation

Sensor measure direction and angle is as below. When install the sensor, please make sure the sensor direct to object.

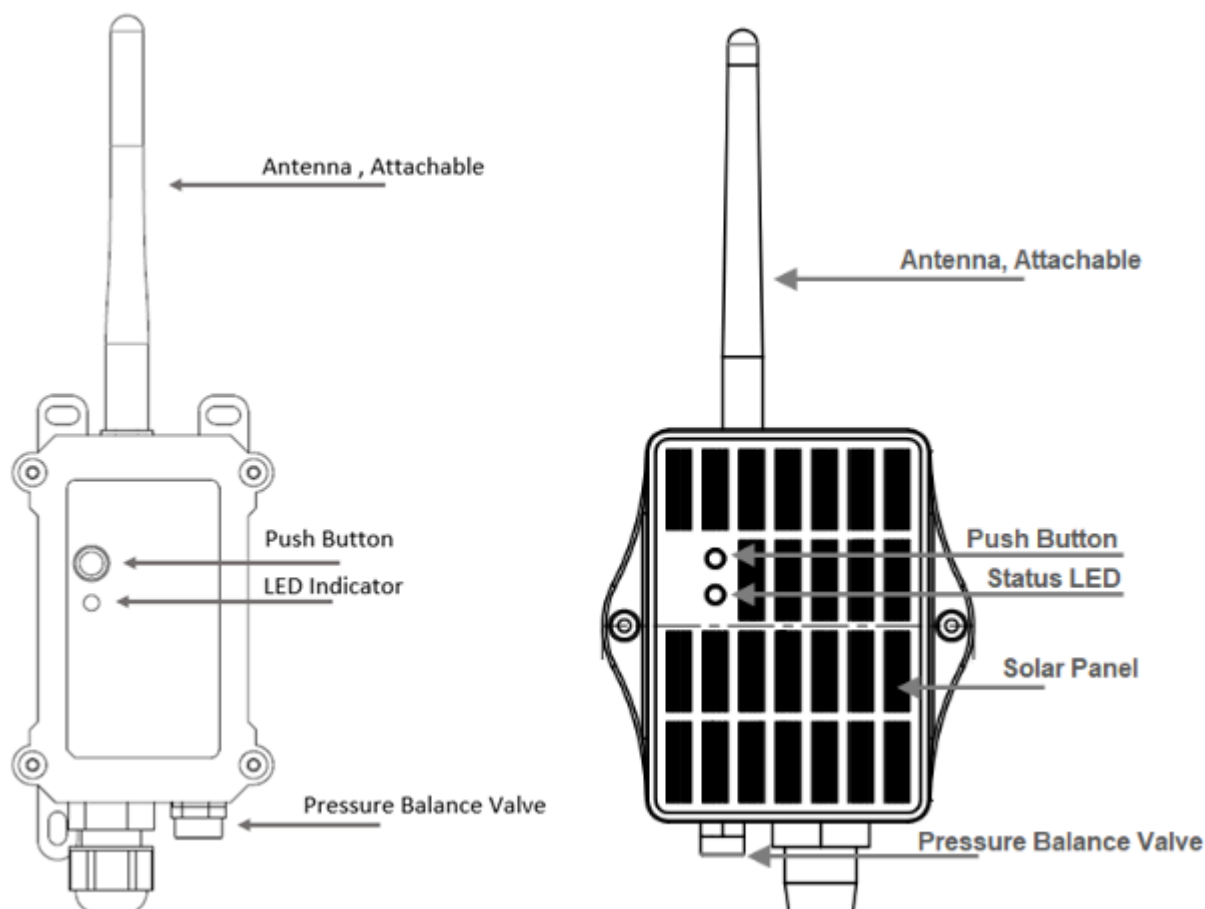


1.6 Sleep mode and working mode

Deep Sleep Mode: Sensor doesn't have any NB-IoT activate. This mode is used for storage and shipping to save battery life.

Working Mode: In this mode, Sensor will work as NB-IoT Sensor to Join NB-IoT network and send out sensor data to server. Between each sampling/tx/rx periodically, sensor will be in IDLE mode), in IDLE mode, sensor has the same power consumption as Deep Sleep mode.

1.7 Button & LEDs



Behavior on ACT	Function	Action
  1~3s	Send an uplink	If sensor has already attached to NB-IoT network, sensor will send an uplink packet, blue led will blink once. Meanwhile, BLE module will be active and user can connect via BLE to configure device.
  >3s	Active Device	Green led will fast blink 5 times, device will enter OTA mode for 3 seconds. And then start to attach NB-IoT network. Once sensor is active, BLE module will be active and user can connect via BLE to configure device, no matter if device attach NB-IoT network or not.
 x5	Deactivate Device	Red led will solid on for 5 seconds. Means device is in Deep Sleep Mode.

Note: When the device is executing a program, the buttons may become invalid. It is best to press the buttons after the device has completed the program execution.

1.8 BLE connection

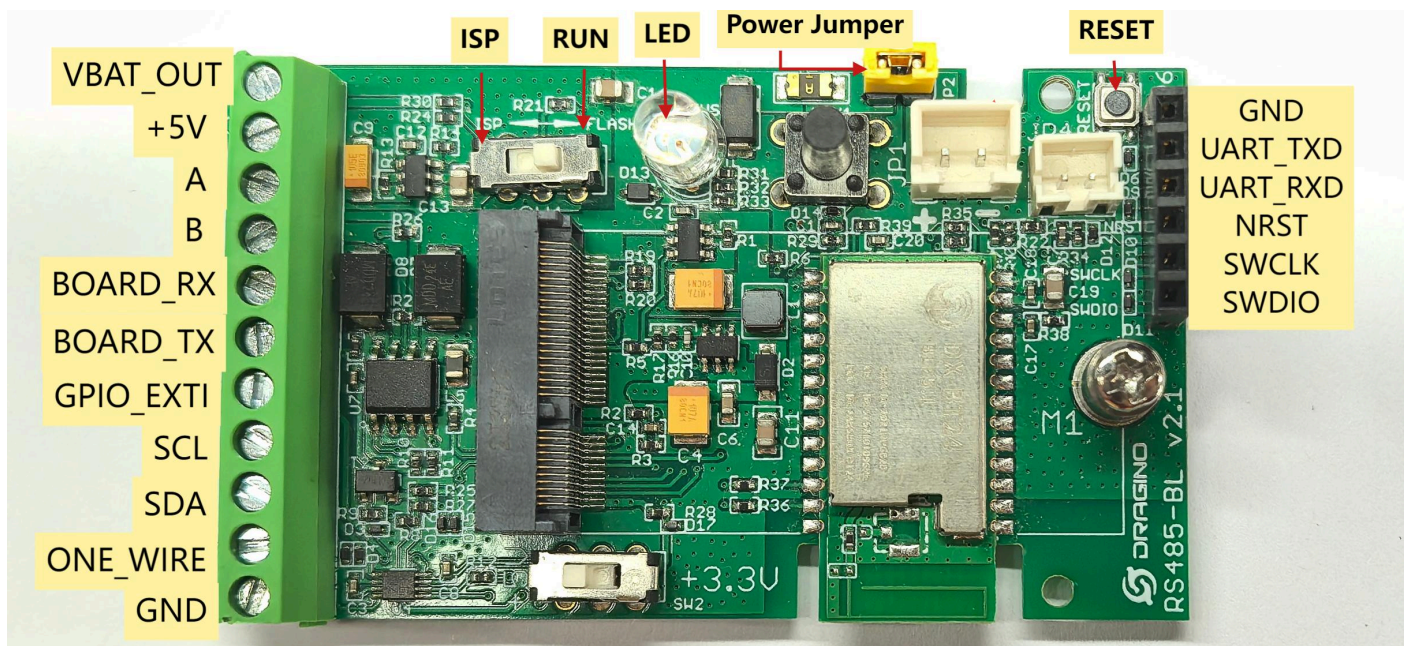
MR-03/12/25-NB/NS support BLE remote configure and firmware update.

BLE can be used to configure the parameter of sensor or see the console output from sensor. BLE will be only activate on below case:

- Press button to send an uplink
- Press button to active device.
- Device Power on or reset.

If there is no activity connection on BLE in 60 seconds, sensor will shut down BLE module to enter low power mode.

1.9 Pin Definitions , Switch & SIM Direction



1.9.1 Jumper JP2

Power on Device when put this jumper.

1.9.2 BOOT MODE / SW1

1) **ISP**: upgrade mode, device won't have any signal in this mode. but ready for upgrade firmware. LED won't work. Firmware won't run.

2) **Flash**: work mode, device starts to work and send out console output for further debug

1.9.3 Reset Button

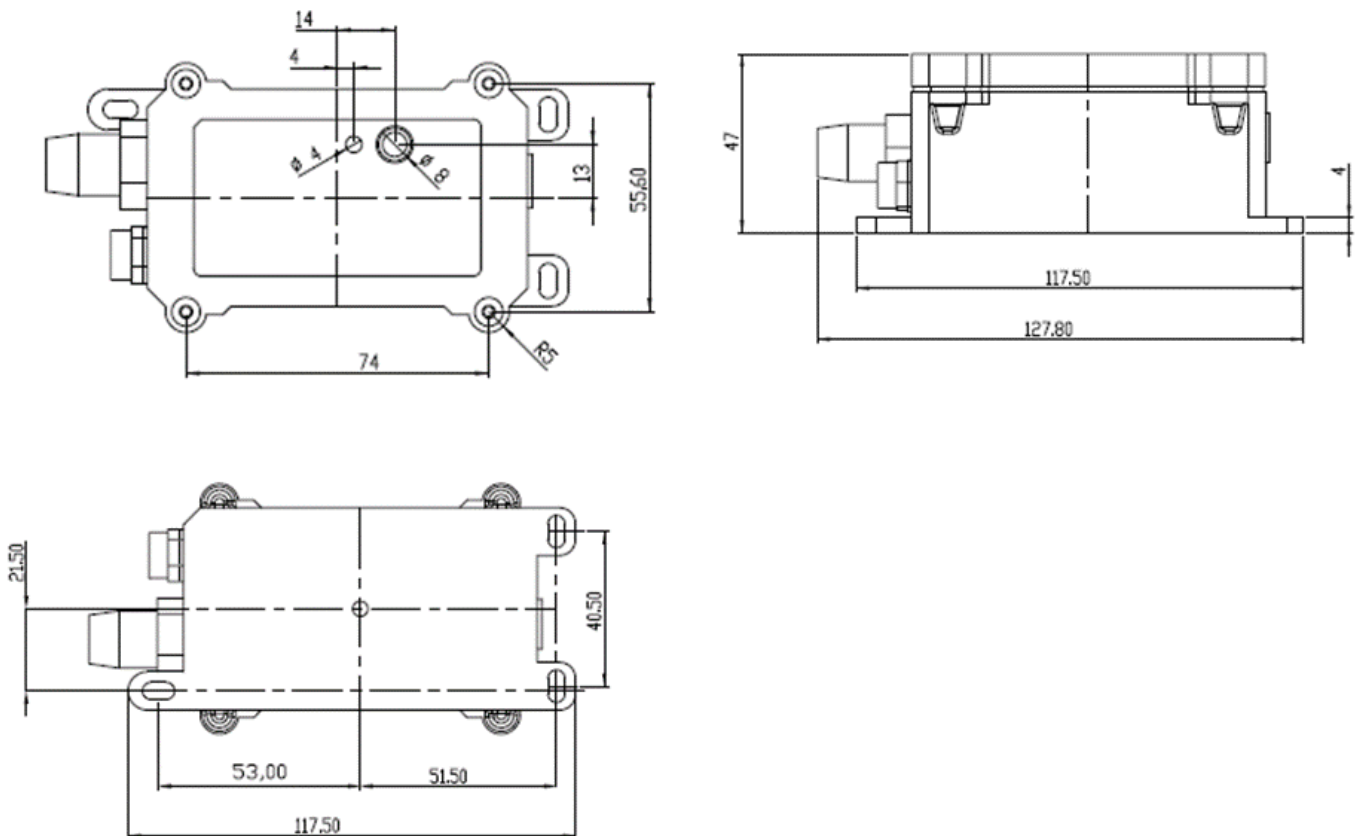
Press to reboot the device.

