DRAGINO NDS01 NB-IoT Door Sensor Instructions

DRAGINO NDS01 NB-IoT Door Sensor

Contents

Introduction

What is NDS01 NB-1oT Door Sensor

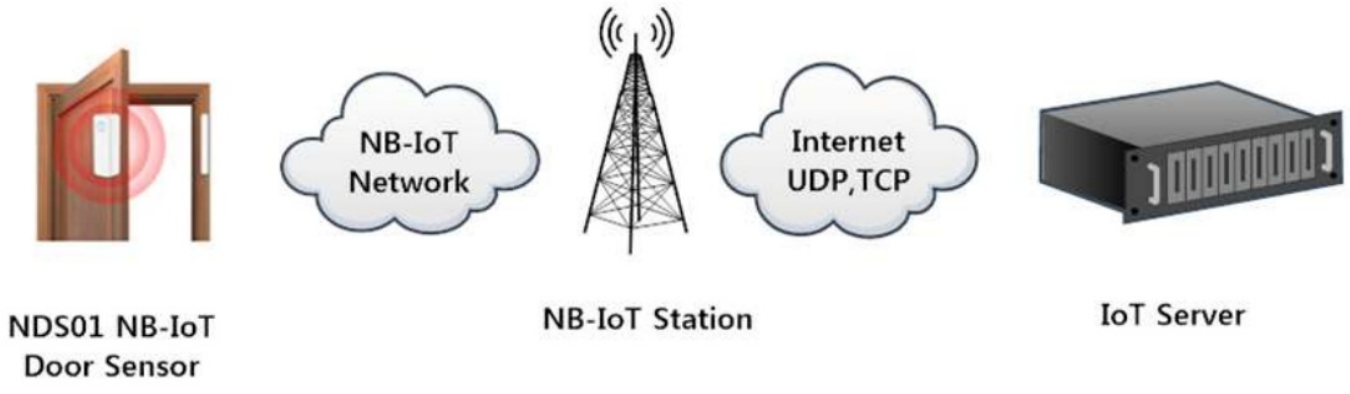
The Dargin NDS01 is a NB-IOT Door Sensor for Internet of Things solution. It is used to detect the open/close event for door and uplink the event to 1oT server via
Besides open/close event, NDS01 also has an internal temperature and humidity sensor which can detect the temperature and humidity inside the sensor.
NarrowBand-Internet of Things (NB-IoT) is a standards-based low power wide area (LPWA) technology developed to enable a wide range of new 1oT devices and sery

improves the power consumption of user devices, system capacity and spectrum efficiency, especially in deep coverage.

NDS01 is powered by 2 x AAA batteries for long term use.

*The measured temperature is 2-3 degree higher than the actually environment temperature out of NDS01.

NDSO1 in a NB-1oT Network



Specifications

Common DC Characteristics:

- Supply Voltage: 2.1v – 3.6v
- Operating Temperature: -10 – 50°C

NB-1oT Spec:

- – B1 @H-FDD: 2100MHz
- – B3 @H-FDD: 1800MHz
- – BB @H-FDD: 900MHz
- – B5 @H-FDD: 850MHz
- – B20 @H-FDD: 800MHz
- – B28 @H-FDD: 700MHz

Power Consumption

- IDEL Mode: 10uA@3.3v
- Max transmit power: <500mA@3.3v

Features

- NB-1oT Bands: B1/B3/B5/B8/B20/B28 @H-FDD
- Ultra low power consumption
- Door Open / Close Detect
- Device remove alarm
- Uplink Protocol: TCP or UDP
- Uplink on periodically
- Micro SIM card slot for NB-1oT SIM
- 2 x AAA LR03 Batteries

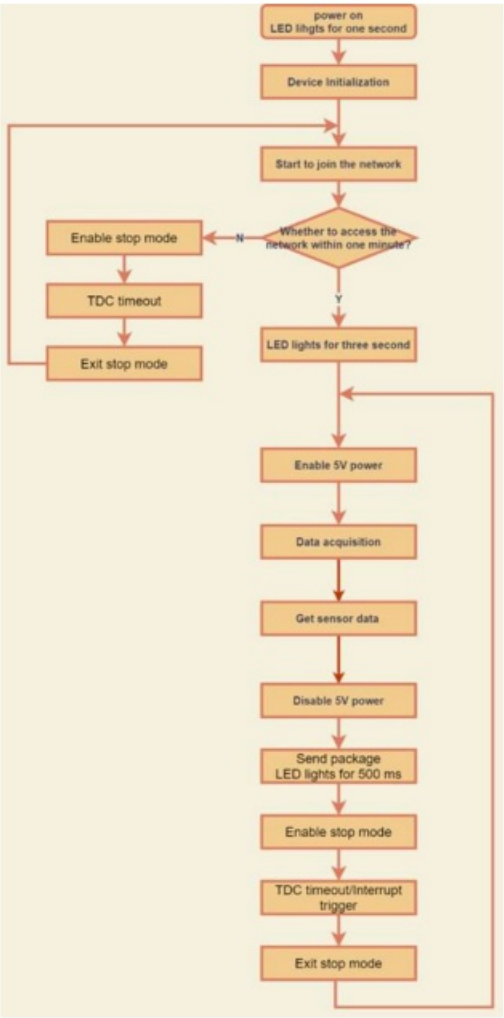
Applications

- Smart Buildings & Home Automation
- Logistics and Supply Chain Management
- Smart Cities
- Smart Factory

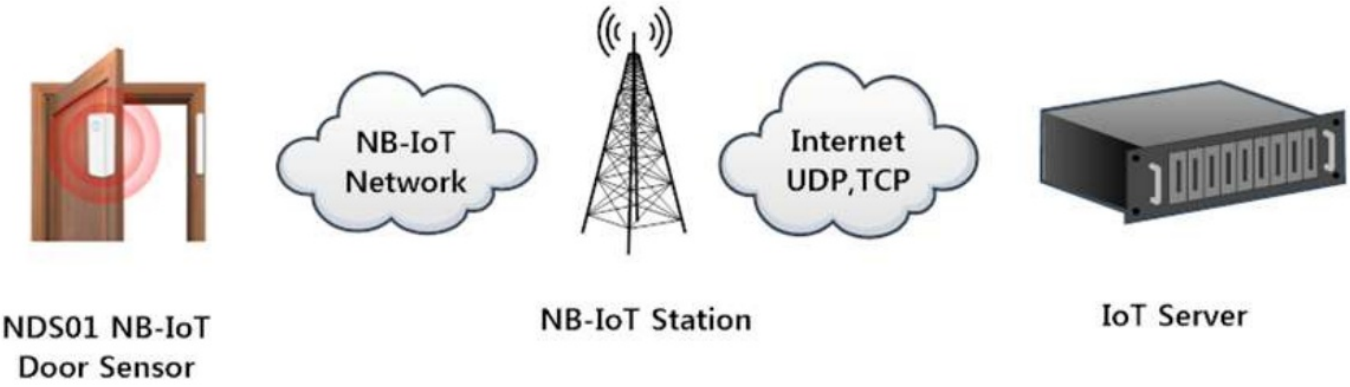
Use NDS01 to communicate with 1oT Server

