

LHT65S-PIR

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LHT65S-PIR



1. Introduction

1.1 What is LHT65S-PIR Temperature, Humidity & PIR Sensor

The Dragino **LHT65S-PIR Temperature, Humidity & PIR sensor** is a Long Range LoRaWAN Sensor. It includes a **built-in Temperature & Humidity sensor** and has an **external PIR Probe**. LHT65S-PIR can detect environment Temperature & Humidity, it also detects **People Activity** via PIR probe and then send these info to LoRaWAN IoT Server.

The LHT65S-PIR allows users to send data and reach extremely long ranges. It provides ultra-long range spread spectrum communication and high interference immunity whilst minimizing current consumption. It targets professional wireless sensor network applications such as irrigation systems, smart metering, smart cities, building automation, and so on.

LHT65S-PIR has a **built-in 2400mAh non-chargeable battery** which can be used for more than 5 years*.

LHT65S-PIR supports **wireless configure & OTA update** which make user easy to use.

LHT65S-PIR is fully compatible with **LoRaWAN v1.0.3 Class A protocol**, it can work with a standard LoRaWAN gateway.



提示

The actual battery life depends on how often to send data, please see battery analyzer chapter.

1.2 Features

- LoRaWAN v1.0.3 Class A protocol
- Frequency Bands: CN470/EU433/KR920/US915/EU868/AS923/AU915
- AT Commands to change parameters
- Remote configure parameters via LoRaWAN Downlink
- Support wireless OTA update firmware
- Firmware upgradeable via program port
- Built-in 2400mAh battery for up to 5 years of use.
- Built-in Temperature & Humidity sensor
- External PIR Sensor
- Tri-color LED to indicate working status

1.3 Specification

Built-in Temperature Sensor:

- Resolution: 0.01 °C
- Accuracy Tolerance : Typ ± 0.3 °C
- Long Term Drift: < 0.02 °C/yr
- Operating Range: -40 ~ 85 °C

Built-in Humidity Sensor:

- Resolution: 0.04 %RH
- Accuracy Tolerance : Typ ± 3 %RH
- Long Term Drift: < 0.02 °C/yr
- Operating Range: 0 ~ 96 %RH

External PIR Sensor:

- Base on RDB223 Sensor
- Cable Length : 1 meter
- Stable detect distance : 0~3 meter

2. Connect LHT65S-PIR to IoT Server

2.1 How does LHT65S-PIR work?

LHT65S-PIR is configured as LoRaWAN OTAA Class A sensor by default. Each LHT65S-PIR is shipped with a worldwide unique set of OTAA keys. To use LHT65S-PIR in a LoRaWAN network, first, we need to put the OTAA keys in LoRaWAN Network Server and then activate LHT65S-PIR.

If LHT65S-PIR is within the coverage of this LoRaWAN network. LHT65S-PIR can join the LoRaWAN network automatically. After successfully joining, LHT65S-PIR will start to measure environment temperature, humidity & people activity, and start to transmit sensor data to the LoRaWAN server. The default period for each uplink is 20 minutes.

2.2 How to Activate LHT65S-PIR?

The LHT65S-PIR has two working modes:

- **Deep Sleep Mode:** LHT65S-PIR doesn't have any LoRaWAN activation. This mode is used for storage and shipping to save battery life.
- **Working Mode:** In this mode, LHT65S-PIR works as LoRaWAN Sensor mode to Join LoRaWAN network and send out the sensor data to the server. Between each sampling/tx/rx periodically, LHT65S-PIR will be in STOP mode (IDLE mode), in STOP mode, the PIR sensor is still working to detect people activity in low power consumption.

The LHT65S-PIR is set in deep sleep mode by default; The ACT button on the front is to switch to different modes:



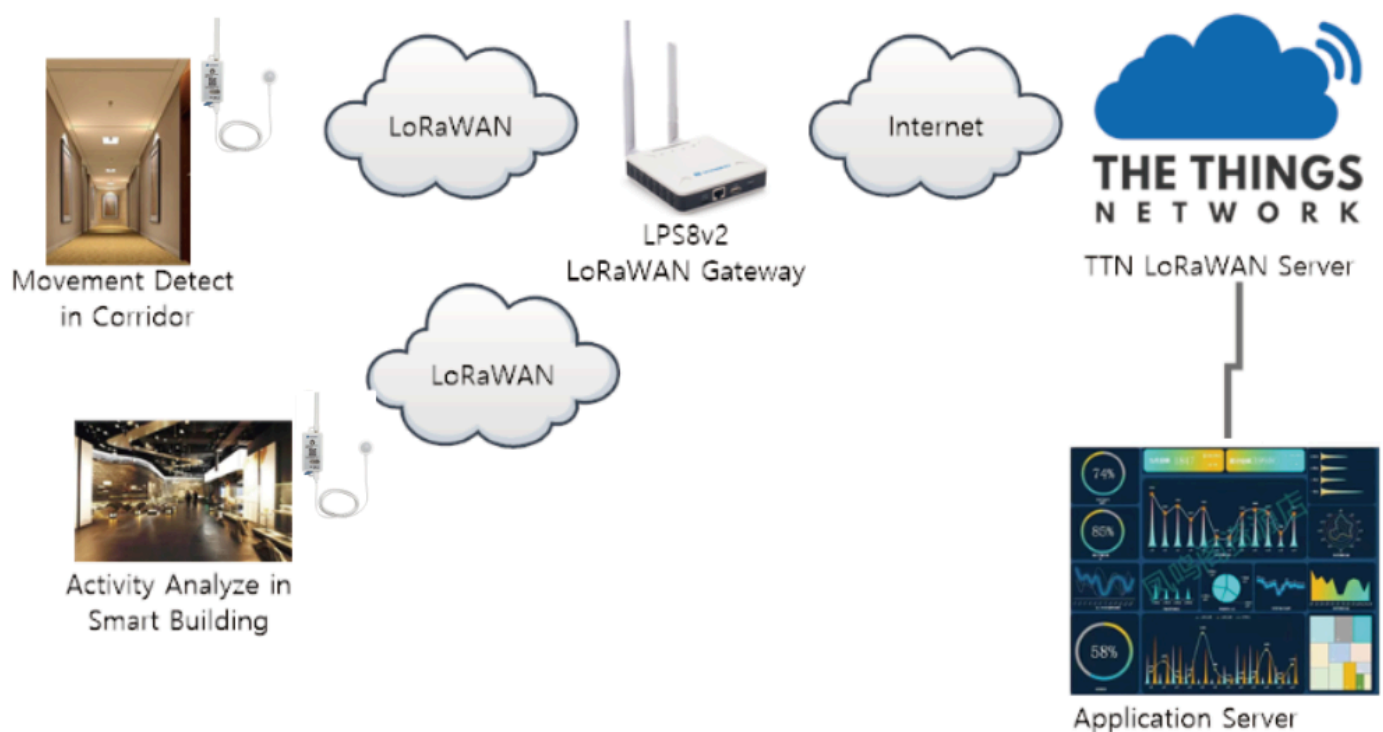


Behavior on ACT	Function	Action
Pressing ACT between 1s < time < 3s	Test uplink status	If LHT65S-PIR is already Joined to the LoRaWAN network, LHT65S-PIR will send an uplink packet, if LHT65S-PIR has external sensor connected, Red led will blink once. If LHT65S-PIR has not external sensor, Red led will blink once.
Pressing ACT for more than 3s	Active Device	Green led will fast blink 5 times, LHT65S-PIR will enter working mode and start to JOIN LoRaWAN network. Green led will solidly turn on for 5 seconds after join in network.
Fast press ACT 5 times.	Deactivate Device	Red led will solid on for 5 seconds. Means LHT65S-PIR is in Deep Sleep Mode.

2.3 Example to join LoRaWAN network

This section shows an example of how to join the TTN V3 LoRaWAN IoT server. Use with other LoRaWAN IoT servers is of a similar procedure.

LHT65S-PIR in a LoRaWAN Network



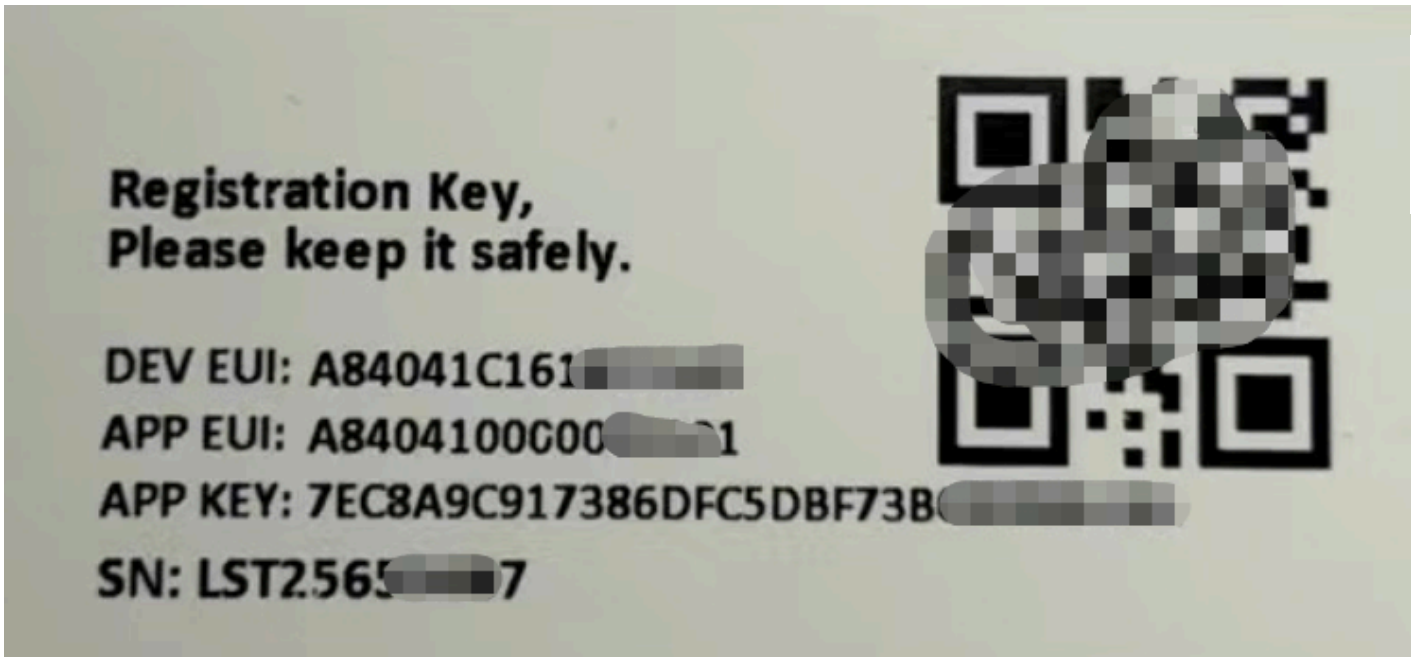
Assume the LPS8v2 is already set to connect to [TTN V3 network](#), So it provides network coverage for LHT65S-PIR. Next we need to add the LHT65S-PIR device in TTN V3:

2.3.1 Step 1: Create Device n TTN

Create a device in TTN V3 with the OTAA keys from LHT65S-PIR.