1.9.4 SIM Card Direction

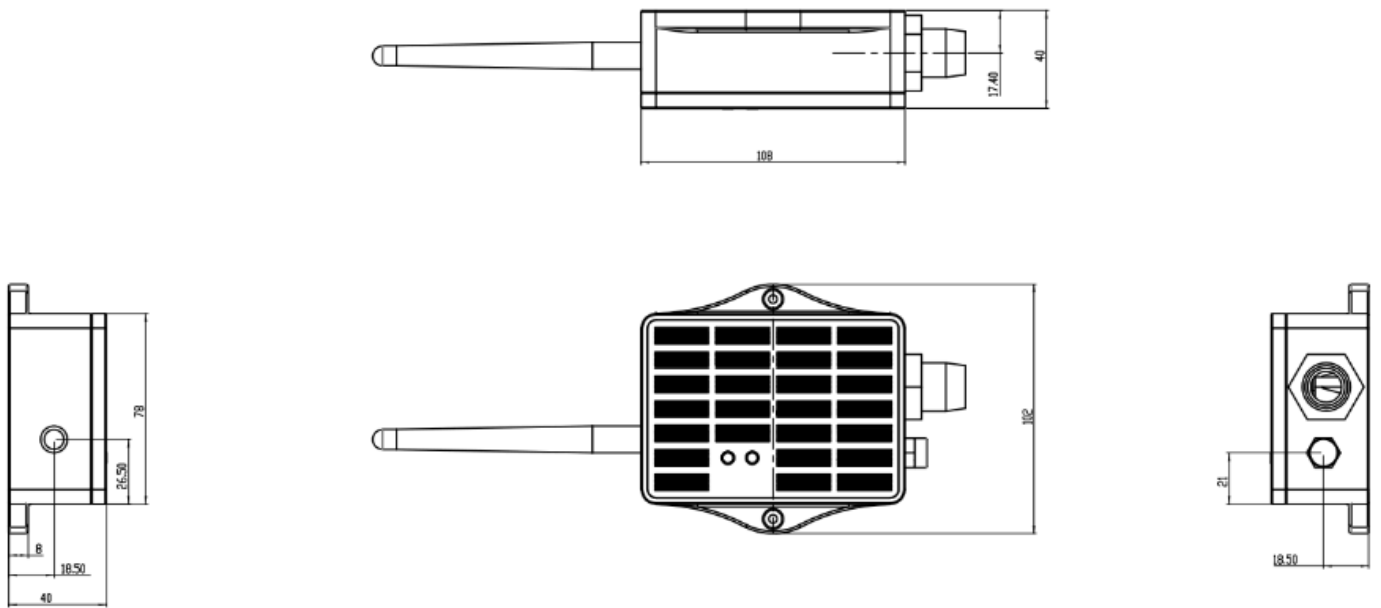
See this link. [How to insert SIM Card](#).

1.10 Mechanical

1.10.1 for NB version

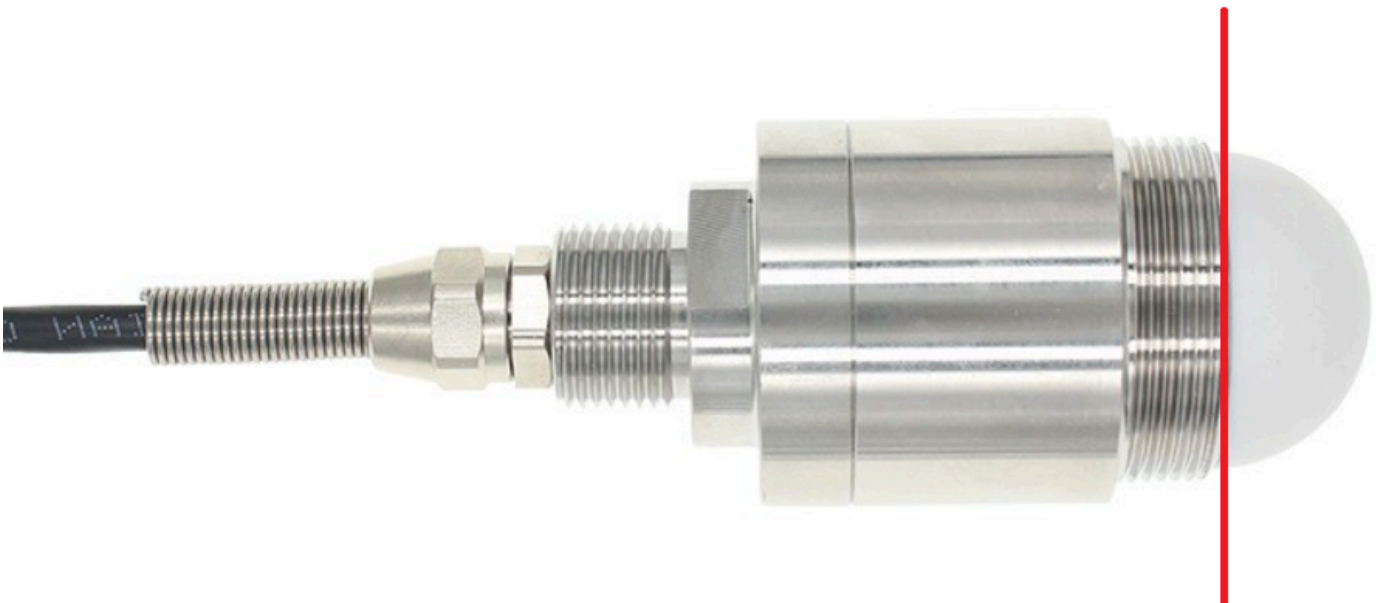


1.10.2 for NS version



1.11 Measure starting point

Measurement starting point



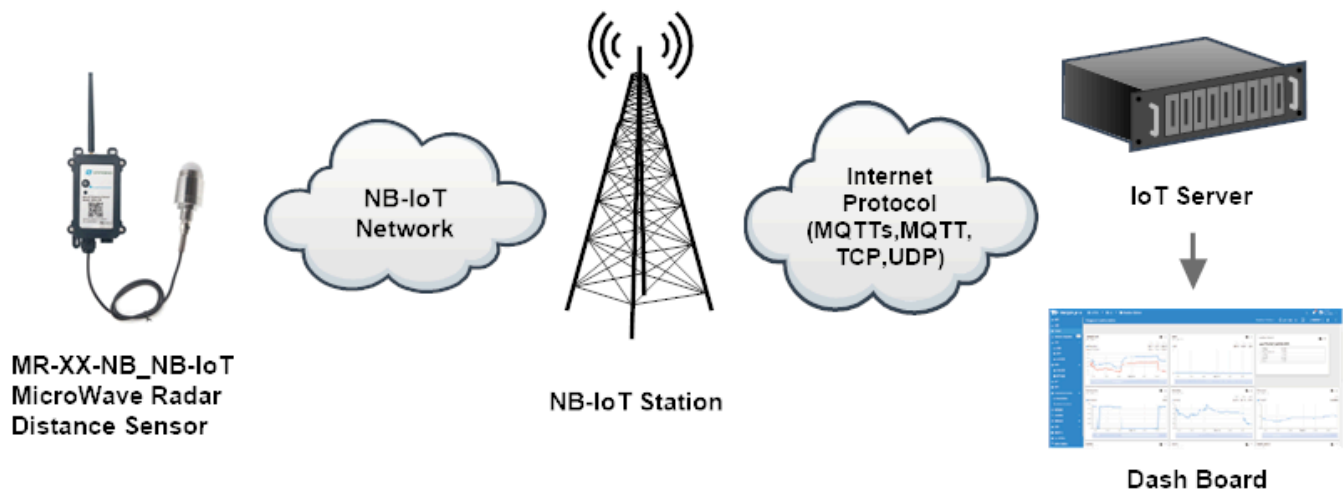
2. Use MR-03/12/25-NB/NS to communicate with IoT Server

2.1 Send data to IoT server via NB-IoT network

The MR-03/12/25-NB/NS is equipped with a NB-IoT module, the pre-loaded firmware in MR-03/12/25-NB/NS will get environment data from sensors and send the value to local NB-IoT network via the NB-IoT module. The NB-IoT network will forward this value to IoT server via the protocol defined by MR-03/12/25-NB/NS.

Below shows the network structure:

MR-XX-NB in a NB-IoT Network



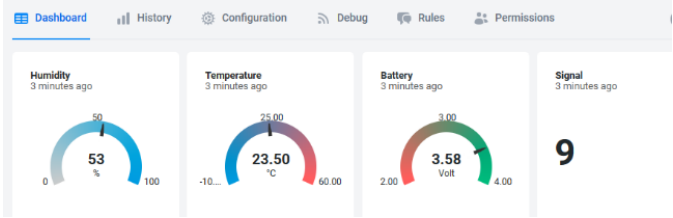
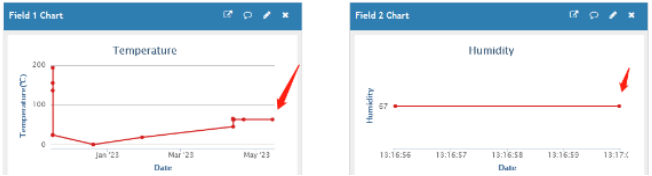
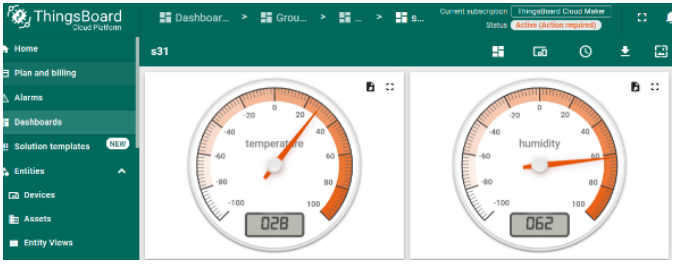
There are two version: **-GE** and **-1T** version of MR-03/12/25-NB/NS.