How it works

The NDS01 is equipped with a NB-1oT module, the pre-loaded firmware in NDS01 will get environment data from sensors and send the value to local NB-1oT network via
network will forward this value to 1oT server via the protocol defined by NDS01.
The diagram below shows the working flow in default firmware of NDS01:

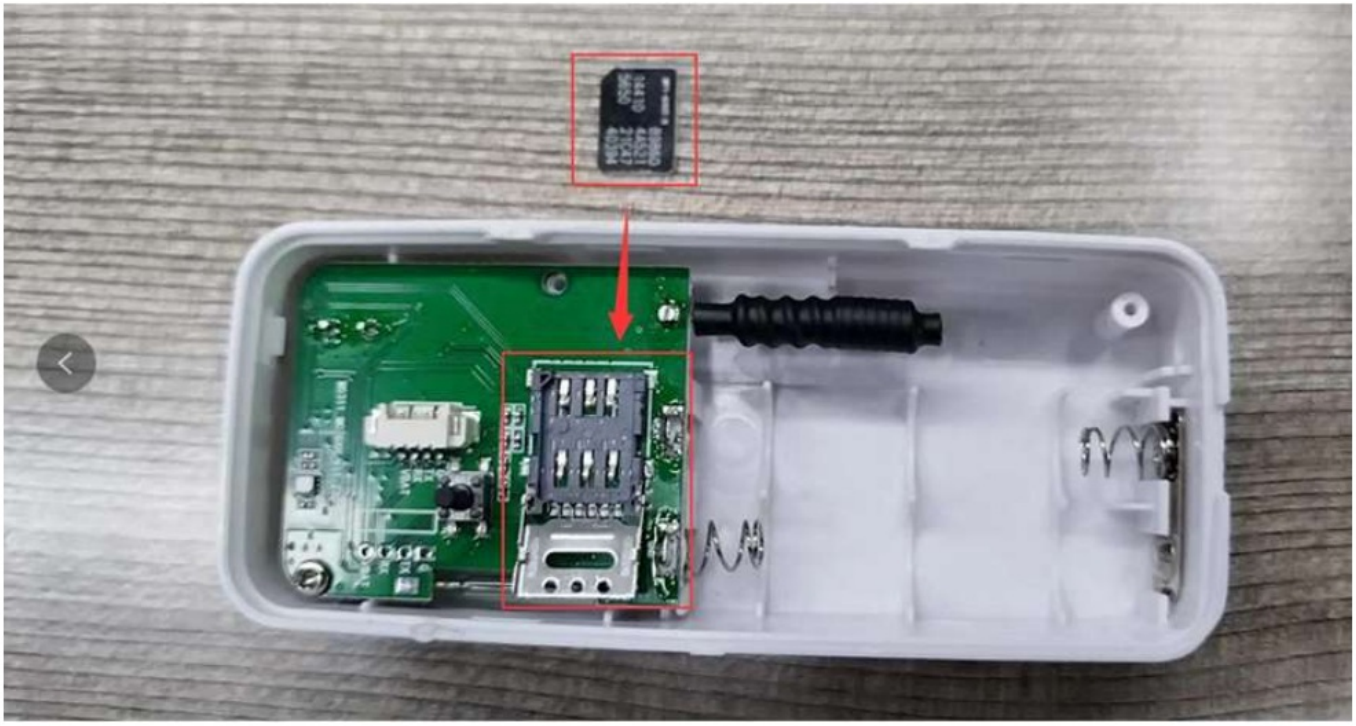


NDSO1 in a NB-1oT Network



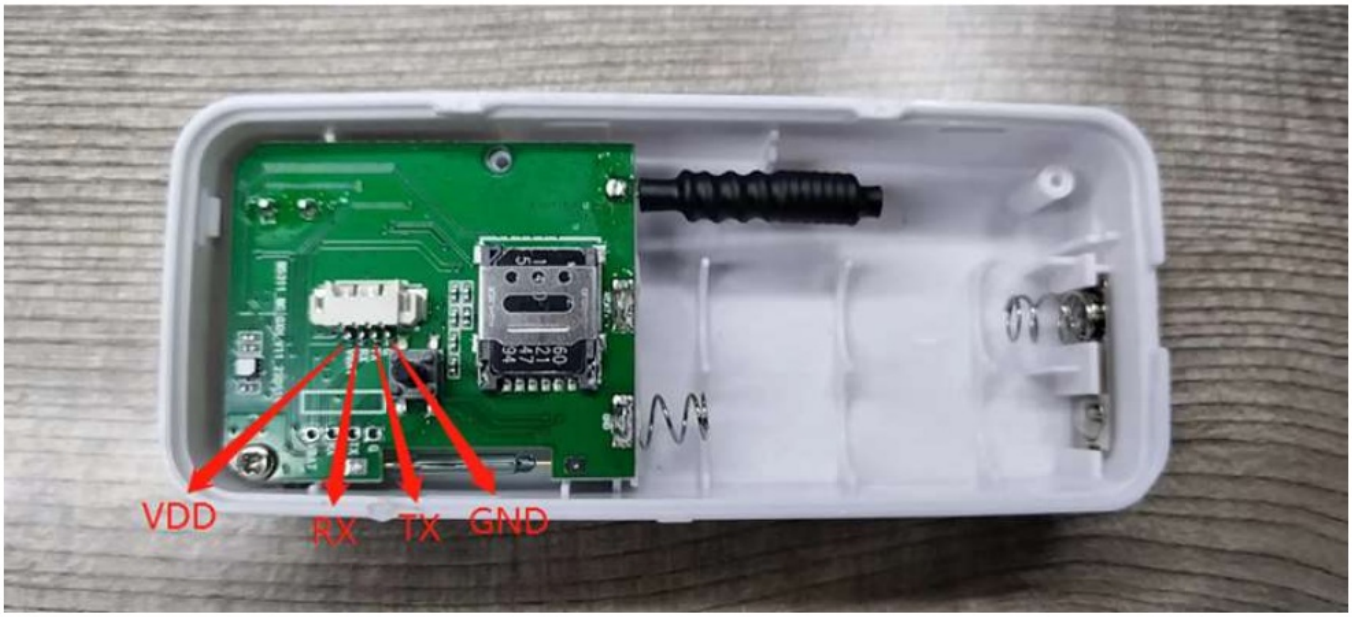
Insert SIM card

Insert the NB-1oT Card get from your provider.
User need to take out the NB-1oT module and insert the SIM card like below:



Configure NDS01

User need to configure NDS01 via serial port to set the Server Address/ Uplink Topic to define where and how-to uplink packets. NDS01 support AT Commands, user, connect to NDS01 and use AT Commands to configure it, NDS01 needs to be in the wake-up state when using AT commands.as below.