Each LHT65S-PIR is shipped with a sticker with its device EUI, APP Key and APP EUI as below:





User can enter these keys in the LoRaWAN Server portal. Below is TTN V3 screenshot:

Add APP EUI in the application.

THE THINGS STACK
Community Edition

Overview Applications Gateways Orgs

Add application

Owner*
davidhuang

Application ID*
my-new-application

Application name
My new application

Description
Description for my new application

Optional application description; can also be used to save notes about the application

Create application

General Information

Application ID: 123

Created at: Feb 2, 2021 11:12:30

Last updated at: Apr 30, 2021 11:00:33

Live data

- 10:09:42 1231234234... Forward data message to Application Server
- 10:09:42 1231234234... Store upstream data message
- 10:09:42 1231234234... Forward uplink data message
- 10:09:42 1231234234... Receive uplink data message
- 10:09:42 1231234234... Successfully processed data message
- 10:09:42 1231234234... Drop data message

End devices (4)

Search by ID | Import end devices | **+ Add end device**

Register end device

From The LoRaWAN Device Repository | Manually

1. Select the end device

Brand * Model *

Dragino Technology Co.,... | Type to search...

Cannot find your exact end device?

2. Enter registration data

Please choose an end device first to

Register end device

LBT1
LDDS20
LDDS75
LDS01
LGT92
LHT65
LSE01
LSN50-V2

 Note LHT65S-PIR use same payload decoder as LHT65.

Frequency plan ① *

Last seen 3 seconds ago

↑ 573 ↓ 34

Created 8 days ago

Overview

Live data

Messaging

Location

Payload formatters

Claiming

General settings

Time

Type

Data preview

Pause

Clear

↑ 10:09:42

Forward data message to Applic...

DevAddr: 26 0B B5 9A

MAC payload: 79 41 62 C5 18 2A B9 99 5A E2 A7

FPort: 2 SNR: -6.2 RSSI: -126 Bandwidth: 125000

ⓘ 10:09:42

Store upstream data message

DevAddr: 26 0B B5 9A

Temperature Sensor", Hum_SHT: 56.1, TempC_DS: 327.67, TempC_SHT: 38.28, C8 F4 0B D4 02 31 01 7F FF 7F FF

FPort: 2 SNR: -6.2 RSSI: -126 Ban

↑ 10:09:42

Forward uplink data message

DevAddr: 26 0B B5 9A

FPort: 2 SNR: -6.2 RSSI: -126 Ban

↑ 10:09:42

Receive uplink data message

DevAddr: 26 0B B5 9A

FPort: 2 SNR: -6.2 RSSI: -126 Ban

↑ 10:09:42

Successfully processed data me...

DevAddr: 26 0B B5 9A FCnt: 573 FPort: 2 MAC payload: 79 41 62 C5 18 2A B9 99 5A E2 A7

Bandwidth: 125000 SNR: -6.2 RSSI: -126 Raw pay:

↑ 10:09:42

Drop data message

Uplink is a duplicate

↑ 10:09:42

Receive data message

DevAddr: 26 0B B5 9A FCnt: 573 FPort: 2 MAC payload: 79 41 62 C5 18 2A B9 99 5A E2 A7

Bandwidth: 125000 SNR: 7.5 RSSI: -46 Raw paylo:

2.4 Uplink Payload--Device Status, (Fport=5)

Users can use the downlink command(0x26 01) to ask LHT65S-PIR to send device configure detail, include device configure status. LHT65S-PIR will uplink a payload via FPort=5 to server.

The Payload format is as below.

Device Status (FPORT=5)

Size (bytes)	1	2	1	1	2
Value	Sensor Model	Firmware Version	Frequency Band	Sub-band	BAT

Example parse in TTNv3

LHT65N-PIR

ID: eui-70b3d57ed005d58e

↑ 7 ↓ 4

Last activity 5 seconds ago

Overview

Live data

Messaging

Location

Payload formatters

Claiming

General settings

Time

Type

Data preview

Verbose stream

↓ 15:18:47

Schedule data downlink for transmissi...

DevAddr: 26 0B F6 9C

Rx1 Delay: 5

↑ 15:18:47

Forward uplink data message

DevAddr: 26 0B F6 9C

Payload: { BAT: 3.334, FIRMWARE_VERSION: "1.4.1", FREQUENCY_BAND: "EU868", SENSOR_MODEL: "LHT65N-PIR", SUB_BAND: "NULL" }

1A 01 41 01 FF 00 06

FPort: 5 Data rate: SF7B125 SNR: 10 RSSI: -72

↑ 15:18:47

Successfully processed data message

DevAddr: 26 0B F6 9C

Sensor Model: For LHT65S-PIR, this value is 0x1A

Firmware Version: 0x0100, Means: v1.0.0 version

Frequency Band:

*0x01: EU868

*0x02: US915

*0x03: IN865

*0x04: AU915

*0x05: KZ865

*0x06: RU864

*0x07: AS923

*0x08: AS923-1

*0x09: AS923-2

*0x0a: AS923-3

*0x0b: CN470

*0x0c: EU433

*0x0d: KR920

*0x0e: MA869

Sub-Band:

AU915 and US915: value 0x00 ~ 0x08

CN470: value 0x0B ~ 0x0C

Other Bands: Always 0x00

Battery Info:

Check the battery voltage.

Ex1: 0x0B45 = 2885mV

Ex2: 0x0B49 = 2889mV

2.5 Uplink Payload, Sensor Data (Fport=2)

The uplink payload includes totally 11 bytes. Uplink packets use FPORT=2 and **every 20 minutes** send one uplink by default.

After each uplink, the **BLUE LED** will blink once.

Size(bytes)	2	2	2	1	4
Value	BAT	Built-In Temperature	Built-in Humidity	Ext #	Ext value

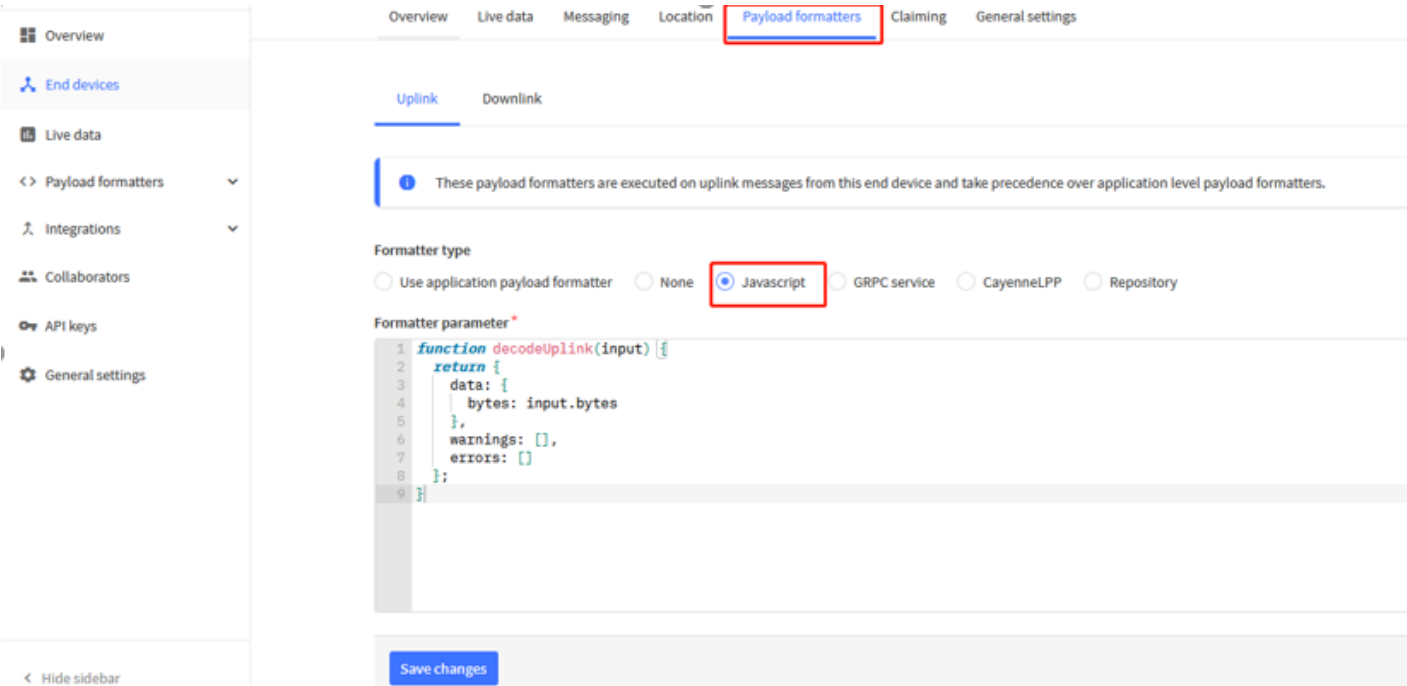
- The First 6 bytes: has fix meanings for every LHT65S-PIR.
- The 7th byte (EXT #): defines the external sensor model. It can be 0x0A for LHT65S-PIR
- The 8th byte: Alarm Bit (if this uplink is from periodically or movement)
- The 9th ~ 11st byte: Movement Detect Count.