GE Version: This version doesn't include SIM card or point to any IoT server. User needs to use AT Commands to configure below two steps to set MR-03/12/25-NB/NS send data to IoT server.

- Install NB-IoT SIM card and configure APN. See instruction of [Attach Network](#).
- Set up sensor to point to IoT Server. See instruction of [Configure to Connect Different Servers](#).

Below shows result of different server as a glance.

Servers	Dash Board	Comments
Node-Red		

DataCake		
Tago.IO		
General UDP	Raw Payload. Need Developer to design Dash Board	
General MQTT	Raw Payload. Need Developer to design Dash Board	
ThingSpeak		
ThingsBoard		

1T Version: This version has 1NCE SIM card pre-installed and configure to send value to ThingsEye. User Just need to select the sensor type in ThingsEyeand Activate MR-03/12/25-NB/NS and user will be able to see data in ThingsEye. See here for [ThingsEye Config Instruction](#).

2.2 Payload Types

To meet different server requirement, MR-03/12/25-NB/NS supports different payload type.

Includes:

- [General JSON format payload](#). (Type=5)
- [HEX format Payload](#). (Type=0)
- [ThingSpeak Format](#). (Type=1)
- [ThingsBoard Format](#). (Type=3)

User can specify the payload type when choose the connection protocol. Example:

AT+PRO=1,0 // Use COAP Connection & hex Payload

AT+PRO=1,5 // Use COAP Connection & Json Payload
AT+PRO=2,0 // Use UDP Connection & hex Payload
AT+PRO=2,5 // Use UDP Connection & Json Payload
AT+PRO=3,0 // Use MQTT Connection & hex Payload
AT+PRO=3,5 // Use MQTT Connection & Json Payload
AT+PRO=4,0 // Use TCP Connection & hex Payload
AT+PRO=4,5 // Use TCP Connection & Json Payload

2.2.1 General Json Format(Type=5)

This is the General Json Format. As below:

```
{
  "IMEI": "863663062798914",
  "Model": "MR03/12/25-NB",
  "distance": 200,
  "interrupt": 0,
  "interrupt_level": 0,
  "battery": 3.37,
  "signal": 16,
  "1": [200, "2025/12/05 01:11:24"],
  "2": [200, "2025/12/05 01:10:24"],
  "3": [200, "2025/12/05 01:09:24"],
  "4": [200, "2025/12/05 01:08:24"],
  "5": [200, "2025/12/05 01:07:24"],
  "6": [200, "2025/12/05 01:06:24"],
  "7": [200, "2025/12/05 01:05:24"],
  "8": [200, "2025/12/05 01:04:24"]
}
```

MQTT.fx - 1.7.1

File Extras Help

node-red Connect Disconnect

Publish **Subscribe** Scripts Broker Status Log

MR-XX-NB Subsc... QoS 0 QoS 1 QoS 2 Autoscroll

MR-XX-NB Dump Messages Mute

Topics Colle... ..

MR-XX-NB 1 QoS 0

MR-XX-NB 2 QoS 0

MR-XX-NB 3 QoS 0

MR-XX-NB 3 QoS 0

05-12-2025 09:12:29.33149488

```
{
  "IMEI": "863663062798914",
  "Model": "MR03/12/25-NB",
  "distance": 200,
  "interrupt": 0,
  "interrupt_level": 0,
  "battery": 3.37,
  "signal": 16,
  "1": [200, "2025/12/05 01:11:24"],
  "2": [200, "2025/12/05 01:10:24"],
  "3": [200, "2025/12/05 01:09:24"],
  "4": [200, "2025/12/05 01:08:24"],
  "5": [200, "2025/12/05 01:07:24"],
  "6": [200, "2025/12/05 01:06:24"],
  "7": [200, "2025/12/05 01:05:24"],
  "8": [200, "2025/12/05 01:04:24"]
}
```

Payload decoded by Plain Text Decoder

Notice, from above payload:

- Distance , Interrupt, Interrupt_level, Battery, Signal, time are the value at uplink time.
- Json entry 1 ~ 8 are the last 1 ~ 8 sampling data as specify by **AT+CLOCKLOG=1,65535,15,8** Command. Each entry includes (from left to right): Distance, Sampling time.

2.2.2 HEX format Payload(Type=0)

This is the HEX Format. As below:

f86366306279891441640d360f010000072b6932321500fc693231b402236932318c00c86932313c00c869323

HEX Format for MR03/12/25-NB(AT+CLOCKLOG=1,65535,15,8)									
f863663062798914		4164	0d36	0f	01	00	00	072b	69323215
f+IMEI		Version	BAT	signal	Mod	Interrupt	Interrupt_level	Distance	Timestamp
8 Bytes		14 Bytes							
00fc	693231b4	02236932318c		00c86932313c		00c869323100			
Distance	Timestamp	last 2nd data		last 3rd data		last 4th data			
6 Bytes		6 Bytes		6 Bytes		6 Bytes			
00c8693230c4		00c869323088		00c86932304c		00c869323010			
last 5th data		last 6th data		last 7th data		last 8th data			
6 Bytes		6 Bytes		6 Bytes		6 Bytes			

If we use the MQTT client to subscribe to this MQTT topic, we can see the following information when the NB sensor uplink data.

The screenshot shows the MQTT.fx - 1.7.1 application window. The 'Subscribe' button is active, and the topic 'MR-XX-NB' is entered in the subscription field. The 'Subsc...' button is also visible. The 'QoS 0' button is selected, and the 'Autoscroll' button is active. The message list on the right shows four messages for the topic 'MR-XX-NB', all with QoS 0. The latest message is selected, and its payload is displayed in a black box with white text, showing a hex string: f86366306279891441640d36f010000072b6932321500fc693231b402236932318c00c86932313c00c86932310000c8693230c400c86932308800c86932304c00c869323010. The payload is decoded by the 'Plain Text Decoder'.

Version:

These bytes include the hardware and software version.

Higher byte: Specify Sensor Model: 0x41 for MR-03/12/25-NB/NS

Lower byte: Specify the software version: 0x64=100, means firmware version 1.0.0

BAT (Battery Info):

Ex1: 0x0D36 = 3382mV

Signal Strength:

NB-IoT Network signal Strength.

Ex1: 0x0f = 15

0 -113dBm or less

1 -111dBm

2...30 -109dBm... -53dBm

31 -51dBm or greater

99 Not known or not detectable

Distance:

Distance between sensor probe to the first object. (unit: mm)

For example, if the data you get from the register is 0x01 0x40, the distance between the sensor and the measured object is **072B(H) = 1835(D) = 1835mm**.

Notice: The distance has a special value :

0x00C8: Invalid reading (probe beyond effective range or entering detection blind zone) or probe not detected.

Interrupt:

This data field shows if this packet is generated by interrupt or not.

Example:

0x00: Normal uplink packet.

0x01: Interrupt Uplink Packet.

Interrupt Level:

This byte shows whether the interrupt is triggered by a high or low level.

Ex1: 0x00 Interrupt triggered by falling edge (low level)

Ex2: 0x01 Interrupt triggered by rising edge (high level)

TimeStamp:

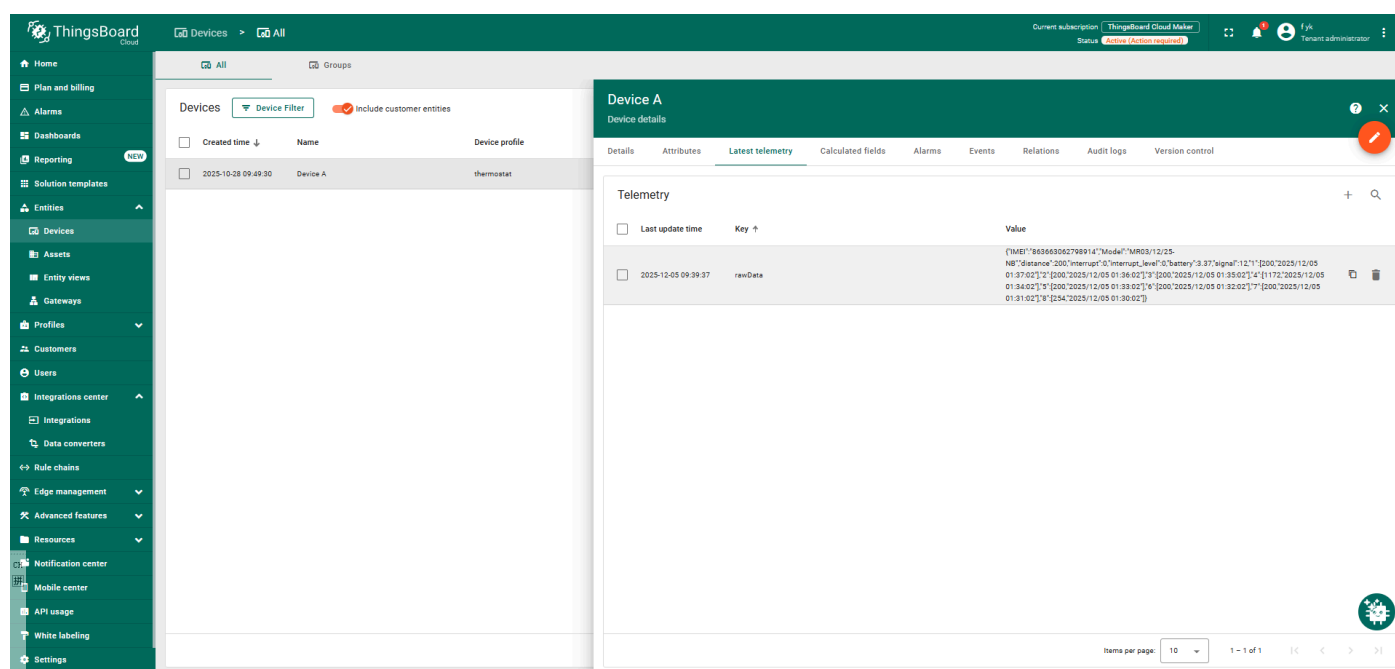
Unit TimeStamp Example: 650d02ff(H) = 1695351551(D)

Put the decimal value into this link(<https://www.epochconverter.com>) to get the time.