Connection:

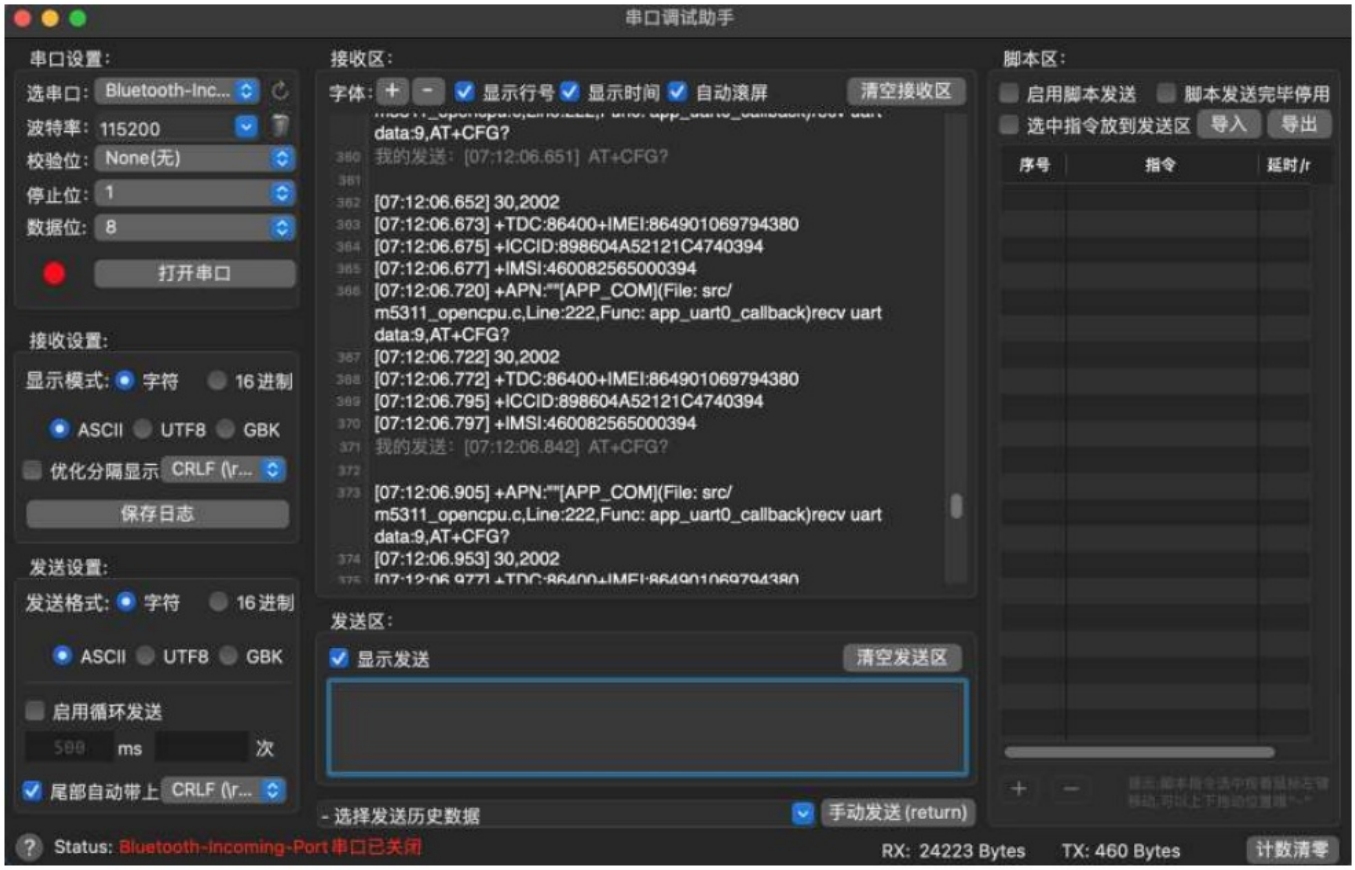
USB TTL GND <—-> GND
USB TTL TXD <—-> UART _RXD
USB TTL RXD <—-> UART_ TXD

In the PC, use below serial tool settings:

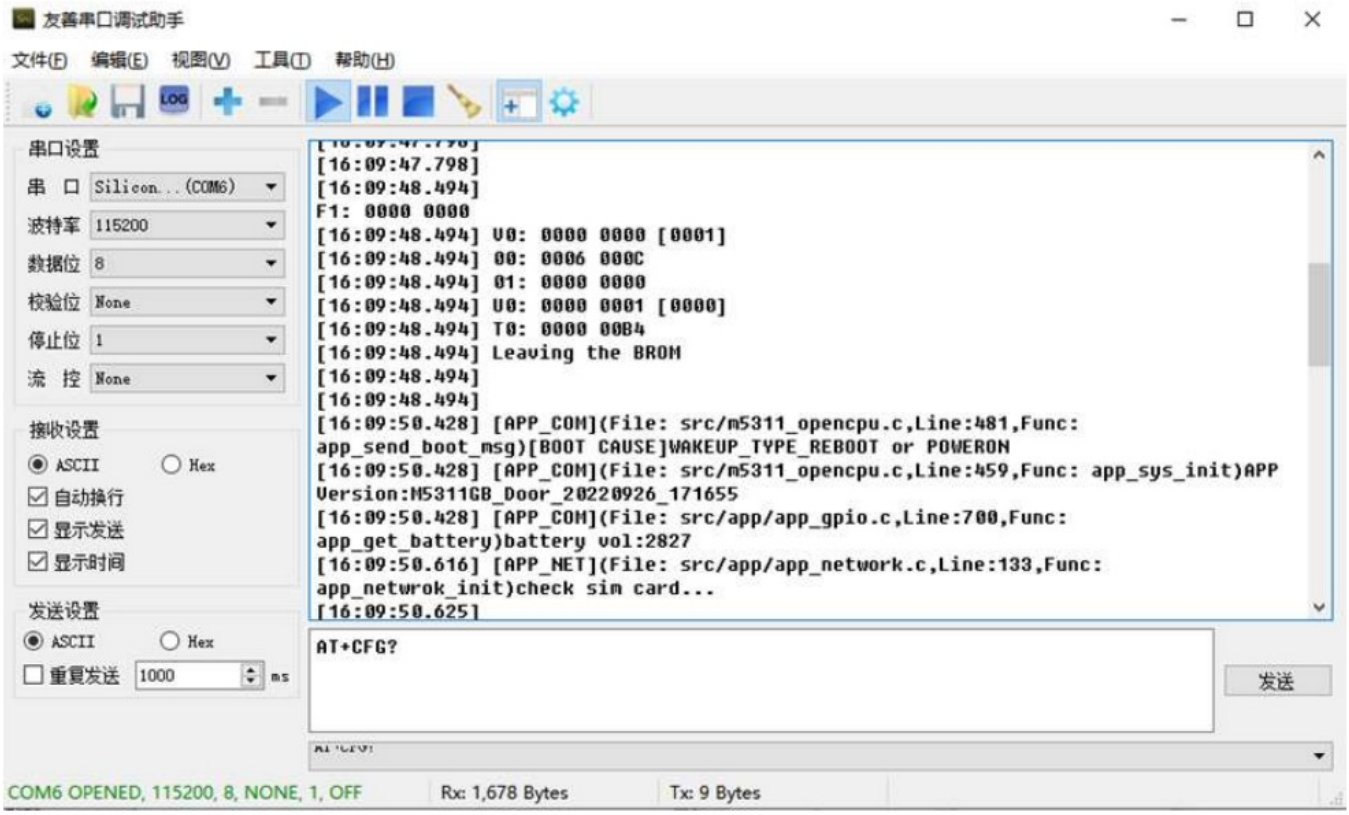
- Baud: 115200

- Data bits: 8
- Stop bits:
- Parity: None
- Flow Control: None

If you are using Mac OS, please download the serial port assistant for Mac OS. The settings and operation are the same as Windows



After powering on the NDS01, the following information will be printed



AT command set

1. **Set and query the communication protocol**

   Send: AT +PRO=<val> Val: 0:TCP 1 :UDP

   Reply: OK

   Send: AT +PRO? // Inquire

   Reply: +PRO:0

   OK
2. **Set and query the server address**

   Send: AT +SERVADDR=<server>,<port>

   Reply: OK

   Send: AT +SERVADDR? // Inquire

   Reply: +SERVADDR:<server>,<port>

   OK
3. **Set and query the TDC**

   Send: AT+ TDC=<value> II Heartbeat time, in seconds, the default is 86400s,which is 24 hours

   Reply: OK

   Send: AT+ TDC? // Inquire

   Reply: + TDC:<value>

   OK
4. **Query parameters**

   Send: AT +CFG?

   Reply: +PRO:0

   +SERVADDR: 120.27 .12.119,2023

   +TDC:86400

+CSQ:31

+I MEI :868163049937383

+ICCI D:898604611619C0854626

+IMSI:460048118204626

OK

5. **Set and query the APN**

   Send: AT +APN=”<apn>” // Set APN

   Reply: OK

   Send: AT +APN? // Inquire

   Reply: +APN:”cmiot”

   OK

6. **Alarm and Silencer**

   Send: AT +ALARM=<value> // 0-1,0: mute 1: buzzer alarm (note that no data will be reported, only the buzzer and the red light are on, if it is in silent mode, only the r

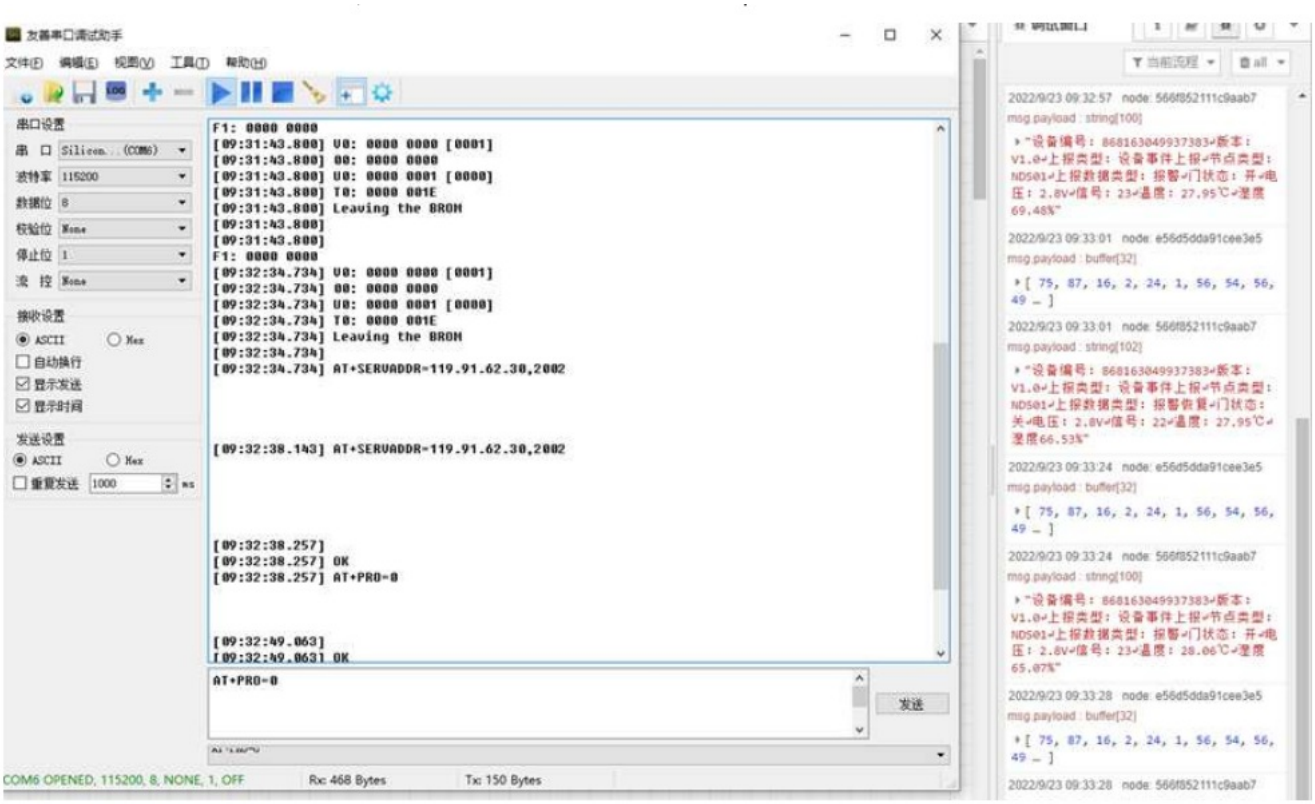
   Reply: OK

Use UDP protocol to uplink data (Default protocol)

- **AT +PRO=1** // Set to use UDP protocol to uplink
- **AT+SERVADDR=119.91.62.30, 1999** // to set UDP server address and port

Use TCP protocol to uplink data

- AT +PRO=0 II Set to use TCP protocol to uplink
- AT+SERVADDR=119.91.62.30,2002 II to set TCP server address and port.