2.5.1 Decoder in TTN V3

When the uplink payload arrives TTNv3, it shows HEX format and not friendly to read. We can add LHT65S-PIR decoder in TTNv3 for friendly reading.

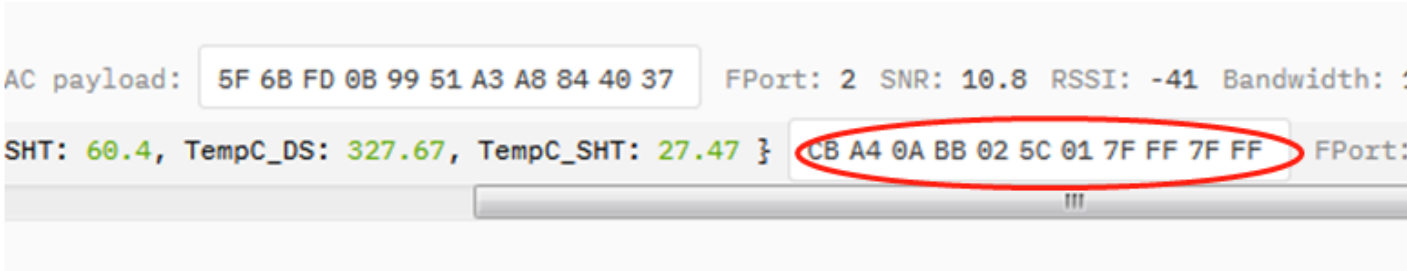
Below is the position to put the decoder and LHT65S-PIR decoder can be download from here: [Dragino end node decoder](#)



2.5.2 BAT-Battery Info

These two bytes of BAT include the battery state and the actually voltage

Bit(bit)	[15:14]	[13:0]
Value	BAT Status 00(b): Ultra Low (BAT <= 2.50v) 01(b): Low (2.50v <=BAT <= 2.55v) 10(b): OK (2.55v <= BAT <=2.65v) 11(b): Good (BAT >= 2.65v)	Actually BAT voltage



Check the battery voltage for LHT65S-PIR.

- BAT status=(0xcb4>>14)&0xFF=11(B) , very good
- Battery Voltage =0xCBF6&0x3FFF=0x0BA4=2980mV



2.5.3 Built-in Temperature

AC payload: 5F 6B FD 0B 99 51 A3 A8 84 40 37 FPort: 2 SNR: 10.8 RSSI: -41 Bandwidth: :
 SHT: 60.4, TempC_DS: 327.67, TempC_SHT: 27.47 } CB A4 0A BB 02 5C 01 7F FF 7F FF FPort:

- Temperature: $0x0ABB/100=27.47^{\circ}\text{C}$

▲ 10:02:54 1559 2 payload: CBBDF5C6022E01F54F7FFF

- Temperature: $(0xF5C6-65536)/100=-26.18^{\circ}\text{C}$

2.5.4 Built-in Humidity

AC payload: 5F 6B FD 0B 99 51 A3 A8 84 40 37 FPort: 2 SNR: 10.8 RSSI: -41 Bandwidth: :
 SHT: 60.4, TempC_DS: 327.67, TempC_SHT: 27.47 } CB A4 0A BB 02 5C 01 7F FF 7F FF FPort:

- Humidity: $0x025C/10=60.4\%$

2.5.5 Ext value

2.5.5.1 Ext=0x0E, PIR Sensor

↑ 11:38:21 Successfully processed data message DevAddr: 26 0B EE D2 <>
 ↓ 11:38:15 Schedule data downlink for transmiss DevAddr: 26 0B EE D2 <> FPort: 1 Confirmed downlink MAC payload: 53 C2 <> Rx1 Delay: 5
 ↑ 11:38:15 Forward uplink data message 3, Exti_pin_level: "No activity", Hum_SHT: 65.6, Move_count: 0, TempC_SHT: 27.45, Work_mode: "PIR Sensor" } CC 00 0A B9 02 90 0E 00 <> FPort: 2 Data rate: S
 ↑ 11:38:15 Successfully processed data message DevAddr: 26 0B EE D2 <>
 ↓ 11:38:05 Receive downlink data message Payload: 26 01 <> FPort: 1

2.5.5.2 Ext Value

There are 4 bytes in Ext Value field.

Bit0 of byte 8th shows if this uplink is generate by PIR activity.

The 8th byte	Bit 1~7	Bit 0
Value	Reserve	0: Normal Uplink 1: Uplink by activity detected

The 9th ~ 11st byte: Movement Detect Count.

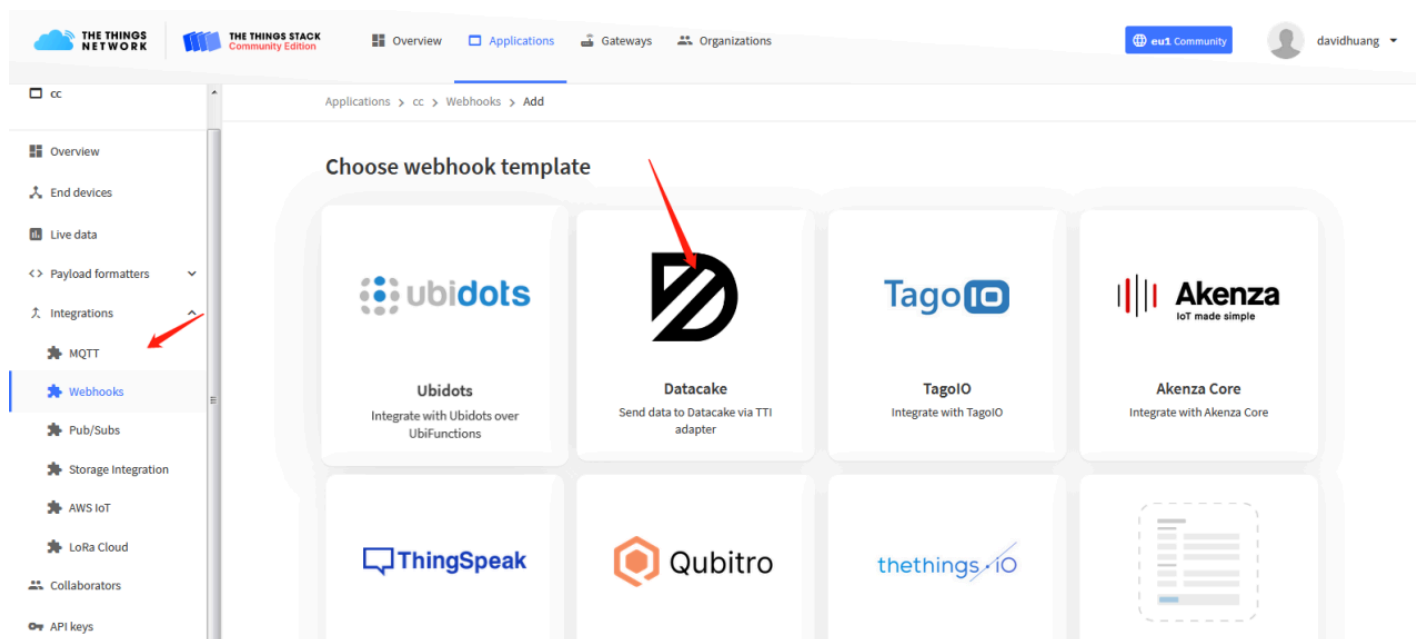
0x00 E5 09 : Total detect 58633 activity since end node start.

2.6 Show data on Datacake

Datacake IoT platform provides a human-friendly interface to show the sensor data, once we have sensor data in TTN V3, we can use Datacake to connect to TTN V3 and see the data in Datacake. Below are the steps:

Step 1: Be sure that your device is programmed and properly connected to the LoRaWAN network. **Step 2:** Configure your Application to forward data to Datacake you will need to add integration. Go to TTN V3 Console → Applications → Integrations → Add Integrations.

Add Datacake:



Select default key as Access Key:



Applications > lgt92test > Webhooks > Add > Datacake

Add custom webhook

Template information



Datacake

Send data to Datacake via TTI adapter

[About Datacake](#) | [Documentation](#)

Template settings

Webhook ID *

Token *

Datacake API Token

Create datacake webhook

In Datacake console ([Datacake](#)), add LHT65 device.



Device Template

Datacake supports LoRaWAN devices from different manufacturers out of the box without complex configuration and setup.

☐ Dragino LGT92
Dragino

☐ Dragino LHT52
Dragino
Temperature and Humidity

☐ Dragino LHT65
Dragino
Temperature & Humidity sensor

☒ Dragino LHT65N
Dragino
New Version of LHT65(N) temperature & humidity

☐ Dragino LLDS12
Dragino
Template for the awesome Dragino LIDAR Distance Sensor LLDS12.

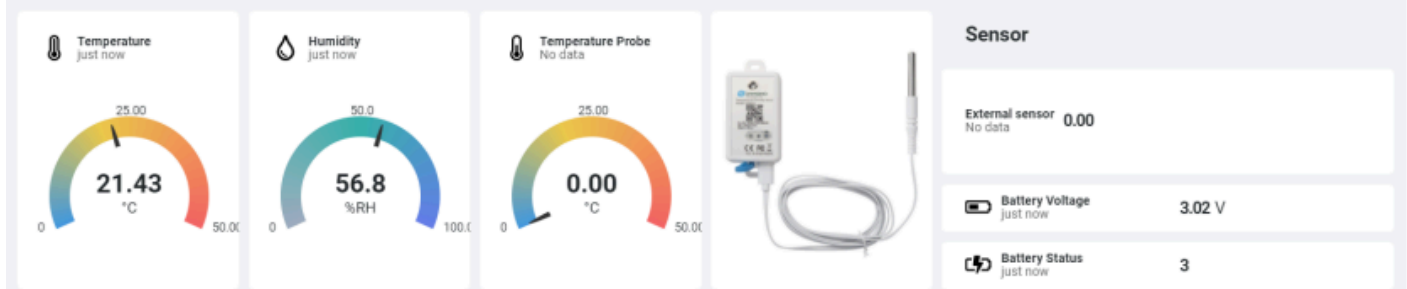
Showing 6 to 10 of 19 results Previous Next

lht65n

Serial Number
1231234234234320

Last update
Wed Dec 14 2022 17:11:59 GMT+0800

[Dashboard](#) [History](#) [Downlinks](#) [Configuration](#) [Debug](#) [Rules](#) [Permissions](#)



2.7 LED Indicator

The LHT65S-PIR has a triple color LED which for easy showing different stage .