2.2.3 ThingsBoard Payload(Type=3)

Type3 payload special design for ThingsBoard, it will also configure other default server to ThingsBoard.

```
{
  "IMEI": "863663062798914",
  "Model": "MR03/12/25-NB",
  "distance": 200,
  "interrupt": 0,
  "interrupt_level": 0,
  "battery": 3.37,
  "signal": 12,
  "1": [200,"2025/12/05 01:37:02"],
  "2": [200,"2025/12/05 01:36:02"],
  "3": [200,"2025/12/05 01:35:02"],
  "4": [1172,"2025/12/05 01:34:02"],
  "5": [200,"2025/12/05 01:33:02"],
  "6": [200,"2025/12/05 01:32:02"],
  "7": [200,"2025/12/05 01:31:02"],
  "8": [254,"2025/12/05 01:30:02"]
}
```



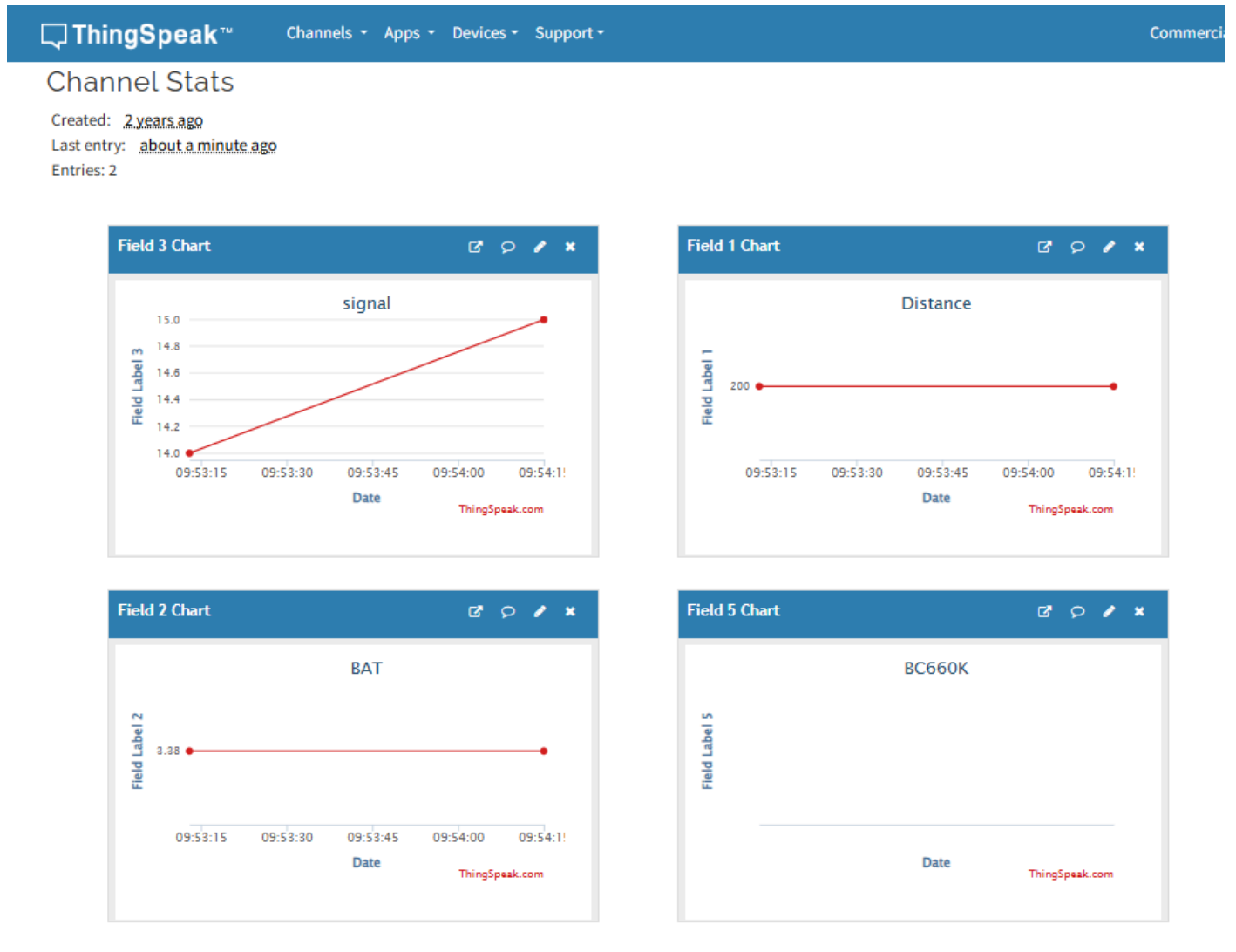
2.2.4 ThingSpeak Payload(Type=1)

This payload meets ThingSpeak platform requirement. It includes only four fields. Form 1~3 are:

Distance, Battery & Signal. This payload type only valid for ThingSpeak Platform.

As below:

field1=Distance value & field2=Battery value & field3=Signal value



2.3 Test Uplink and Change Update Interval

By default, Sensor will send uplinks **every 2 hours**

User can use below commands to change the **uplink interval**.

AT Command: AT+TDC

Example: AT+TDC=7200 // Set Update Interval to 7200 seconds

Downlink Commands: 0x01

Format: Command Code (0x01) followed by 3 bytes.

Example: 12 hours= 43200 seconds 43200(D)=0xA8C0(H)

Downlink Payload: **01 00 A8 C0** // AT+TDC=43200, Set Update Interval to 12 hours.

Note: User can also push the button for more than 1 seconds to activate an uplink.

2.4 Set Alarm Distance

On each sampling define by AT+CLOCKLOG=1,65535,15,8 (default 15 minutes), when the value exceed the range, it will trigger an Alarm and immediately sends a uplink.

AT command: AT+ALARM1

AT+ALARM=AA,BB

- AA: Dec value for Alarm low threshold, BB: Dec value for Alarm high threshold
- When 0xAA=0, and 0xBB≠0, Alarm trigger when higher than max
- When 0xAA≠0, and 0xBB =0xFFFF, Alarm trigger when lower than min
- When 0xAA≠0 and 0xBB≠0, Alarm trigger when higher than max or lower than min

Example:

AT+ALARM1=100,200 // For distance 1, alarm when < 100 or higher than 200.(Min:50cm, Max:2000cm)

Downlink command: 0x08

Format: Command Code (0x08) followed by 8 bytes. The first 4 bytes after 08 are set to the limit range of distance 1, and the last 4 bytes after 08 are set to the limit range of distance 2.

Example:

Downlink Payload: **08 00 64 00 C8 00 C8 01 2C** // AT+ALARM1=100,200 & AT+ALARM2=200,300

Downlink Payload: **08 00 00 00 00 00 00 00** // AT+ALARM1=0,0 & AT+ALARM2=0,0 Distance 1 and Distance 2 alarms are not enabled.

2.5 Set Interrupt Mode(0x06)

Feature, Set Interrupt mode for GPIO_EXTI.

AT Command: AT+INTMOD

Command Example	Function	Response
AT+INTMOD=?	Show current interrupt mode	0 OK the mode is 0 = No interruption
AT+INTMOD=2	Set Transmit Interval 0. (Disable Interrupt), 1. (Trigger by rising and falling edge) 2. (Trigger by falling edge) 3. (Trigger by rising edge)	OK

Downlink Command: 0x06

Format: Command Code (0x06) followed by 3 bytes.

This means that the interrupt mode of the end node is set to 0x000003=3 (rising edge trigger), and the type code is 06.

- Example 1: Downlink Payload: 06000000 // Turn off interrupt mode
- Example 2: Downlink Payload: 06000003 // Set the interrupt mode to rising edge trigger

2.6 Clock logging

Sometimes when we deploy lots of end nodes in field. We want all sensors sample data at the same time, and upload these data together for analyze. In such case, we can use clock logging feature.

We can use this command to set the start time of data recording and the time interval to meet the requirements of the specific collection time of data.

- **AT Command: AT+CLOCKLOG=a,b,c,d**

a: 0: Disable Clock logging. 1: Enable Clock Logging

b: Specify First sampling start second: range (0 ~ 3599, 65535) // **Note:** If parameter b is set to 65535, the log period starts after the node accesses the network and sends packets.

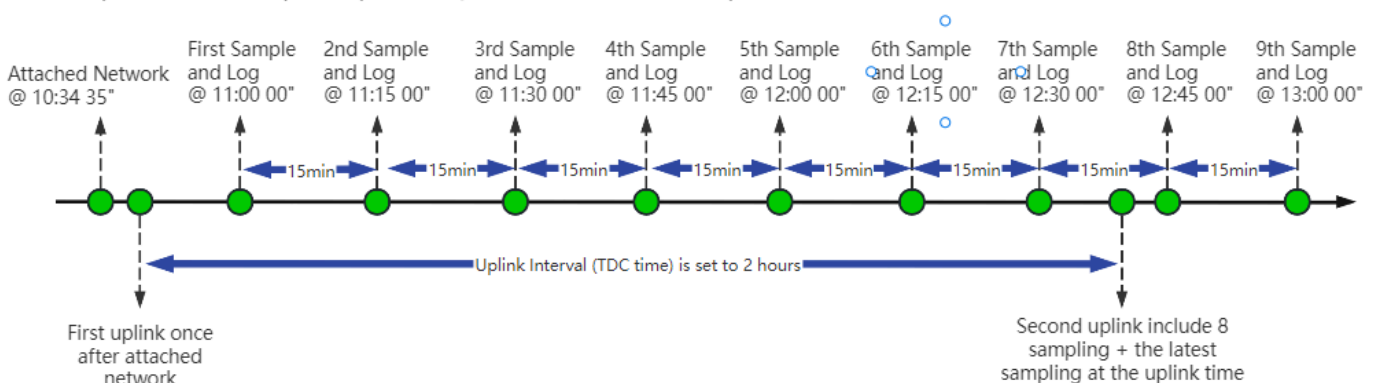
c: Specify the sampling interval: range (0 ~ 255 minutes)

d: How many entries should be uplink on every TDC (max 32)

Note: To disable clock recording, set the following parameters: AT+CLOCKLOG=1,65535,0,0