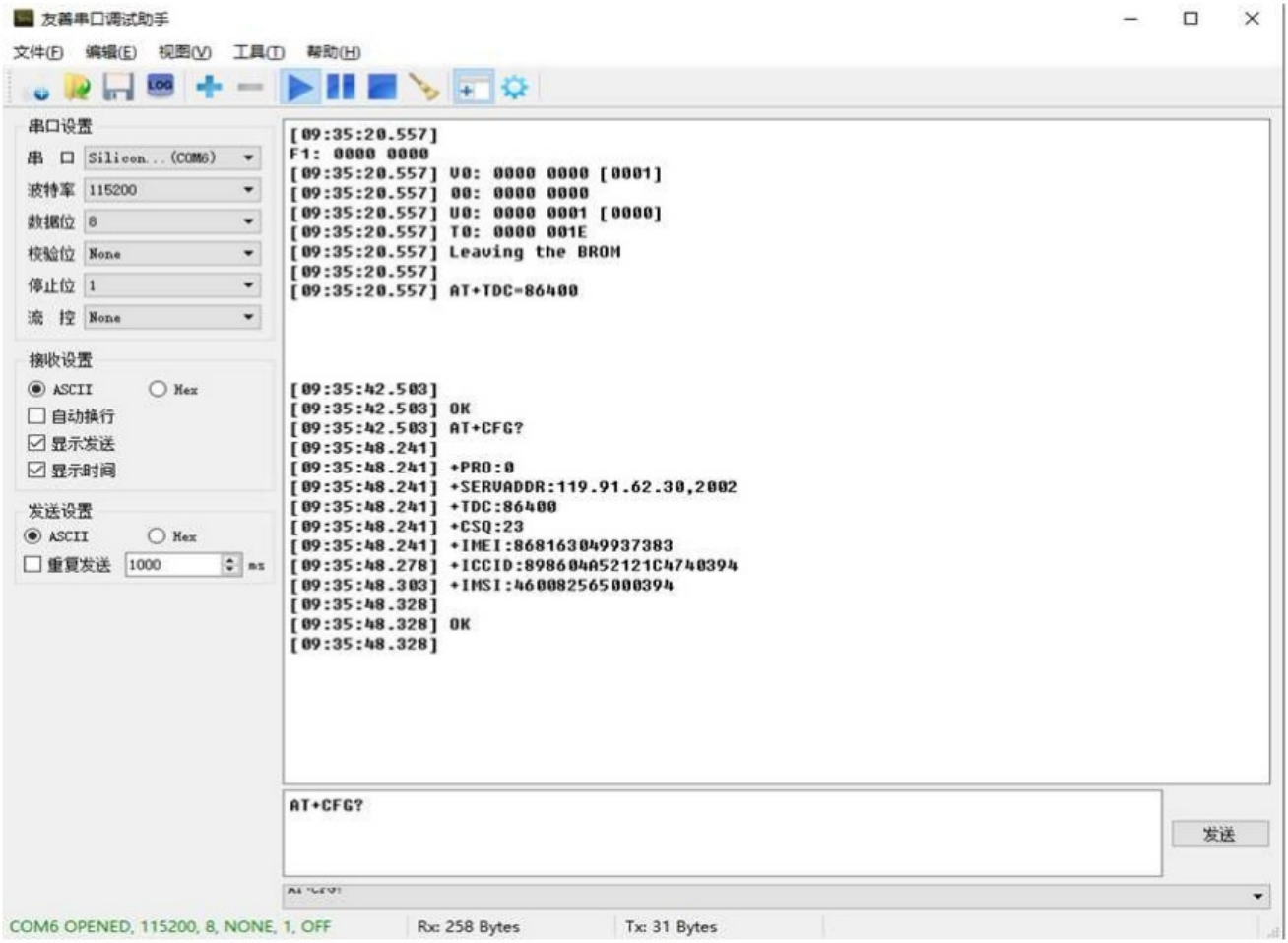
Change Update Interval

User can use below command to change the uplink interval.

- **AT+TDC=86400** // Set Update Interval to 86400s

NOTE:

1. By default, the device will send an uplink message every 24 hour (86400s).



Uplink Payload

registration package, uplink payload includes in total 61 bytes

Size(bytes)	**2**	**1**	**1**	**1**	**1**	**15**	**15**	**20**	**1**	**1**	**3**
Value	head	Version	data type	Data length	device type	device ID	IMSI	ICCID	BAT	Signal	tail

The payload is ASCII string, representative same HEX: **Ox 4B57 1 O 01 34 01 383639393735303334343431303832 383938363131323032323430313433393837363211**

where:

- **Head:** 0x4B57(fixed)
- **Version:** 0x1 0=”V1 .0″
- **Data type:** 0x01=1(1:register,2:data sending)
- **Data length:** 0x34=52(Valid data is 52 bytes)
- **Device type:** 0x01 = 1 (Representative NDS01)
- **Device ID:** 0x383639393735303334343431303832=869975034441082(ASCII)
- **IMSI:** 0x34363031313331313837343337333 2 = 460113118743732(ASCII)
- **ICCID:** 0x38393836313132303232343031343339383736 32=89861120224014398762(ASCII)
- **Bat:** 0x1 E = 30/10=3.0V

- **Signal:** 0x15=21
  0 -113dBm or less
  1 -111dBm
  2 … 30 -109dBm … -53dBm
  31 -51dBm or greater
  99 Not known or not detectable
- **Tail:** 0x494F54(fixed)

data upload, uplink payload includes in total 32 bytes

1	**1**	**1**	**1**	**1**	**1**	**1**	**3**
Door magnetic state	BAT	Signal	data type	Data length	device type	device ID	event type