While user press ACT button, the LED will work as per LED status with ACT button.

In a normal working state:

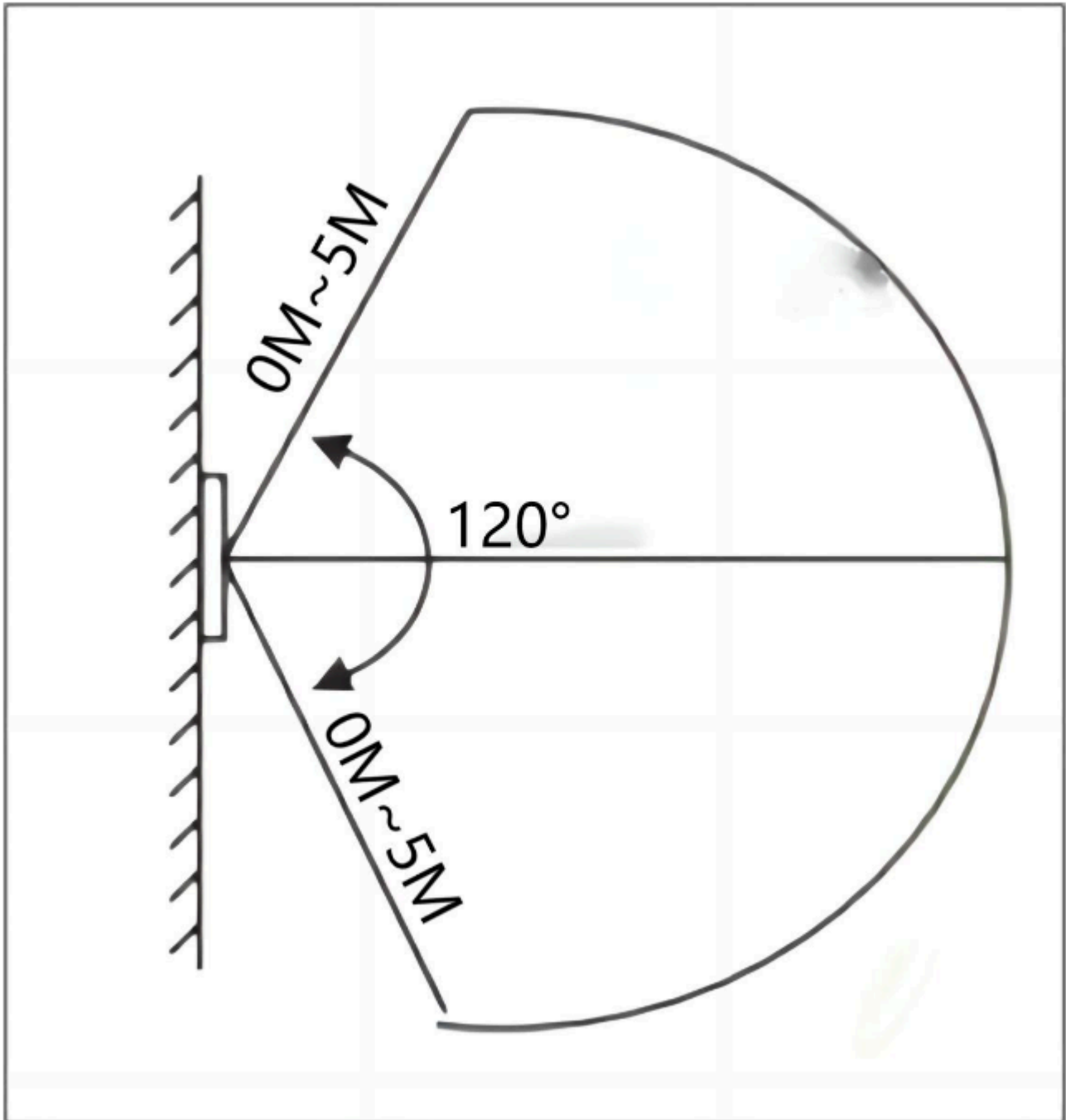
- For each uplink, the **BLUE LED** or **RED LED** will blink once. **BLUE LED** when external sensor is connected.
- RED LED** when external sensor is not connected
- For each success downlink, the **PURPLE LED** will blink once



2.8 installation

1. Don't install LHT65S-PIR outdoor or place where will get wet.
2. Towards the PIR probe to the place where need to monitor activity. Below is the detect beam.

Stable distance is 03m. Some motion might not detected between 35 m.



Notice: PIR can only detect motion activity, not to use to detect static people case.

- PIR Motion Detector should not be installed near the Air conditioner places where with cold wind or hot wind flow, because PIR motion detector is sensitive with the temperature changes of the environment. Environment changes quickly will cause a false alarm.



- PIR should not be installed facing the glass window, facing glass window will be interfered by the outside sunlight and moving objects (people or vehicle). The infrared energy can penetrate the glass window.
- PIR should not be installed facing the moving objects or background changing objects, movement object will cause airflow change, it may cause false alarm.
- Between the detection range of PIR Motion detector, there is should be less objects. Many objects may reduce the sensitive of detection range.
- Do not install more than one (2 or above) Wireless PIR in the same detection space (like at the same room).



3. Sensors and Accessories

3.1 E2 Extension Cable



LHT65N-E2



1m long breakout cable for LHT65S-PIR. Features:

Use for AT Command

Update firmware for LHT65S-PIR



LHT65S_E2 Cable Pin Mapping



4. Configure LHT65S-PIR

4.1 Configure Methods:

LHT65S-PIR supports below configure method:

- AT Command via UART Connection : See FAQ.
- LoRaWAN Downlink. Instruction for different platforms: See [IoT LoRaWAN Server](#) section.

4.2 General Commands

These commands are to configure:

- General system settings like: uplink interval.
- LoRaWAN protocol & radio related command.

They are same for all Dragino Devices which support DLWS-005 LoRaWAN Stack. These commands can be found on the wiki:

</docs/LoRaWAN-General-Configuration/at-commands-downlink/>

4.3 Commands special design for LHT65S-PIR

These commands only valid for LHT65S-PIR, as below:

4.3.1 Set Transmit Interval Time

Feature: Change LoRaWAN End Node Transmit Interval.



AT Command: AT+TDC

Command Example	Function	Response
AT+TDC?	Show current transmit Interval	30000 OK the interval is 30000ms = 30s
AT+TDC=60000	Set Transmit Interval	OK Set transmit interval to 60000ms = 60 seconds

Downlink Payload: 0x01

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

If the downlink payload=0100003C, it means set the END Node's Transmit Interval to 0x00003C=60(S), while type code is 01.

- **Example 1:** Downlink Payload: 0100001E // Set Transmit Interval (TDC)= 30 seconds
- **Example 2:** Downlink Payload: 0100003C // Set Transmit Interval (TDC)= 60 seconds

4.3.2 Get Device Status

Send a LoRaWAN downlink to ask device send Alarm settings.

- **Downlink Payload:** 0x26 01

Sensor will upload Device Status via FPORT=5. See payload section for detail.

4.3.3 Set Password

Feature: Set device password, max 9 digits

AT Command: AT+PWD

Command Example	Function	Response
AT+PWD=?	Show password	123456 OK
AT+PWD=999999	Set password	OK

Downlink Command:

No downlink command for this feature.

4.3.4 Set to sleep mode

Feature: Set device to sleep mode

- **AT+Sleep=0** : Normal working mode, device will sleep and use lower power when there is no LoRa message



- **AT+Sleep=1** : Device is in deep sleep mode, no LoRa activation happen, used for storage or shipping.

AT Command: AT+SLEEP

Command Example	Function	Response
AT+SLEEP	Set to sleep mode	Clear all stored sensor data... OK

Downlink Command:

- There is no downlink command to set to Sleep mode.

4.3.5 Set UOA (Uplink on Activity)

Feature: Enable / Disable Uplink on Activity

- **AT+UOA=0** : Disable UoA
- **AT+UOA=1, 2** : Enable UoA , Calm Down Time: 2 minutes. If device already send a uplink on activity, it will not send another uplink on activiy in 2 minutes, even detect activity.

Notice: Calm Down time range is 1 ~ 65535 minutes. If user set Calm Down time to low value, such as 1 minute, the sensor might send uplink very frequenctly and battery drain fast.

AT Command: AT+UOA

Downlink Command: xxxxxxxx

5. Battery & Power Consumption

LHT65S-PIR use **CR17450** battery pack. See below link for detail information about the battery info and how to replace.

Battery Info & Power Consumption Analyze .

6. OTA firmware update

User can change firmware LHT65S-PIR to:

- Change Frequency band/ region.
- Update with new features.
- Fix bugs.