Example: AT+CLOCKLOG=1,0,15,8

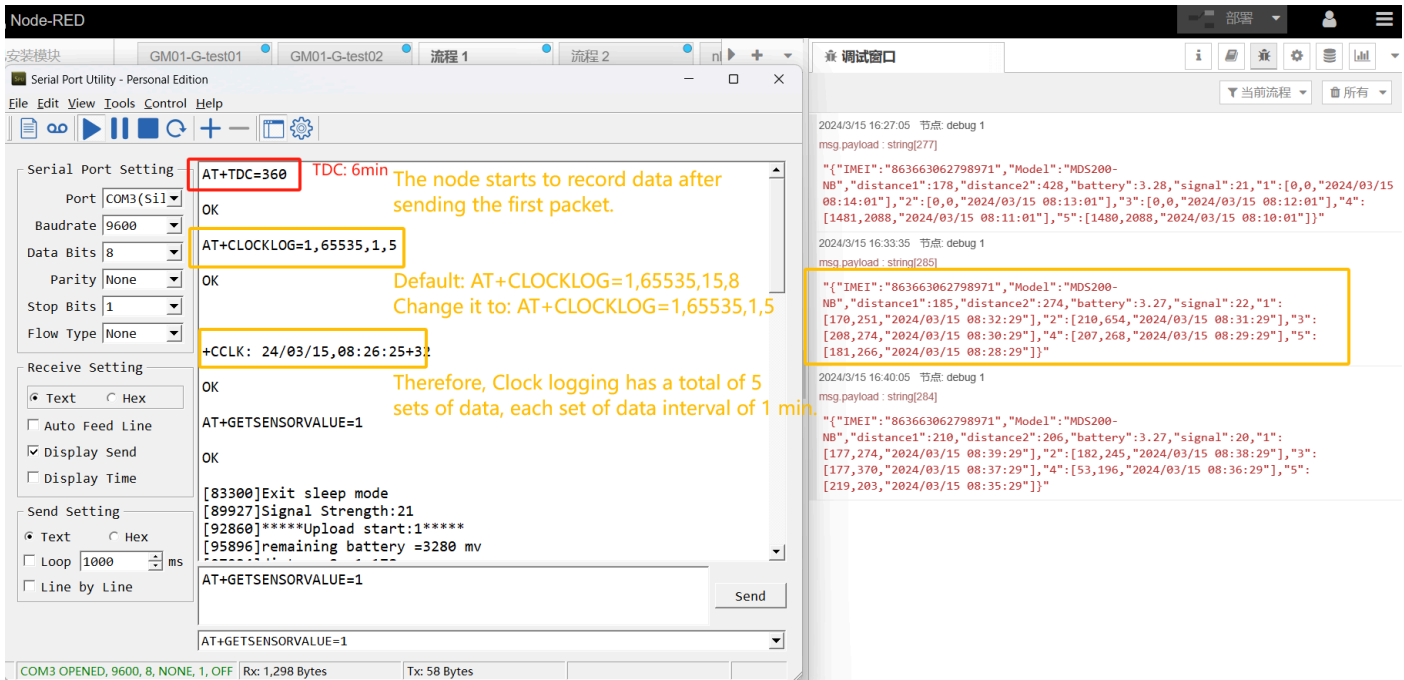
Device will log data to memory start from the 0th second (11:00 00" of first hour and then sampling and log every 15 minutes. Every TDC uplink, the uplink payload will consist: Battery info + last 8 memory record with timestamp + the latest sample at uplink time). See below for the example.



Example:

AT+CLOCKLOG=1,65535,1,5

After the node sends the first packet, data is recorded to the memory at intervals of 1 minute. For each TDC uplink, the uplink load will include: battery information + the last 5 memory records (payload + timestamp).



Note: Users need to synchronize the server time before configuring this command. If the server time is not synchronized before this command is configured, the command takes effect only after the node is reset.

- **Downlink command: 0x0A**

Format: Command Code (0x0A) followed by 5 bytes.

- **Example 1:** Downlink Payload: **0A01FFFF0F08** // Set SHT record time:
AT+CLOCKLOG=1,65535,15,8
- **Example 1:** Downlink Payload: **0A0104B00F08** // Set SHT record time:
AT+CLOCKLOG=1,1200,15,8

Note: When entering the downlink payload, there must be no Spaces between bytes.

2.7 Datalog Function

2.7.1 Unix TimeStamp

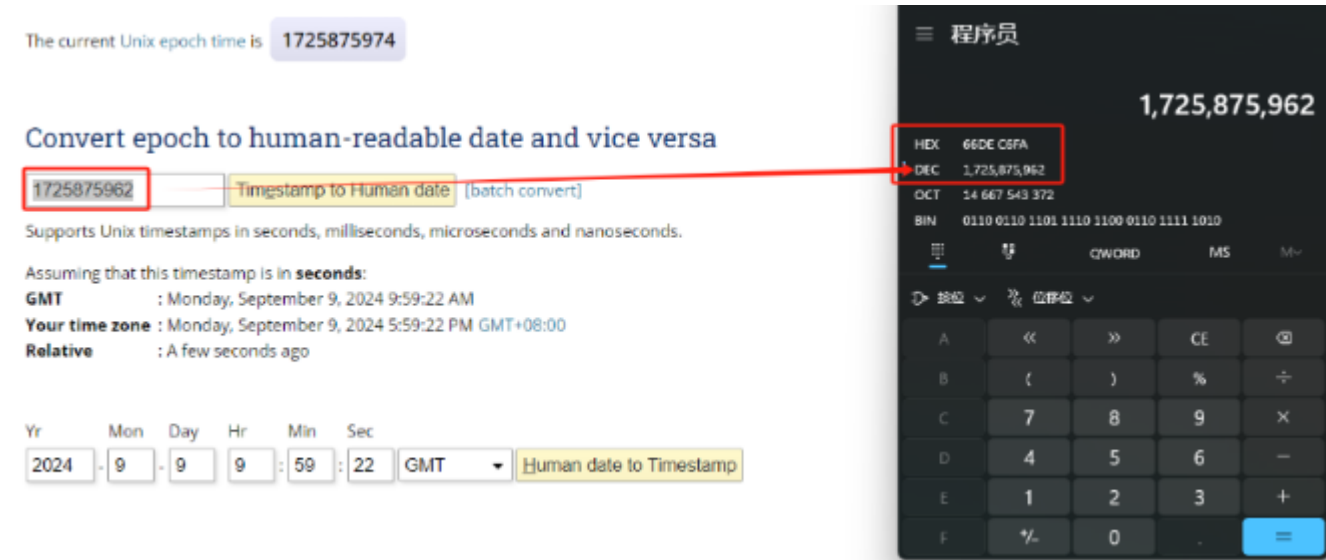
MR-03/12/25-NB/NS uses Unix TimeStamp format based on

Size (bytes)	4	1
DeviceTimeAns Payload	32-bit unsigned integer : Seconds since epoch*	8bits unsigned integer: fractional-second in 1/2^8 second steps

Figure 10 : DeviceTimeAns payload format

User can get this time from link: <https://www.epochconverter.com/> :

Below is the converter example



So, 1725875962 means that the current time is Monday, September 9, 2024 at 9:59 AM.

2.7.2 Poll sensor value

User can poll sensor value based on timestamps from the server. Below is the downlink command.

1 byte	4 bytes	4 bytes
31	Timestamp start	Timestamp end

Timestamp start and Timestamp end use Unix TimeStamp format as mentioned above. Devices will reply with all data log during this time period.

For example, downlink command **31 6932 44D4 6932 46B4**

Is to check 2025/12/5 02:35:00 to 2025/12/5 02:43:00's data

2.7.3 Datalog Uplink payload

The Datalog poll reply uplink will use below payload format.

Retrieval data payload:

Size(bytes)	2	2	4
value	Distance	Reserve	Timestamp

Function Description: This feature is only used when the clock logging feature is turned on. one uplink packet can send **64** groups of stored data totaling **512** bytes.

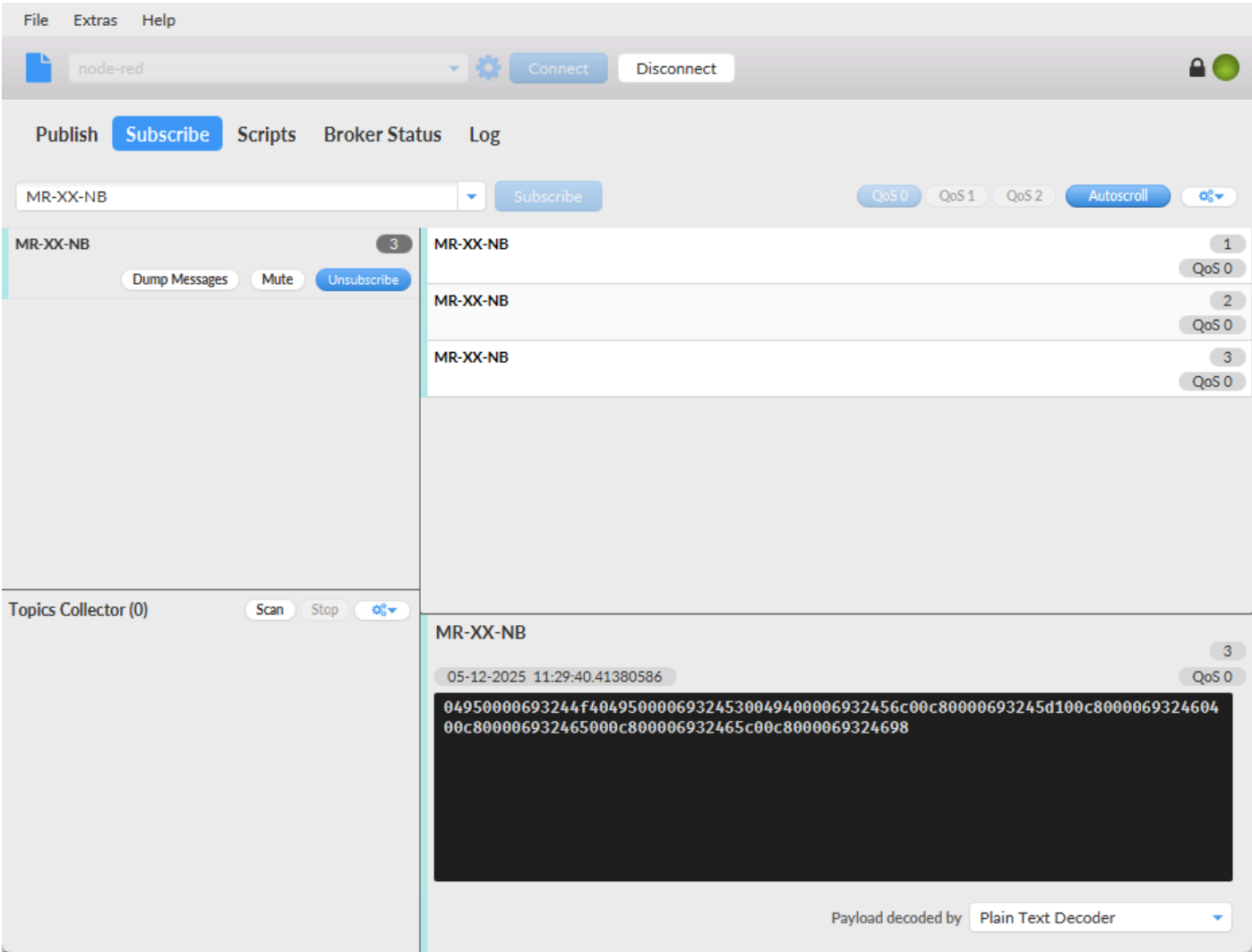
Example(For MQTT.fx):

If user sends below downlink command:

Where : Start time: 693244D4= time 25/12/5 02:35:00

Stop time: 693246B4= time 25/12/5 02:43:00

MR-03/12/25-NB/NS will uplink this payload.



