Manuals+ — User Manuals Simplified.

DRAGINO LDS01 LoRaWAN Door Sensor User Manual

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DRAGINO LDS01 LoRaWAN Door Sensor

Introduction

What is LDS01 LoRaWAN Door Sensor

The Dragino LDS01 is a LoRaWAN Door Sensor. It detects door open/close status and uplink to LoRaWAN network. The LDS01 is small sensor; the dimension is as small as 64 x 30 x 14 mm. LDS01 is powered by a CR2032 coin battery, in a good LoRaWAN Network Coverage case, it can transmit as many as 12,000 uplink packets (base on SF7, 14dB). in poor LoRaWAN network coverage, it can transmit ~ 1,300 uplink packets (base on SF10, 18dB). The design goal for one battery is up to 1 year. User can easily change the CR2032 battery for reuse. The LDS01 will send periodically data every day as well as for each door open/close action. It also counts the door open times and calculate last door open duration. Each LDS01 is pre-loaded with a set of unique keys for LoRaWAN registrations, register these keys to local LoRaWAN server and it will auto-connect after power on.

LDS01 in a LoRaWAN Network

Features

- LoRaWAN Class A v1.0.3
- Frequency Bands: CN470/EU433/KR920/US915/EU868/AS923/AU915/IN865/RU864
- SX1262 LoRa Core
- Door Open/Close detect
- Door open/close statistics
- CR2032 battery powered
- T Commands to change parameters
- plink on periodically and open/close action
- Remote configure parameters via LoRa Downlink
- Firmware upgradable via program port

Applications

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

Dimension

Firmware Change log

LDS01 Image files – Download link

Power ON LDS01

When receive the LDS01, please open the enclosure and remove the isolated paper and PRESS RESET so the coin battery can power on the device and device runs on low power mode. The LED will blink when devices is powered.

How to install LDS01

This mark is at the close side to the magnet
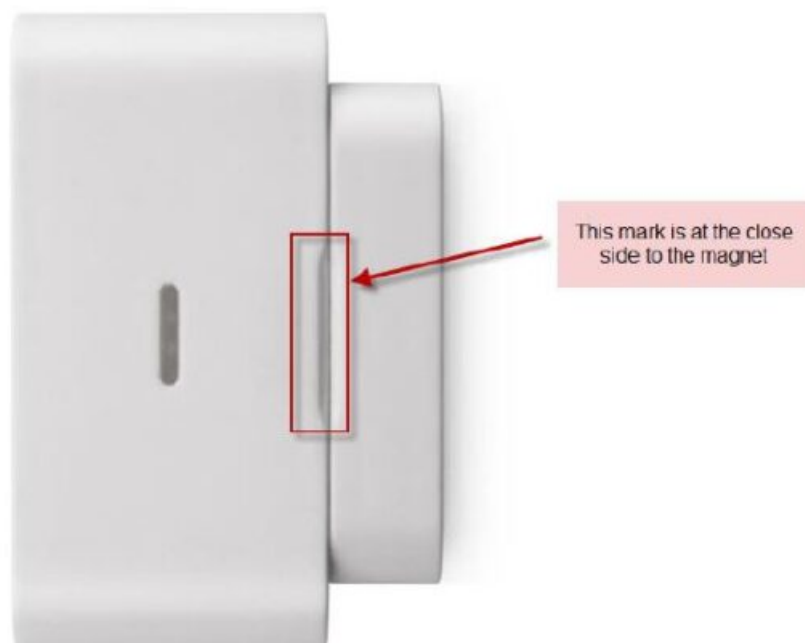
Operation Mode

How it works?
The LDS01 is configured as LoRaWAN OTAA Class A mode by default. It has OTAA keys to join network. To connect a local LoRaWAN network, user just need to input the OTAA keys in the network server and power on the LDS01. It will auto join the network via OTAA. In case user can't set the OTAA keys in the network server and has to use the existing keys from server. User can use AT Command to set the keys in the devices.

Example to join LoRaWAN network
Here shows an example for how to join the TTN V3 Network. Below is the network structure, we use our LG308 as LoRaWAN gateway here.

The LDS01 in installed on the door edge to detect the open/close event. And send the status to the LoRaWAN server. The LDS01 will uplink two type of messages to the server.