Firmware and changelog can be downloaded from : **Firmware download link**

Methods to Update Firmware:

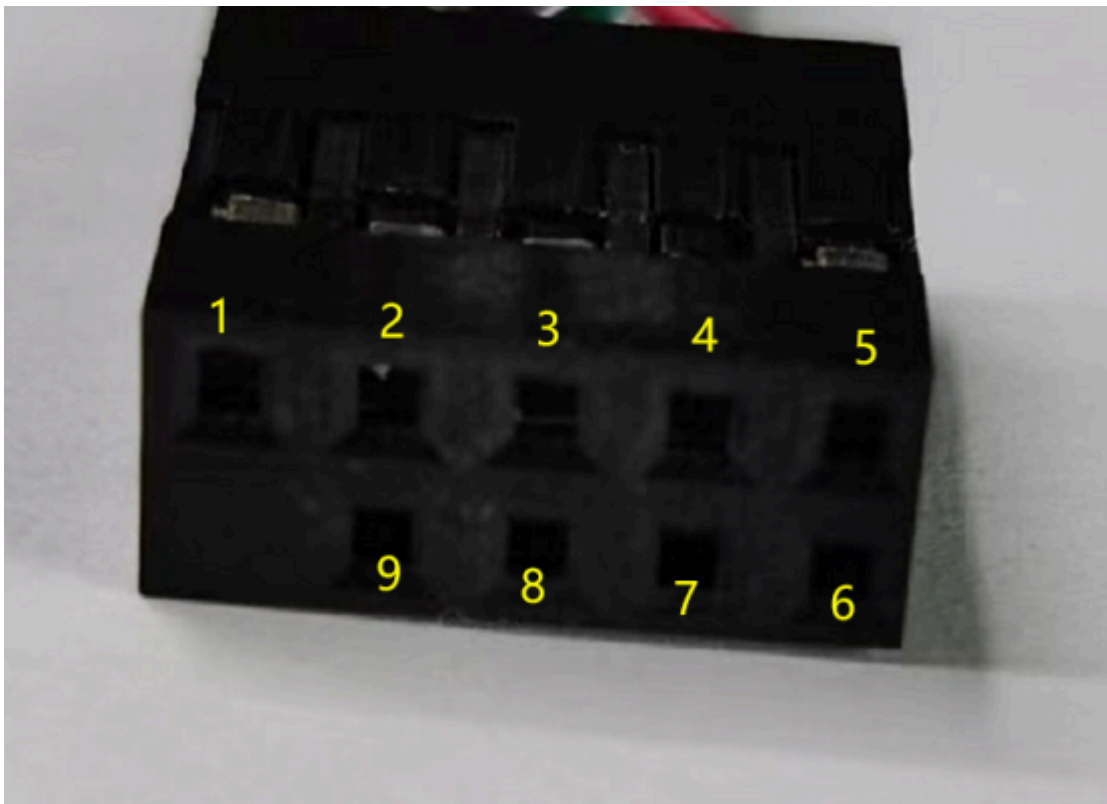


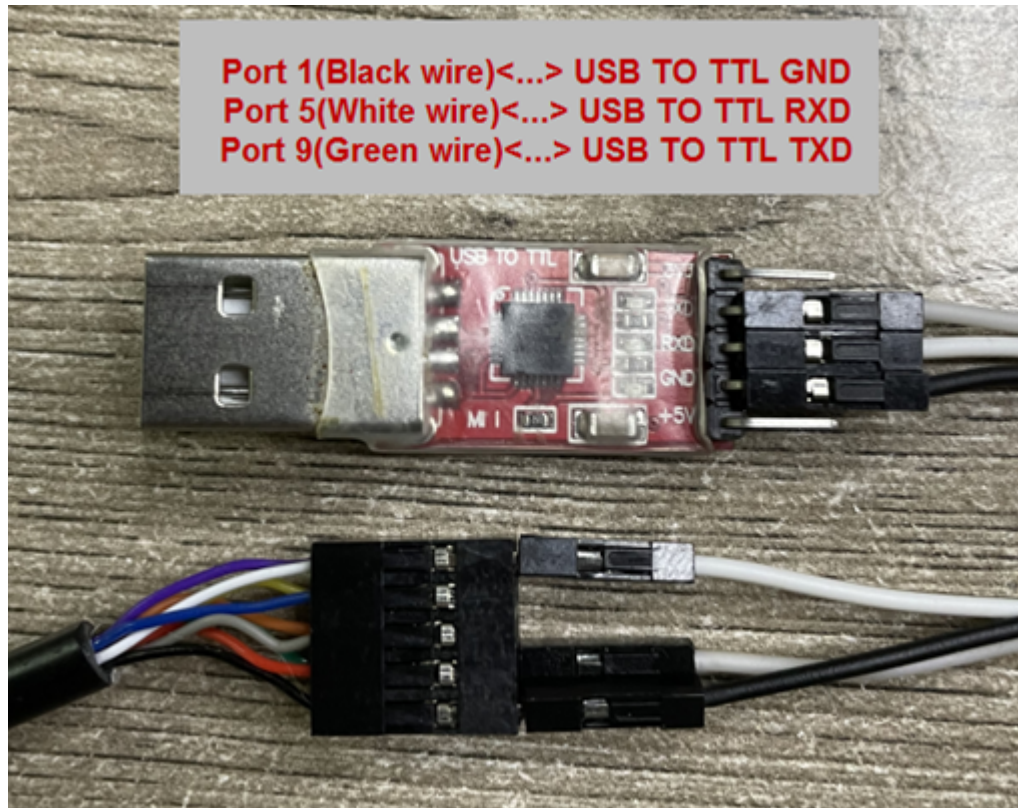
- (Recommended way) OTA firmware update via wireless: </docs/LoRaWAN-Firmware-Update/lorawan-ota-upgrade-mode/>
- Update through UART TTL interface. **Instruction.**

7. FAQ

7.1 How to use AT Command?

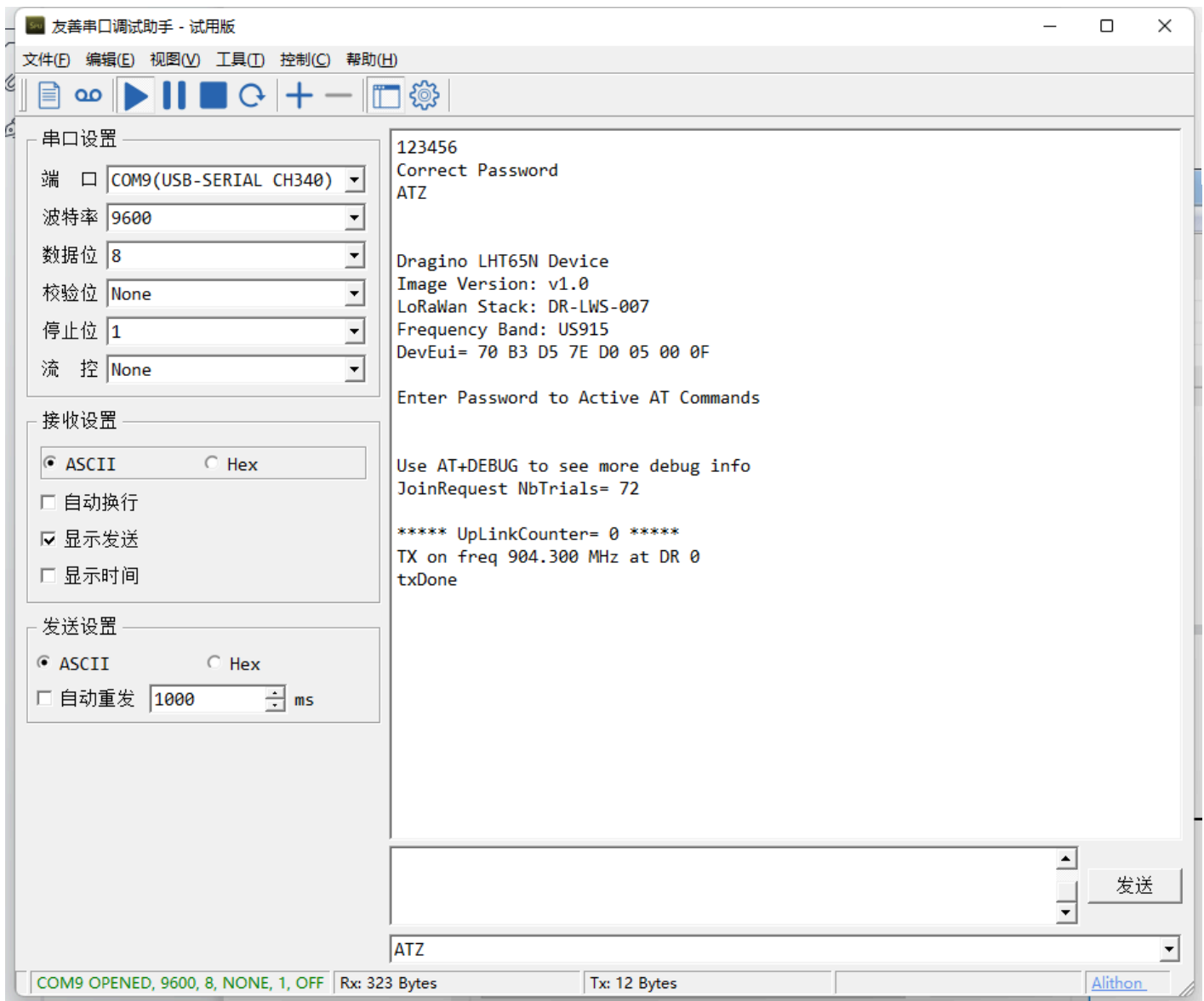
LHT65S-PIR supports AT Command set. User can use a USB to TTL adapter plus the Program Cable to connect to LHT65 for using AT command, as below.





In PC, User needs to set serial tool (such as **putty**, SecureCRT) baud rate to **9600** to access to access serial console for LHT65S-PIR. The AT commands are disabled by default and need to enter password (default: **123456**) to activate it. Timeout to input AT Command is 5 min, after 5-minute, user need to input password again. User can use AT+DISAT command to disable AT command before timeout.