Size(bytes)	**2**	**1**	**1**	**1**	**1**	**15**	**1**
Value	head	Version	data type	Temp decimal	Hum integer	Hum decimal	tail

The payload is ASCII string, representative same HEX: **Ox 4B57 10 02 14 01 38363939373530333434343130383 2 01 00 20 15 1c 55 23 12 454F54**

where:

- **Head:** 0x4B57(fixed)
- **Version:** 0x1 0=’V1 .0″
- **Data type:** 0x02=2(1 :register,2:data sending)
- **Data length:** 0x14=20(Valid data is 20 bytes)
- **Device type:** 0x01 = 1 (Representative NDS01)
- **Device ID**: 0x383639393735303334343431303832=869975034441082(ASCII)
- **Event type:** 0x01
  01: TDC
  02: alarm
  03: remove alarm
  04: dismantling alarm
  05: remove demolition alarm
  06: low voltage
  07: remove low voltage
- **Door magnetic state:** 0x00
  00: Door sensor is close
  01: Door sensor is open
- **Bat:** 0x20 = 32/10=3.2V
- **Signal:** 0x15=21

0 -113dBm or less

1 -111dBm

2 … 30 -109dBm … -53dBm

31 -51dBm or greater

99 Not known or not delectable

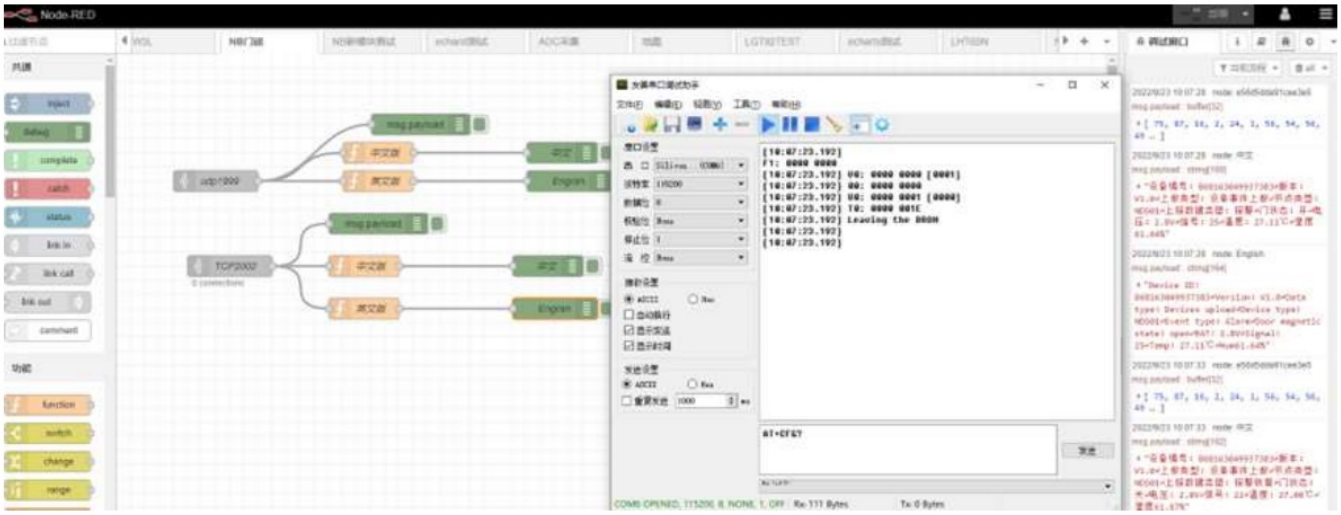
- **Temp integer:** 0x1 c=28
- **Temp decimal:** 0x55=85

  Temp =Temp integer+(Temp decimal)/100=28+85/100=28.85°C
- **Hum integer:** 0x23=35
- **Hum decimal:** 0x12=18

  Hum =Hum integer+(Hum decimal)/100=35+18/100=35.18%rh
- **Tail:** 0x494F54(fixed)

Node-Red Example

Please refer to this link for the use of Node-RED: http://wiki.dragino.com/xwiki/bin/view/Main/Node-RED/ (http://wiki.dragino.com/xwiki/bin/view/Main/Node-RED/)
Please visit this link to download the Node-RED process: https://github.com/dragino/dragino-end-node-decoder/tree/main/Node-RED (htlps://gilhub.com/dragino/draginodecoder/tree/main/Node-RED)



Buttons and LED and Mode

Operating mode

1. In the self-check mode (the default is the self-check mode when power on for the first time}, the state change of the tamper switch does not trigger an alarm;
2. In normal working mode, the state change of the tamper switch triggers an alarm;
3. In silent mode (the default is non-silent mode when power on for the first lime), the buzzer is silent.

led lights

1. After the device is powered on, the green light flashes once;
2. The device does not set server parameters or cannot connect to the server, and the green light flashes quickly;

3. SIM card recognition fails, the green light is always on for 20s;
4. The equipment signal is poor, and the green light flashes once every 3 seconds;
5. When the device sends data, the green light flashes twice;
6. The communication of the equipment is normal, and the green light flashes 3 times continuously;
7. Trigger the tamper switch, the red light is always on for 30s, and goes out when the alarm is canceled;
8. Trigger the door magnetic alarm, the red light is always on for 30s, and goes out when the alarm is canceled;

buzzer

1. When the door magnetic alarm is triggered, the buzzer will sound for 30s; after the alarm is restored, the buzzer will be silenced;
2. Enter the normal working mode (the tamper switch is closed for more than 5s or the door sensor is locked for more than 5s), the buzzer will sound for 1500ms;
3. After entering the normal working mode, the tamper switch does not close, the buzzer sounds for 30s, the tamper switch is closed, and the buzzer sounds 1 time;
4. When the door sensor does not alarm, press the button to trigger the alarm, and the buzzer will sound for 30s; when the door sensor alarms, press it once to cancel the silenced.

button

1. When there is no alarm, press it once to trigger the alarm, and the buzzer will sound; when it alarms, press the buzzer to silence the sound.
2. Press twice to silence the buzzer;
3. Press the button three times or more, when the mute function is turned off, the mute function is turned on, and the green light flashes once; when the mute function is turned off, and the green light flashes once.

data pack

1. The device needs to send a registration packet and a heartbeat packet every time it is powered on and registered;
2. The heartbeat time is reported once every 24 hours by default.