04950000693244f40495000069324530049400006932456c00c80000693245d100c800006932460400c800000

MR03/12/25-NB(8 groups for example)			
0495	0000	693244f4	0495000069324530
Distance	Reserve	Timestamp	2nd data
	8 Bytes		8 Bytes
00c8000069324604	00c8000069324650	00c800006932465c	00c8000069324698
5th data	6th data	7th data	8th data
8 Bytes	8 Bytes	8 Bytes	8 Bytes

Distance= 0x0495=1173mm

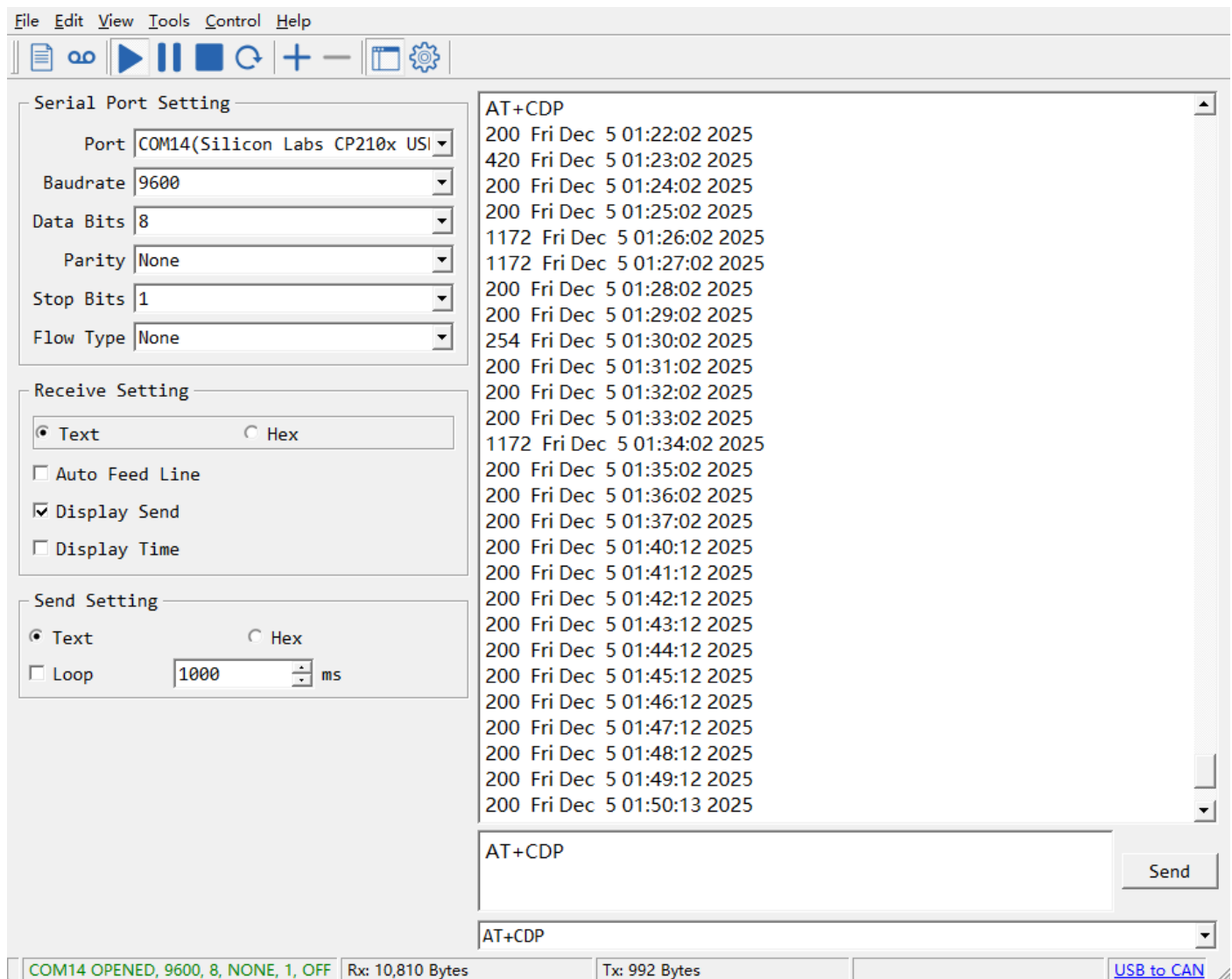
Reserve =0x0000

Unix time is 0x693244f4 =1764902132s=25/12/5 02:35:00

2.8 Example Query saved historical records

- **AT Command: AT+CDP**

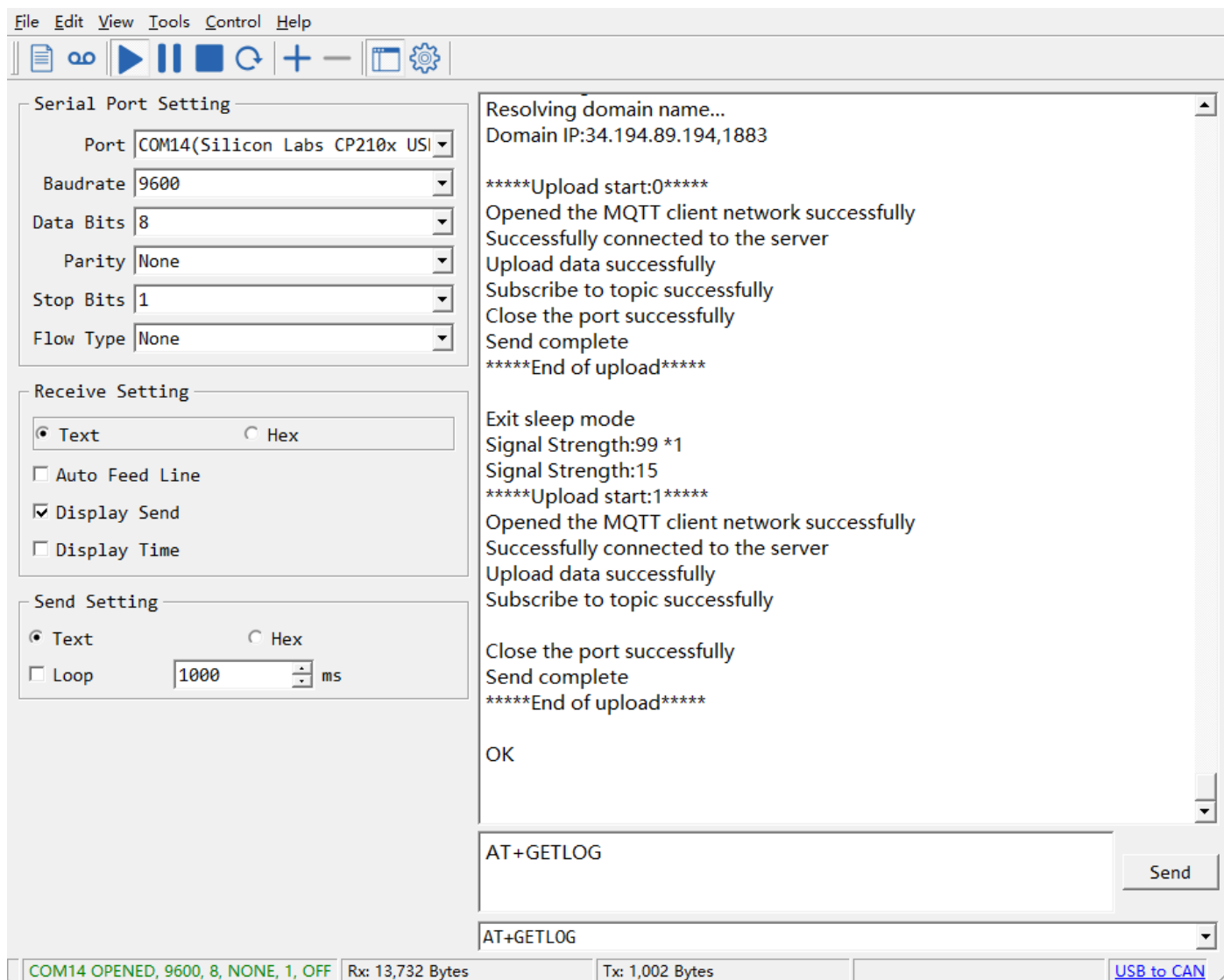
This command can be used to search the saved history, recording up to 32 groups of data, each group of historical data contains a maximum of 100 bytes.



2.9 Uplink log query

- **AT Command: AT+GETLOG**

This command can be used to query upstream logs of data packets.



2.10 Scheduled domain name resolution

This command is used to set up scheduled domain name resolution.

AT Command:

- **AT+DNSTIMER=XX** // Unit: hour

After setting this command, domain name resolution will be performed regularly.

2.11 Set the QoS level

This command is used to set the QoS level of MQTT.

AT Command:

- **AT+MQOS=xx** // 0~2

Downlink command: 0x07

Format: Command Code (0x07) followed by 1 byte.

Ex1: Downlink payload: **0x0700** // AT+MQOS=0

Ex2: Downlink payload: **0x0701** // AT+MQOS=1

2.12 Set the downlink debugging mode

Feature: Set the conversion between the standard version and 1T version downlinks.

AT command: AT+DOWNTE

Command Example	Function/Parameters	Response/Explanation
AT+DOWNTE=?	Get current Settings	0,0 (default) OK
AT+DOWNTE=a,b	a: Set the conversion between the downlink of the standard version and 1T version	0: Set the downlink of the standard version. 1: Set the downlink of the 1T version(ThingsEye platform)
	b: Enable/Disable downlink debugging	0: Disable downlink debugging mode. 1: Enable downlink debugging mode, users can see the original downlink reception.

Example:

- AT+DOWNTE=0,1 // Set to standard version downlink, and enable downlink debugging.
- AT+DOWNTE=1,1 // Set to 1T version downlink, and enable downlink debugging.