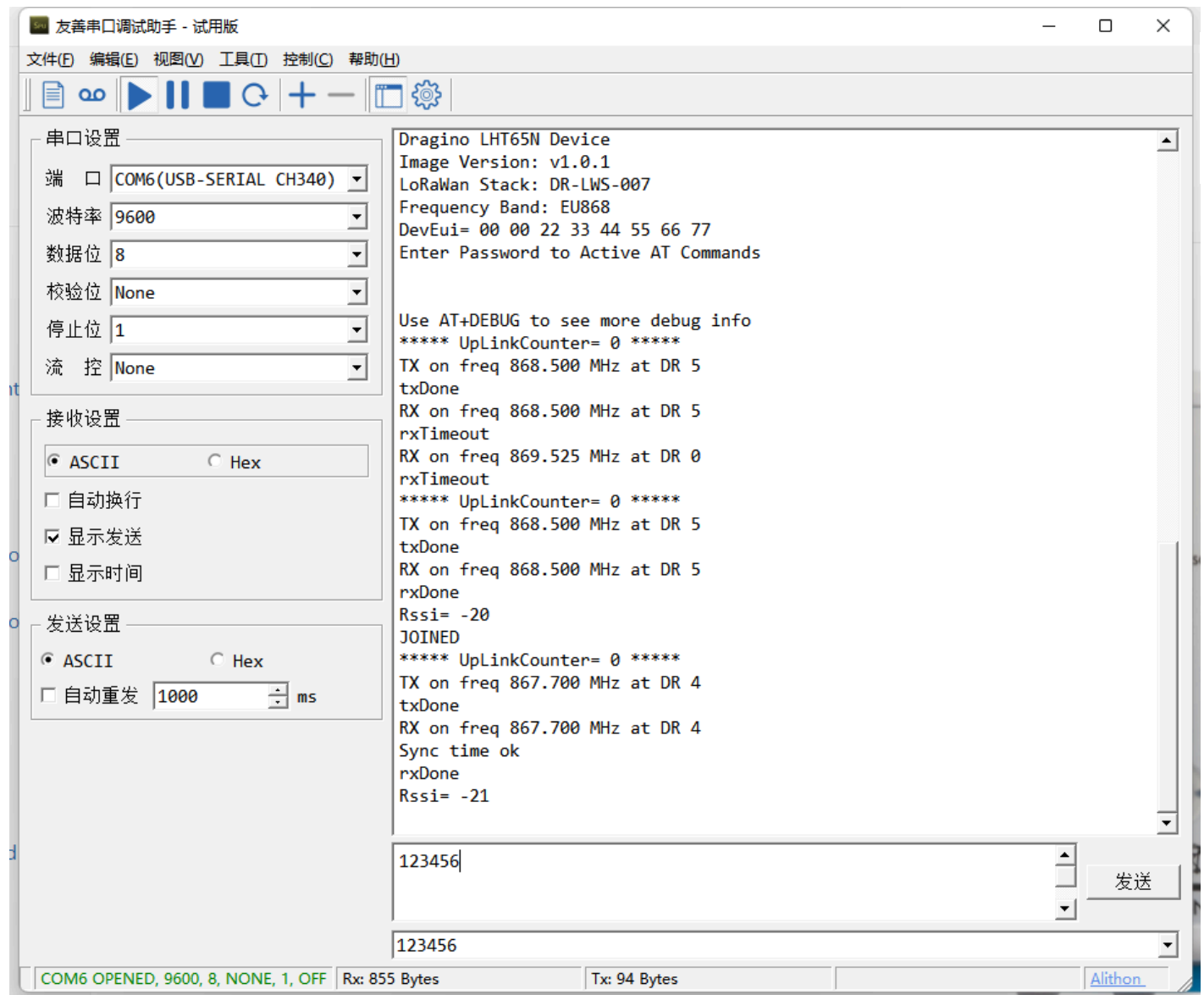




7.2 Where to use AT commands and Downlink commands

AT commands :





Downlink commands:

TTN:



eui-a84041ffff1234dd

ID: eui-a84041ffff1234dd

↑ 156

↓ 156

● Last activity 13 days ago ⓘ

- Overview

Live data

Messaging

Location

Payload formatters

General settings

Uplink

Downlink

Schedule downlink

Insert Mode

- ☒

Replace downlink queue
- ☐

Push to downlink queue (append)

FPort *

1

Payload type

- ☒

Bytes
- ☐

JSON

Payload

The desired payload bytes of the downlink message

- ☐

Confirmed downlink

Schedule downlink

Helium :



Chirpstack: The downlink window will not be displayed until the network is accessed

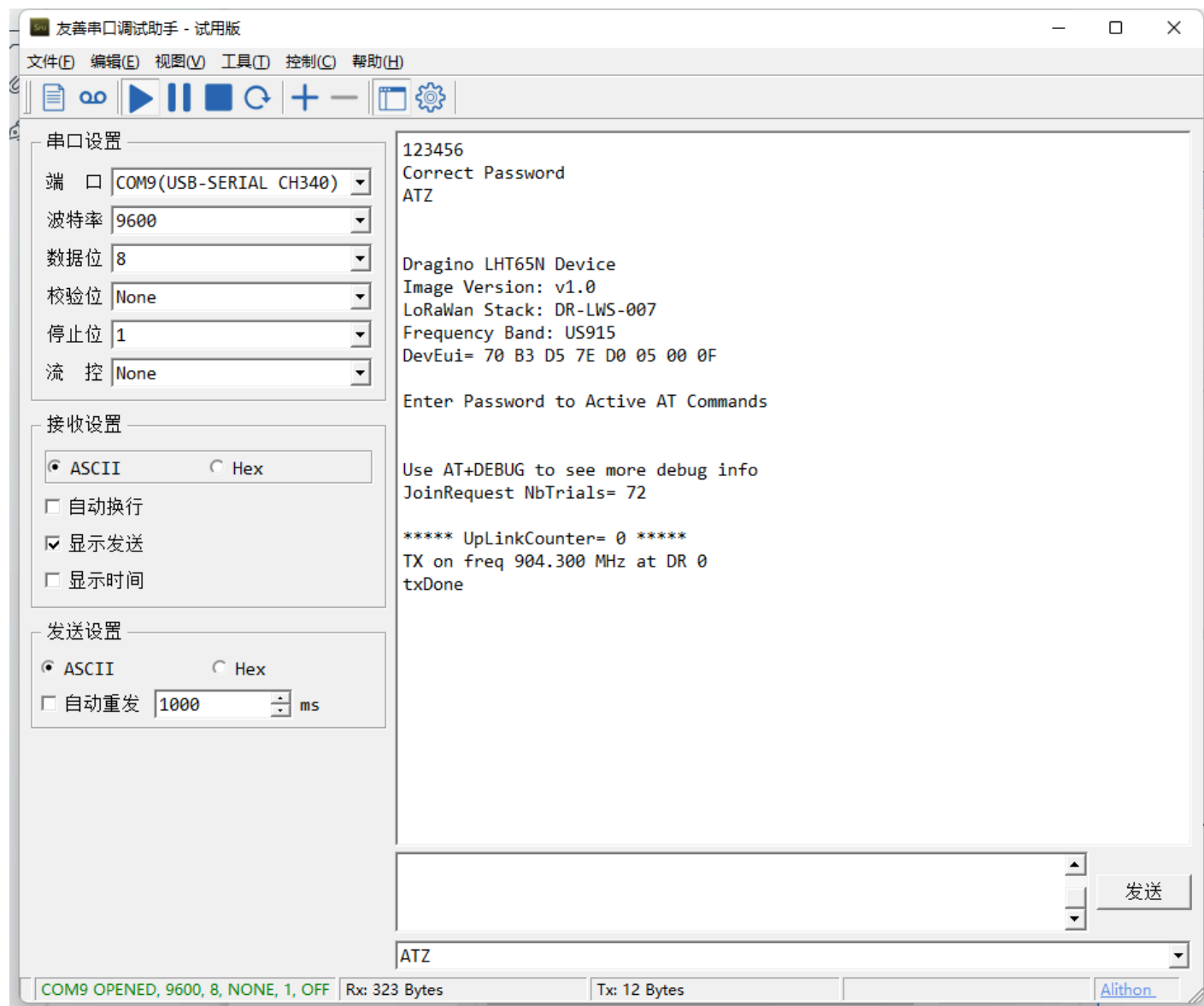
Aws:

The screenshot displays the AWS IoT console interface for a LoRaWAN device. The left sidebar contains a navigation menu with categories like 'Test', 'manage', and 'Device software'. The main content area is divided into several sections:

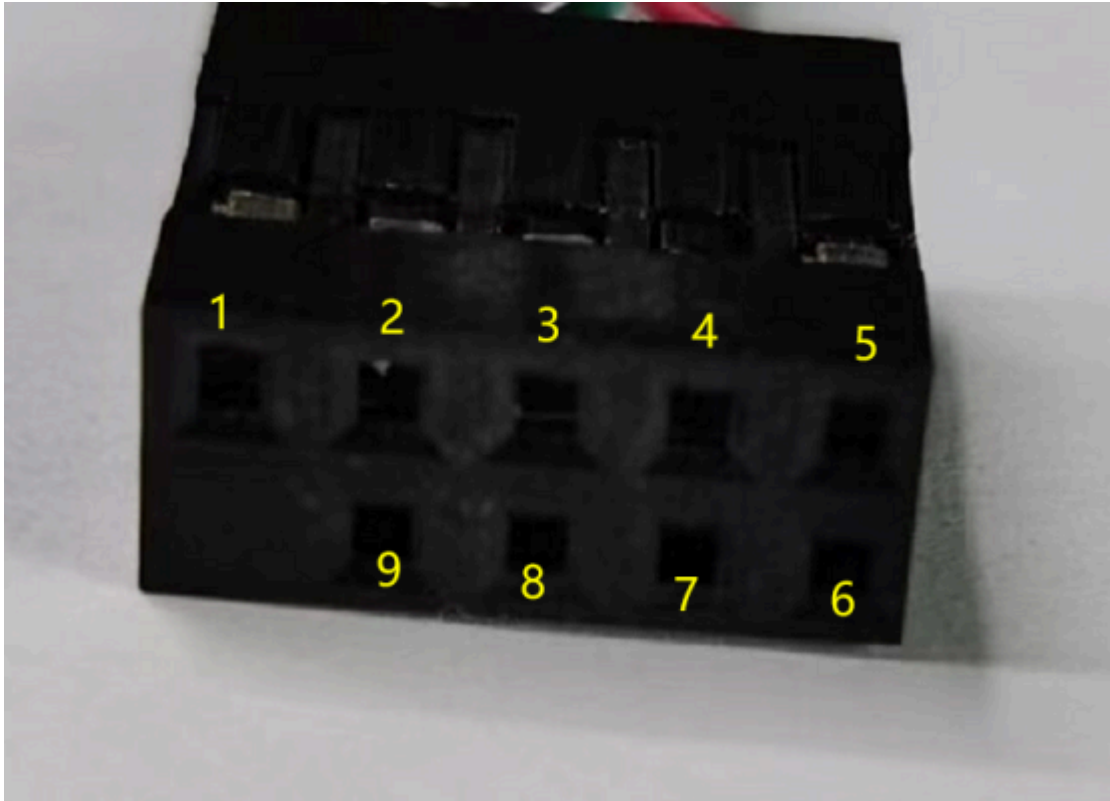
- Device traffic:** A table showing device data. The header row includes 'The gateway to which it was last connected', 'DevEUI', 'RSSI (dBm)', 'SNR (dB)', 'frequency', and 'Data rate'. The data row shows values: 'a840411e96744159', '003586ec8db99ebb', '-79', '13.25', '916800000', and '3'.
- Configuration file:** A section showing device and service configuration files. The device configuration file is '8287665f-9338-415c-ad8c-57f3f2d71ee2' and the service configuration file is 'fdb906f1-f524-4f14-ac20-2a22a17e0933'.
- Downlink message queue (0):** A section showing a table of downlink messages. The table has columns: 'The message ID', 'timestamp', 'FPort', and 'TransmitMode'. The message is 'No downlink message'.
- label:** A section showing a table of labels. The table has columns: 'key' and 'value'. The label is 'No labels'.