FAQ

How to Upgrade Firmware

User can upgrade the firmware for 1) bug fix, 2) new feature release.
Burning software please go to this link to download:
https://www.dropbox.com/sh/floxy4qsf2rgnrc/AAAJXz_rex37dPHwqVMBaql_a?dl=O
(**https://www.dropbox.com/sh/floxy4qsf2rgnrc/AAAJXz_rex37dPHwqVMBaql_a?dl=O**)

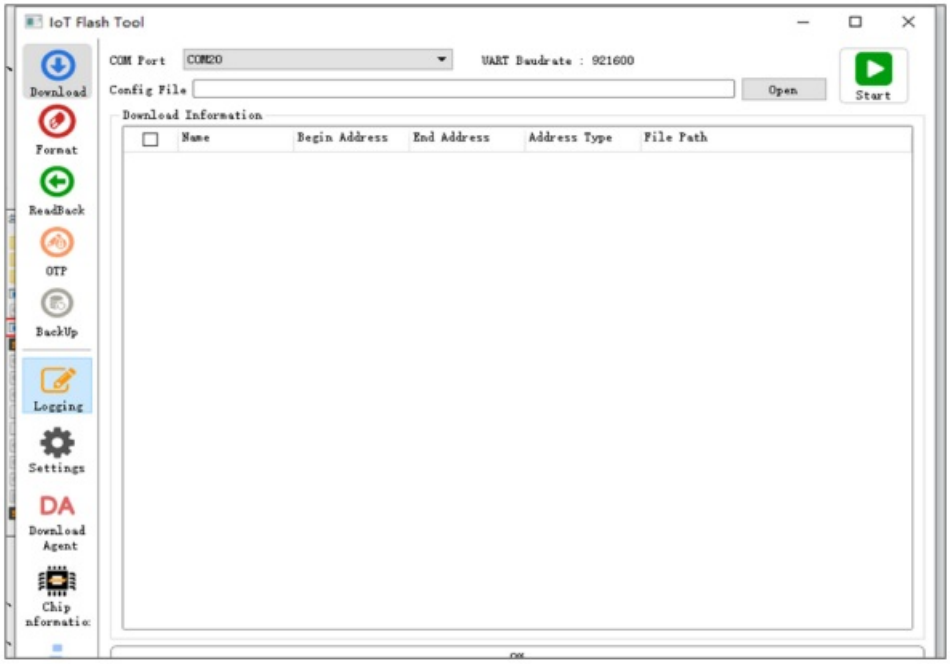
Note:
Disconnect one battery before starting the upgrade

Please use 1.BV USB TO TTL serial port

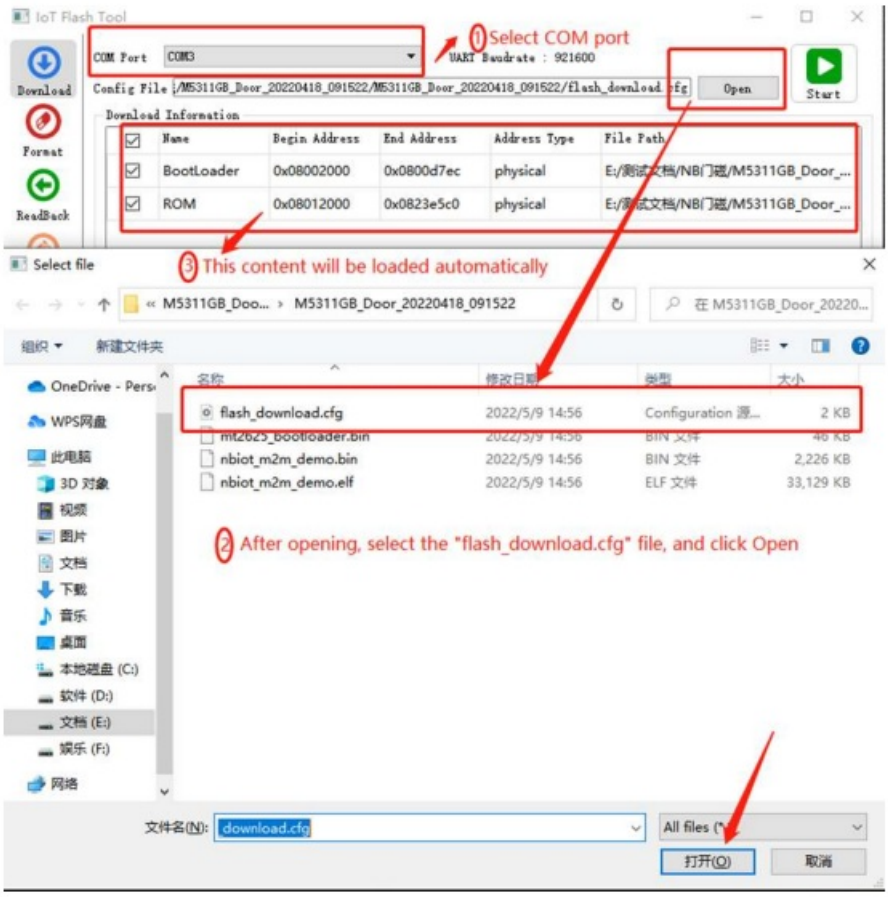
Connection:

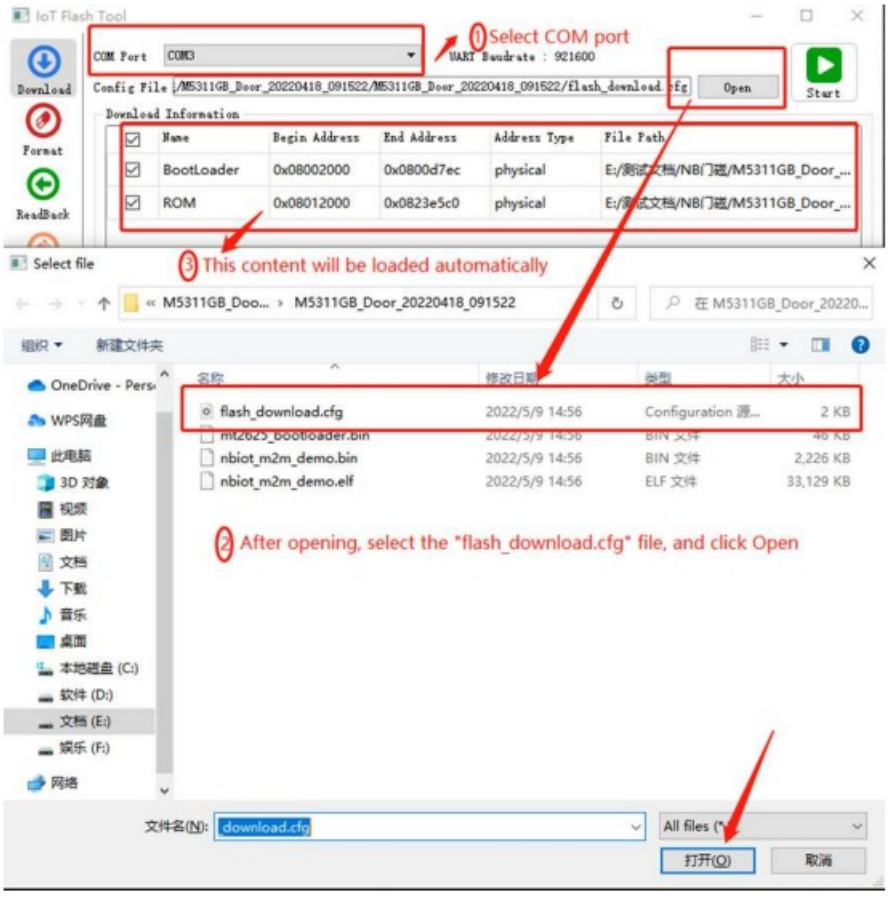
- **USB TTL GND <—-> GND**
- **USB TTL TXD <—-> UART_RXD**
- **USB TTL RXD <—-> UART_TXD**