Downlink Command:

No downlink commands for feature

2.13 Domain name resolution settings

Feature: Set dynamic domain name resolution IP.

AT command: AT+BKDNS

Command Example	Function/Parameters	Response/Explanation
AT+BKDNS=?	Get current Settings	0,0,NULL (default) OK

AT+BKDNS=a,b,c	a: Enable/Disable dynamic domain name resolution.	1: Disable dynamic domain name update. The ip address will be saved after the domain name is resolved, if the next domain name resolution fails, the last saved ip address will be used. 2: Enable dynamic domain name update. The ip address will be saved after domain name resolution, if the next domain name resolution fails, the last saved ip address will be used, and the domain name resolution will be updated regularly according to the time set by the customer.
	b: Set the time to update the domain name resolution at regular intervals.	Unit: hour
	c: Set the IP address manually.	The format is the same as AT+SERVADDR. If domain name resolution fails, this ip address will be used directly, if domain name resolution succeeds, parameter c will be updated to the successfully resolved IP address.

Example:

- AT+BKDNS=1,0 // Dynamic domain name resolution is disabled.
- AT+BKDNS=2,1 // The dynamic domain name resolution function is enabled and the automatic update time is set to 1 hour.
- AT+BKDNS=2,4,3.69.98.183,1883 // The dynamic domain name resolution function is enabled and the automatic update time is set to 4 hour, and manually set the ip address, if the domain name failed to resolve, it will directly use this ip to communicate. When the next domain name resolution is successful, it will be updated to the ip address of the successful resolution.

Downlink Command:

No downlink commands for feature

2.14 Set CoAP option

This command sets the connection parameters of the COAP.

AT command:

- AT+URI1 // CoAP option name, CoAP option length, "CoAP option value"
- AT+URI2 // CoAP option name, CoAP option length, "CoAP option value"
- AT+URI3 // CoAP option name, CoAP option length, "CoAP option value"
- AT+URI4 // CoAP option name, CoAP option length, "CoAP option value"

Example:

- AT+URI1=11,38,"i/faaa241f-af4a-b780-4468-c671bb574858"

2.15 Calibration Command

Feature: When data deviates from the reference standard, users can reduce display errors by adjusting the "correction value." The correction value can be modified within the range of 0-1000. For example, if the displayed value is 100 units too low, we can correct it by adding 100 to the sampled data using this command: 01 06 00 6B 00 64 F9 FD. In the command, 100 corresponds to hexadecimal 0x64. To reduce the value, set a negative number, such as -100, which corresponds to hexadecimal FF 9C. The calculation is $100 - 65535 = 65435$, converted to hexadecimal as 0x FF 9C.

AT Command:

Command Example	Function	Response
AT+RSWRITE= 0106006B0064F9FD	Set the sensor's calibration value to 100. Range : no more than 10 bytes	AT+RSWRITE=0106006B0064F9FD OK return:01 06 00 6b 00 64 f9 fd
AT+RSWRITE= 0103006B0001F5D6	Retrieve the current calibration value for the radar sensor	AT+RSWRITE=0103006B0001F5D6 OK return:01 03 02 00 64 b9 af

Eg: Send command **0106006B0064F9FD** to Radar Sensor

AT+RSWRITE=0106006B0064F9FD

Downlink Command:

- 0xE20106006B0064F9FD Same as: AT+RSWRITE=0106006B0064F9FD

Note:

- Unable to retrieve the calibration value for the current sensor setting via the downlink:
0103006B0001F5D6

2.16 Print last few data entries

Feature: Print the last few data entries

AT command: **AT+PLDTA**

Command Example	Response
-----------------	----------

AT+PLDTA=5 Print last 5 entries	Stop Tx events when read sensor data 1 25/12/5 01:56:51 distance=200 2 25/12/5 01:57:51 distance=241 3 25/12/5 01:58:51 distance=200 4 25/12/5 01:59:51 distance=200 5 25/12/5 02:00:51 distance=200 Start Tx events OK
------------------------------------	--

Downlink Command:

No downlink commands for feature

2.17 Print data entries base on page

Feature: Print the sector data from start page to stop page.

AT command: AT+PDTA

Command Example	Response
-----------------	----------

AT+PDTA=1,1 Print page 1 to 1	Stop Tx events when read sensor data 8028A00 25/12/5 01:01:24 distance=446 8028A08 25/12/5 01:02:24 distance=200 8028A10 25/12/5 01:03:24 distance=200 8028A18 25/12/5 01:04:24 distance=200 8028A20 25/12/5 01:05:24 distance=200 8028A28 25/12/5 01:06:24 distance=200 8028A30 25/12/5 01:07:24 distance=200 8028A38 25/12/5 01:08:24 distance=200 8028A40 25/12/5 01:09:24 distance=200 8028A48 25/12/5 01:10:24 distance=200 8028A50 25/12/5 01:11:24 distance=200 8028A58 25/12/5 01:12:44 distance=547 8028A60 25/12/5 01:13:24 distance=252 8028A68 25/12/5 01:16:02 distance=200 8028A70 25/12/5 01:17:02 distance=200 8028A78 25/12/5 01:18:02 distance=200 Start Tx events OK
----------------------------------	---

Downlink Command:

No downlink commands for feature

2.18 Clear Flash Record

Feature: Clear flash storage for data log feature.

AT command: AT+CLRDTA

Command Example	Function	Response
-----------------	----------	----------

AT+CLRDTA	Clear date record	Stop Tx events,Please wait for the erase to complete Clear all stored sensor data... Start Tx events OK
-----------	-------------------	--

Downlink Command: 0x32

- Example: 0x32 00 // Same as AT+CLRDTA

3. Configure MR-03/12/25-NB/NS

3.1 Configure Methods

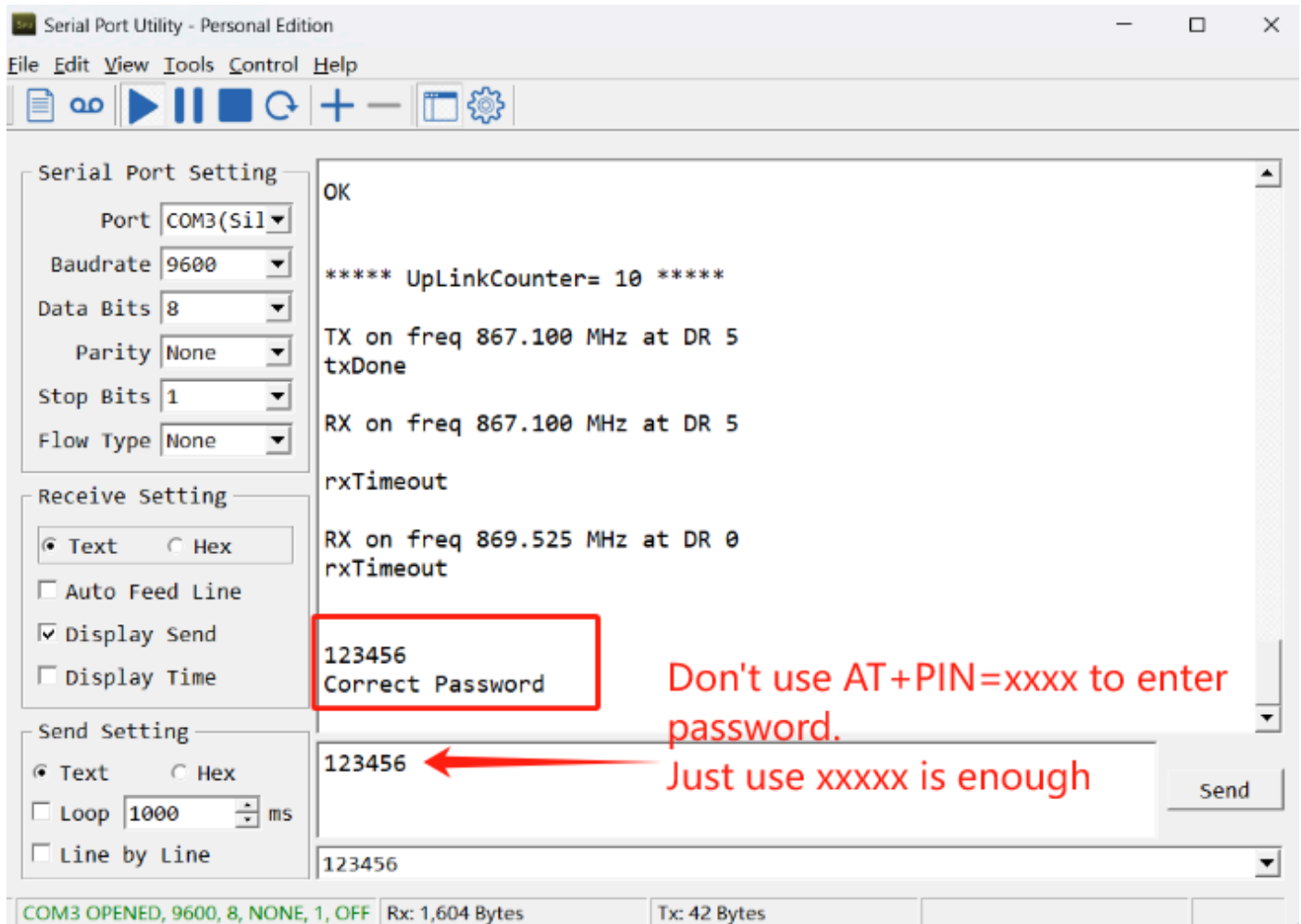
MR-03/12/25-NB/NS supports below configure method:

- AT Command via Bluetooth Connection (**Recommended**): [BLE Configure Instruction](#) .
- AT Command via UART Connection : See [UART Connection](#) .