7.3 How to change the uplink interval ?

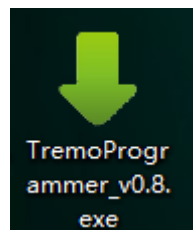
Please see this link: </docs/LoRaWAN-General-Configuration/transmit-interval/>



7.4 How to use TTL-USB to connect PC to upgrade firmware?



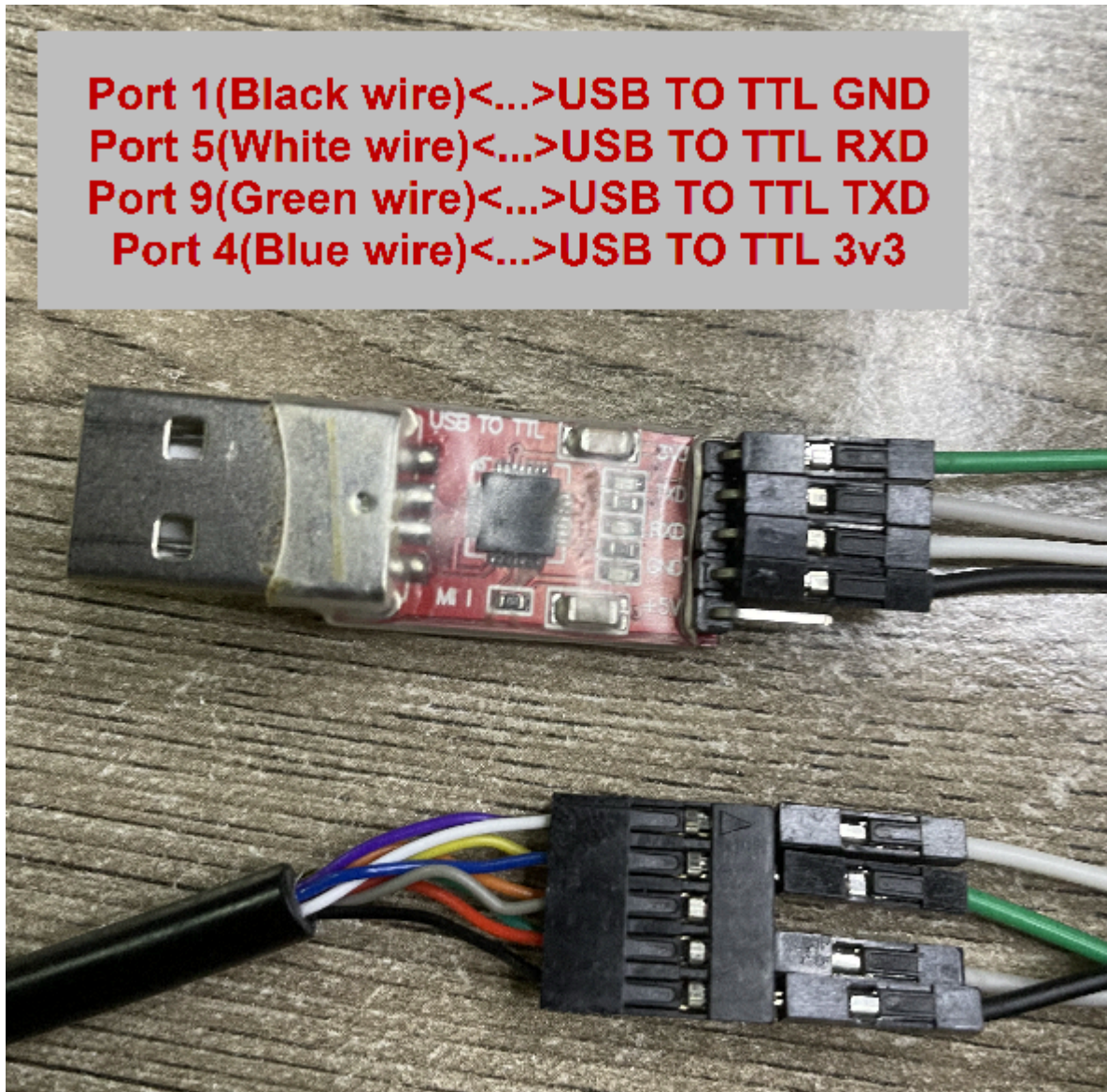
Step1: Install TremoProgrammer first.



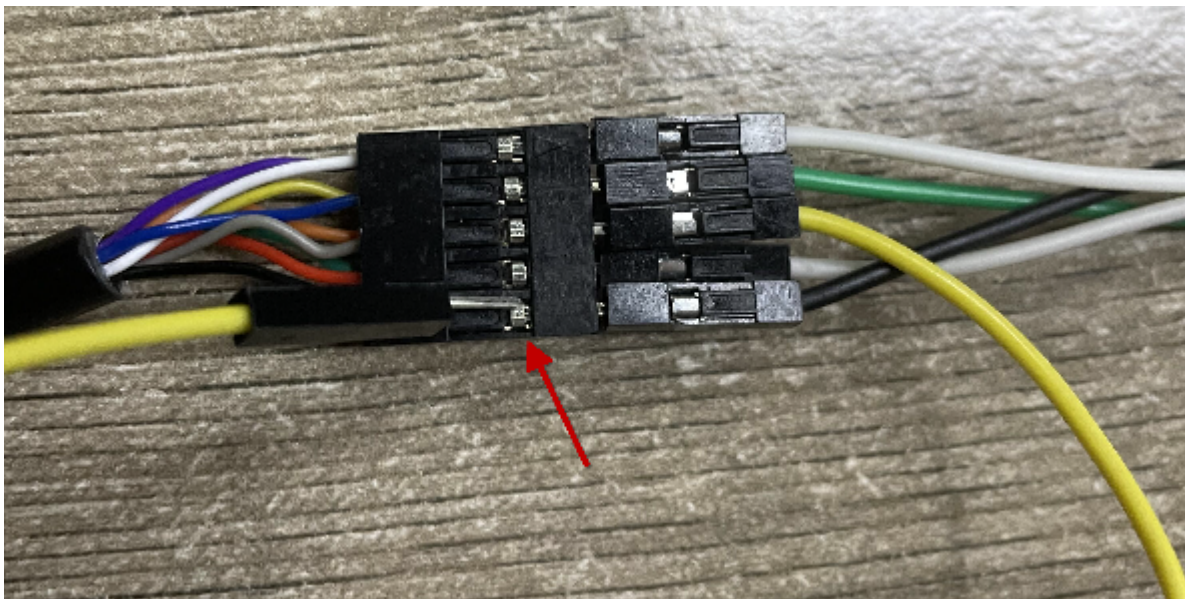
Step2 : wiring method.

First connect the four lines ;

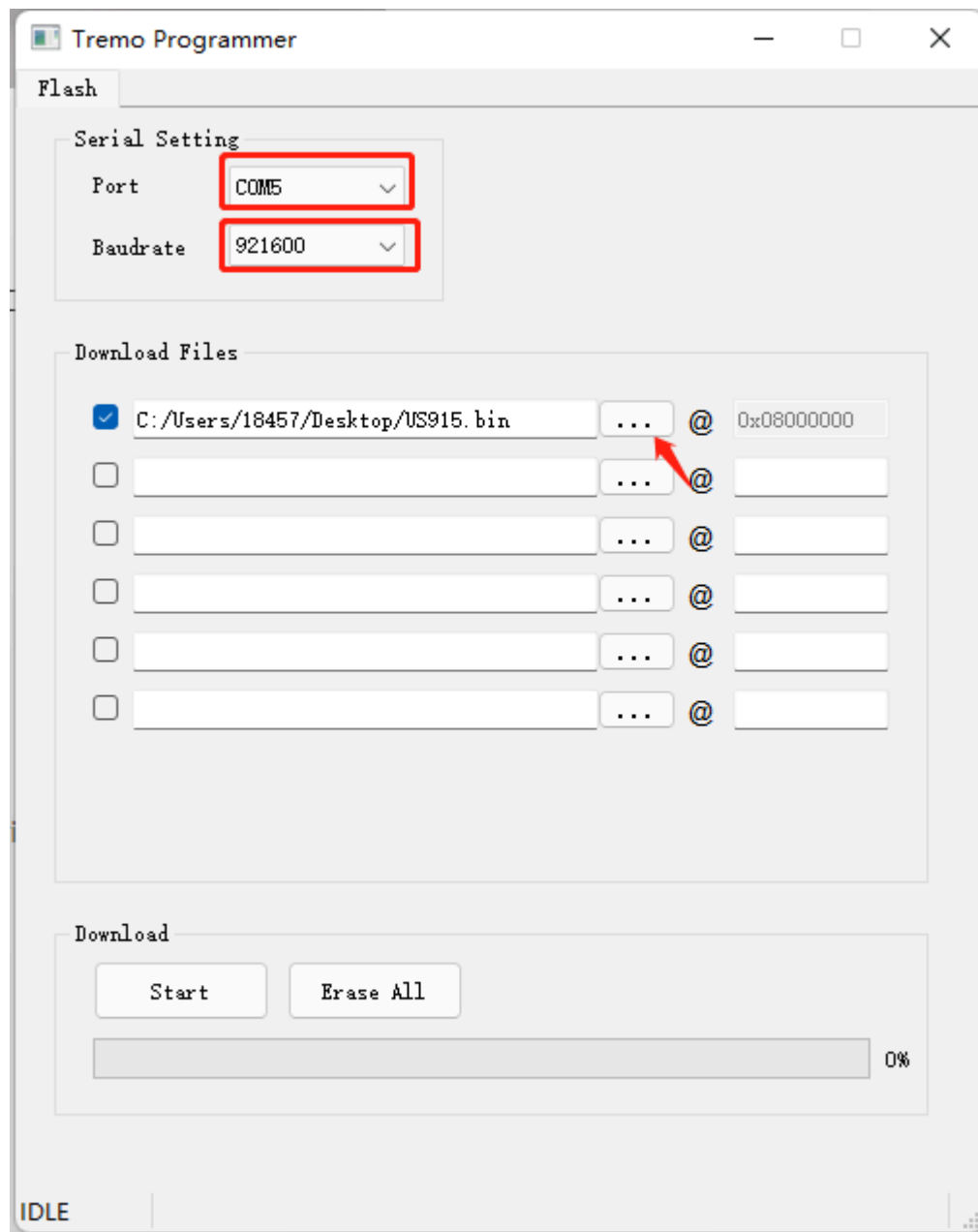




Then use DuPont cable to short circuit port3 and port1, and then release them, so that the device enters bootload mode.