1. **Double-click “FlashTool.exe” to start the program**

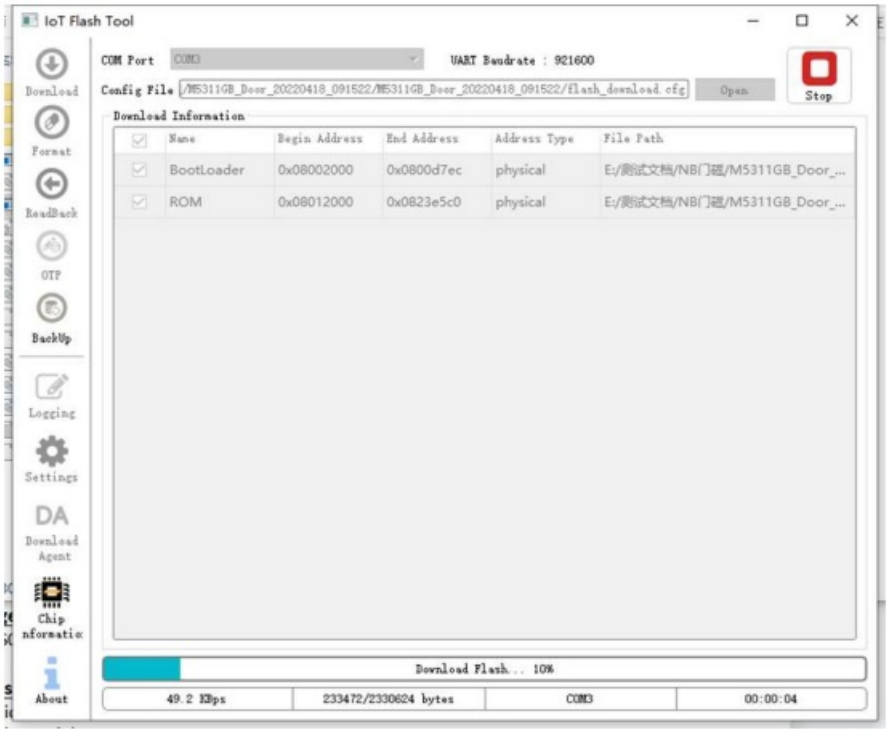


2. **Select burn serial port and firmware package to complete the upgrade**

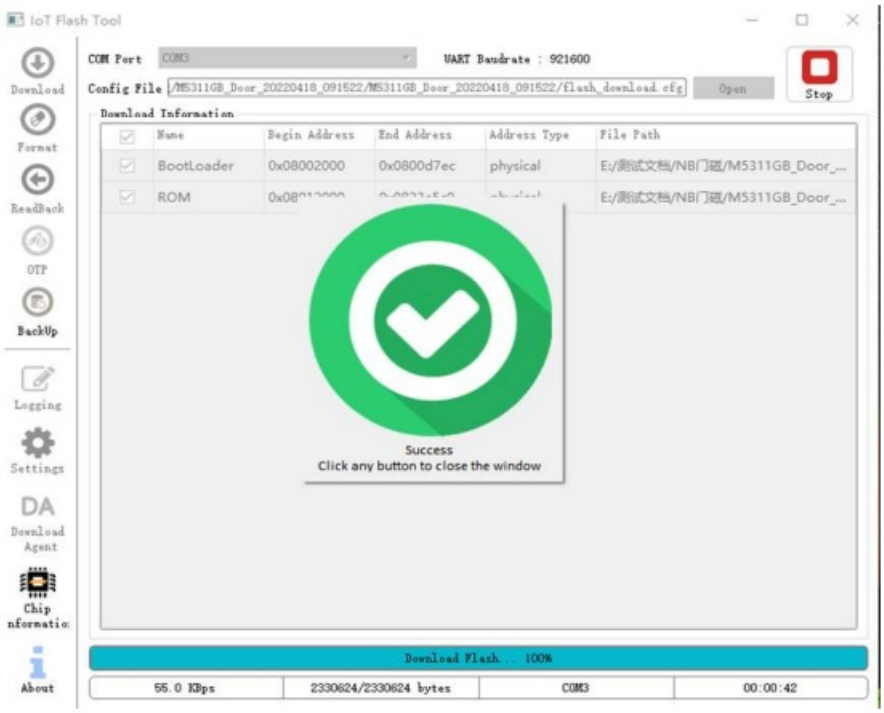




3. **Install the battery to the node, and the upgrade will start at this time**



4. **The following screenshot appears, indicating that the upgrade has been successful**



Order Info

Part Number: **NDS01**

Packing Info

Package Includes:

- NDS01 NB-1oT Door Sensor

Dimension and weight:

- Device Size:
- Device Weight:
- Package Size / pcs :
- Weight/ pcs :

Support

Support is provided Monday to Friday, from 09:00 to 18:00 GMT +8. Due to different time zones we cannot offer live support. However, your questions will be answe 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 (http://../D:%5C%E5%B8%82%E5%9C%BA%E8%B5%84%E6%96%99%5C%E8%AF%B4%E6%98%8E%E4%E

Created by Xiaoling (/xwiki/bin/view/XWiki/Xiaoling) on 2022/11

Documents / Resources

	DRAGINO NDS01 NB-IoT Door Sensor [pdf] Instructions NDS01 NB-IoT Door Sensor, NDS01, NB-IoT Door Sensor, Door Sensor, Sensor