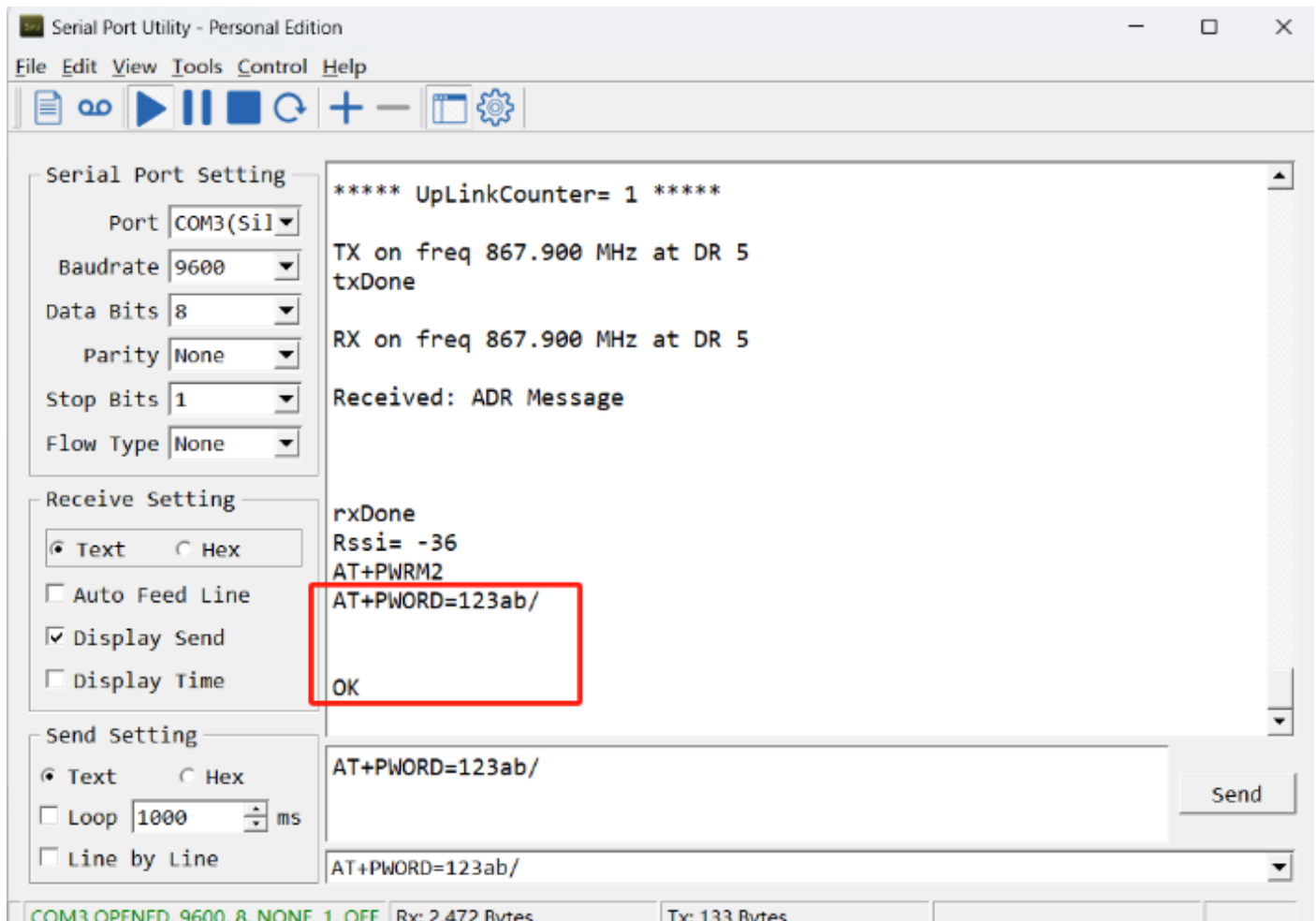
3.2 Serial Access Password

After the Bluetooth or UART connection is successful, use the Serial Access Password to enter the AT command window.

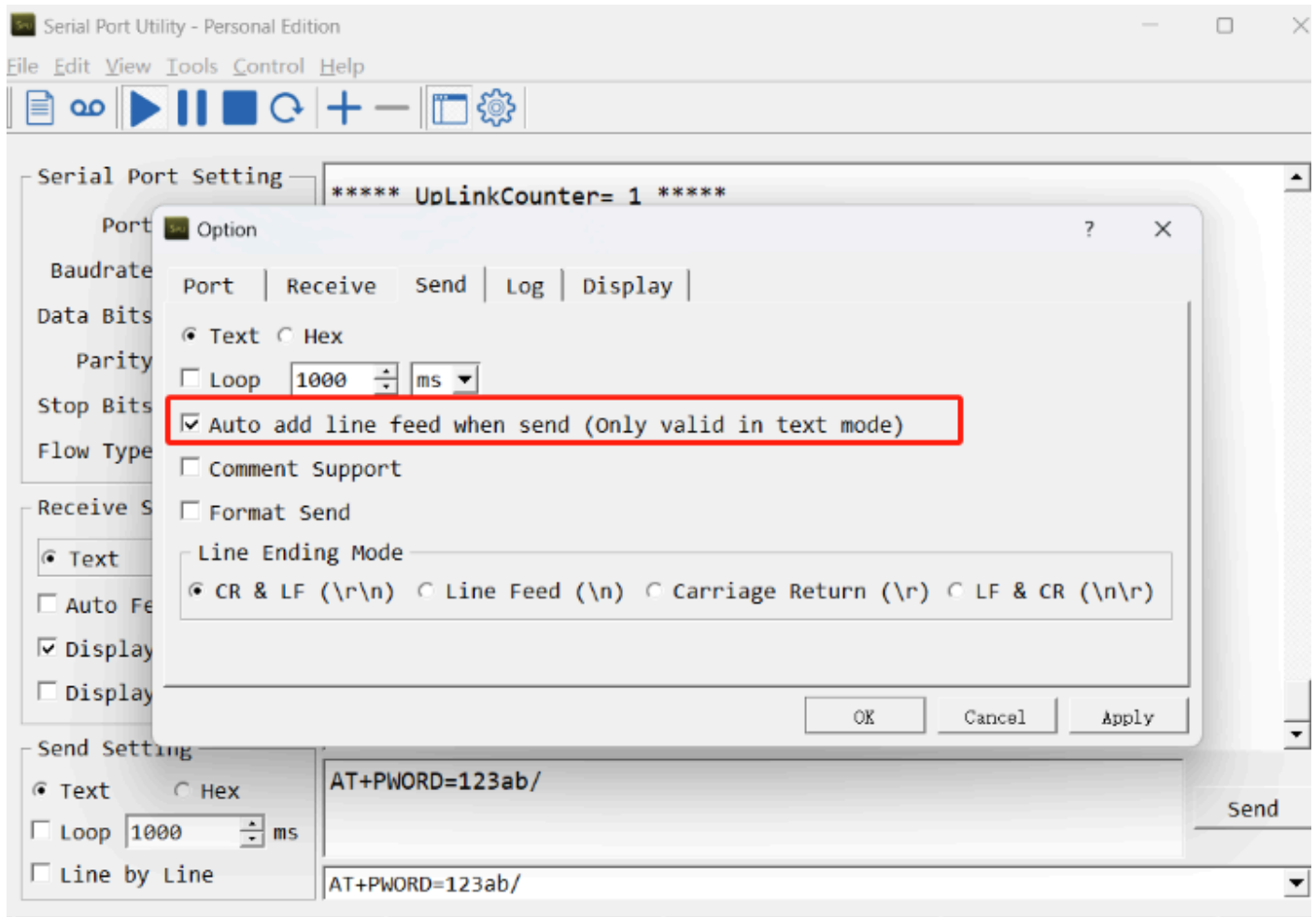
The label on the box of the node will print the initial password: AT+PIN=xxxxxx, and directly use the six-digit password to access the AT instruction window.



If you need to change the password, use **AT+PWORD=xxxxxx** (6 characters), NB nodes only support lowercase letters.



Note: After entering the command, you need to add a line break, and you can also set automatic line breaks in the Bluetooth tool or UART connection tool.



3.3 AT Commands Set

AT+<CMD>? : Help on <CMD>

AT+<CMD> : Run <CMD>

AT+<CMD>=<value> : Set the value

AT+<CMD>=? : Get the value

General Commands

AT : Attention

AT? : Short Help

ATZ : MCU Reset

AT+TDC : Application Data Transmission Interval

AT+CFG : Print all configurations

AT+CFGMOD : Working mode selection

AT+DEUI : Get or set the Device ID

AT+INTMOD : Set the trigger interrupt mode

AT+5VT : Set extend the time of 5V power
AT+PRO : Choose agreement
AT+RXDL : Extend the sending and receiving time
AT+DNSCFG : Get or Set DNS Server
AT+GETSENSORVALUE : Returns the current sensor measurement
AT+NOUD : Get or Set the number of data to be uploaded
AT+CDP : Read or Clear cached data
AT+ALARMC : Set alarm of distance
AT+SERVADDR : Server Address

MQTT Management

AT+CLIENT : Get or Set MQTT client
AT+UNAME : Get or Set MQTT Username
AT+PWD : Get or Set MQTT password
AT+PUBTOPIC : Get or Set MQTT publish topic
AT+SUBTOPIC : Get or Set MQTT subscription topic

Information

AT+FDR : Factory Data Reset
AT+PASSWORD : Serial Access Password
AT+LDATA : Get the last upload data
AT+CDP : Read or Clear cached data

4. Battery & Power Consumption

MR-03/12/25-NB use ER26500 + SPC1520 battery pack and MR-03/12/25-NS use 3000mAh Recharable Battery with Solar Panel. See below link for detail information about the battery info and how to replace.

[Battery Info & Power Consumption Analyze](#)  .

5. Firmware update

User can change device firmware to:

- Update with new features.
- Fix bugs.

Firmware and changelog can be downloaded from : [Firmware download link](#)

Methods to Update Firmware:

- (Recommended way) OTA firmware update via BLE: [Instruction](#).
- Update through UART TTL interface : [Instruction](#).

6. FAQ

6.1 How can I access t BC660K-GL AT Commands?

User can access to BC660K-GL directly and send AT Commands.

[See BC660K-GL AT Command set](#)

6.2 How to configure the certificate?

User can refer to this [description](#) to configure the certificate

6.3 Why is there no LED response when I press the button on the solar panel model?

If the LED does not light up when you press the button, it may be because the battery has entered protection mode.

Solution: To reactivate the battery, simply expose the solar panel to direct sunlight.

For more details, please refer to: [Battery Protection State \(Apply to Solar Panel + Li-ion battery\)](#)

7. Order Info

Part Number: **MR-XX-NB-YY** or **MR-XX-NS-YY**

XX: Measure Range, options: 03: 3 meters; 12: 12 meters; 25: 25 meters.

YY:

- **GE:** General version (Exclude SIM card)
- **1T:** with 1NCE * 10 years 500MB SIM card and Pre-configure to ThingsEye server

8. Packing Info

Package Includes:

- MR-XX-NB or MR-XX-NS NB-IoT Microwave Radar distance sensor x 1

- External antenna x 1

Dimension and weight:

- Device Size: 13.0 x 5 x 4.5 cm
- Device Weight: 150g
- Package Size / pcs : 14.0 x 8x 5 cm
- Weight / pcs : 180g

9. Support

- Support is provided Monday to Friday, from 09:00 to 18:00 GMT+8. Due to different timezones we cannot offer live support. However, your questions will be answered as soon as possible in the before-mentioned schedule.
- Provide as much information as possible regarding your enquiry (product models, accurately describe your problem and steps to replicate it etc) and send a mail to Support@dragino.cc.