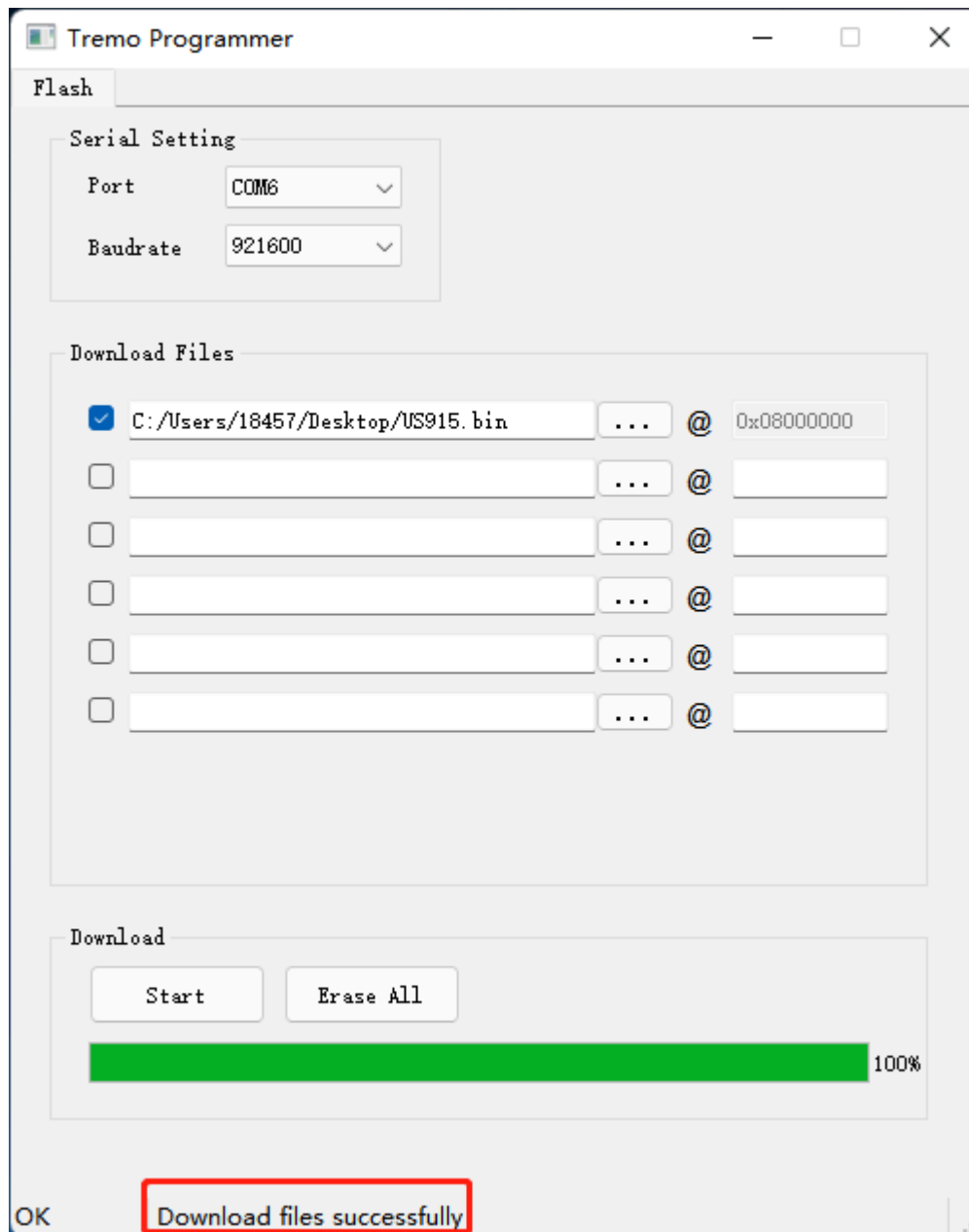
Step3 : Select the device port to be connected, baud rate and bin file to be downloaded.



Click the **start** button to start the firmware upgrade.

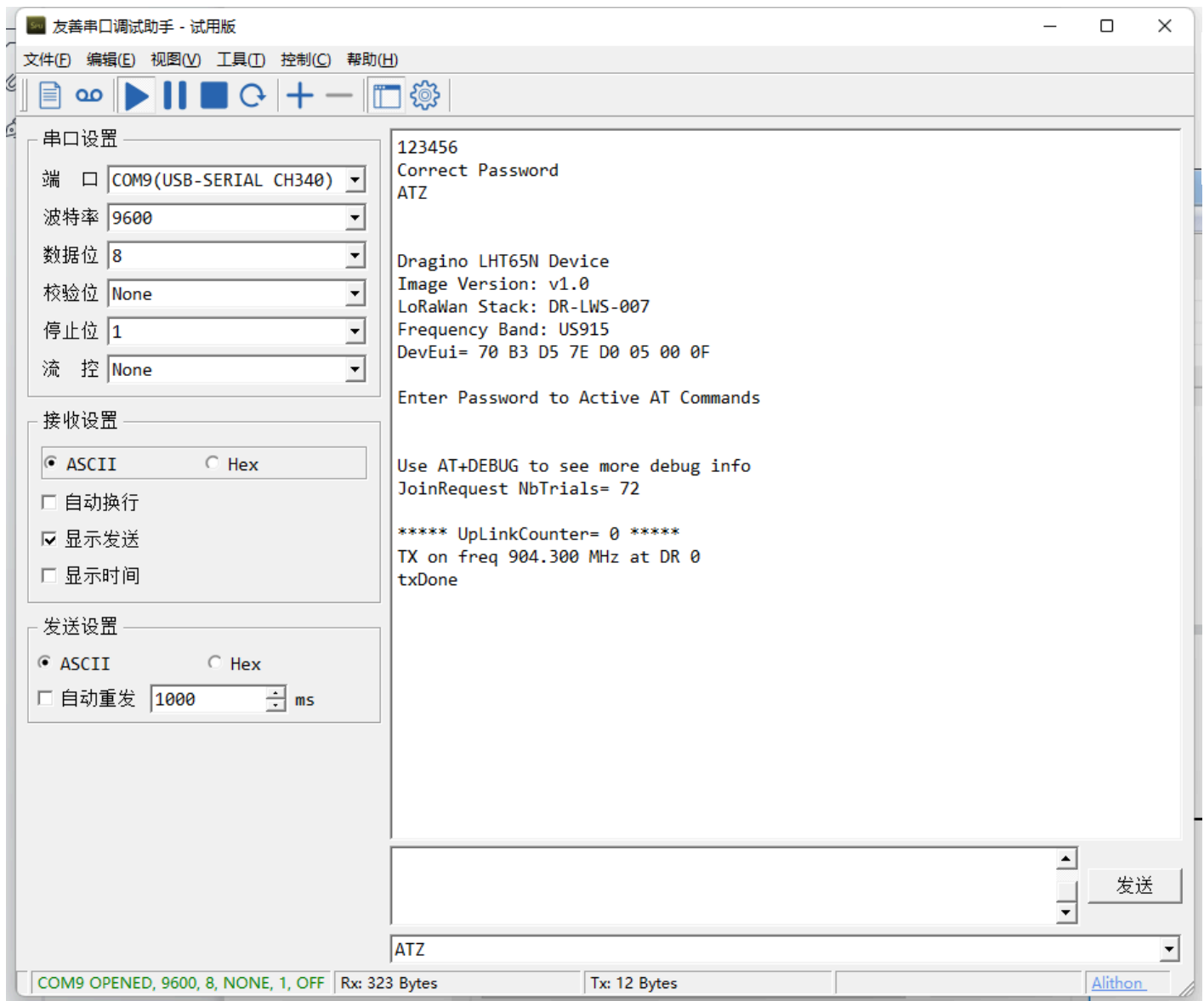
When this interface appears, it indicates that the download has been completed.





Finally, unplug the DuPont cable on port4, and then use the DuPont cable to short circuit port3 and port1 to reset the device.





8. Order Info

Part Number: **LHT65S-PIR-XX**

XX: The default frequency band

- **AS923:** LoRaWAN AS923 band
- **AU915:** LoRaWAN AU915 band
- **EU433:** LoRaWAN EU433 band
- **EU868:** LoRaWAN EU868 band
- **KR920:** LoRaWAN KR920 band
- **US915:** LoRaWAN US915 band
- **IN865:** LoRaWAN IN865 band
- **CN470:** LoRaWAN CN470 band



9. Packing Info

Package Includes:

- LHT65S-PIR Temperature/Humidity/PIR Sensor x 1

10. Reference material

- [Datasheet, photos, decoder, firmware](#)

11. FCC Warning

This device complies with part 15 of the FCC Rules.Operation is subject to the following two conditions:

(1) This device may not cause harmful interference ;

(2) this device must accept any interference received, including interference that may cause undesired operation.