- A keep-alive message which send once per day.
- A door event message when there is a door open/close. (Alarm event can be disabled)

The LG308 is already set to connect to the TTN V3 network. So what we need to now is only configure the TTN V3:
Step 1: Create a device in TTN V3 with the OTAA keys from LDS01.
Each LDS01 is shipped with a sticker with a unique device EUI:

User can enter this key in their LoRaWAN Server portal. Below is TTN V3 screenshot: Add APP EUI in the application.

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

---

ccc
ID: 123

4 End devices   2 Collaborators   2 API keys   Created 95 days ago

General information

Application ID	123
Created at	Feb 2, 2021 11:12:30
Last updated at	Apr 30, 2021 11:00:33

• Live data   See all activity →

↑ 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

ID ⇕	Name ⇕	DevEUI	JoinEUI	Created ⇕

Register end device

From The LoRaWAN Device Repository   Manually

1. Select the end device

Brand *

Dragino Technology Co.,... ∨

Model *

Type to search... ∨

LBT1
LDDS20
LDDS75
LDS01
LGT92
LHT65
LSE01
LSN50-V2

Cannot find your exact end device?   ...ce registration.

2. Enter registration data

Please choose an end device first to   ...n data

Register end device

---

1. Select the end device

Brand *	Model *	Hardware Ver. *	Firmware Ver. *	Profile (Region) *
Dragino Technology Co.,... ∨	LDS01 ∨	Unknown ... ∨	1.3.0 ∨	EU_863_870 ∨

LDS01

MAC V1.0.3, PHY V1.0.3 REV A, Over the air activation (OTAA), Class A

LoRaWAN Door Sensor

Product website ☒

2. Enter registration data

Frequency plan ⓘ *

Select... ∨

The frequency plan used by the end device

AppEUI ⓘ *

·· ·· ·· ·· ·· ·· ·· ·· ⊞

The AppEUI uniquely identifies the owner of the end device. If no AppEUI is provided by the device manufacturer (usually for development), it can be filled with zeror

DevEUI ⓘ *

You can also choose to create the device manually.

Add APP KEY and DEV EUI

Step 2: Power on LDS01 and it will auto join to the TTN V3 network. After join success, it will start to upload message to TTN V3 and user can see in the panel.
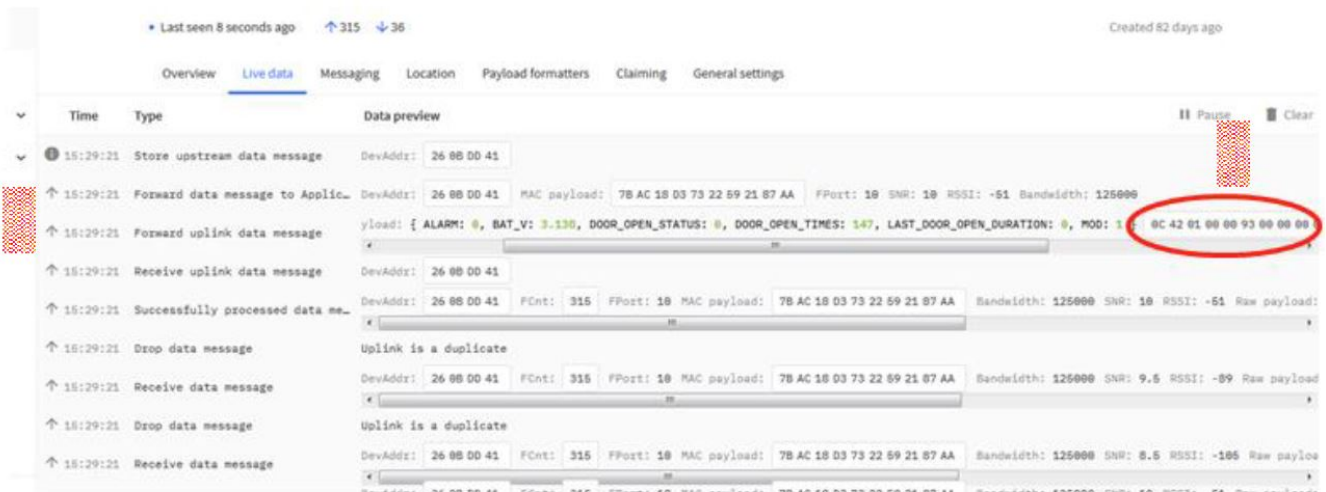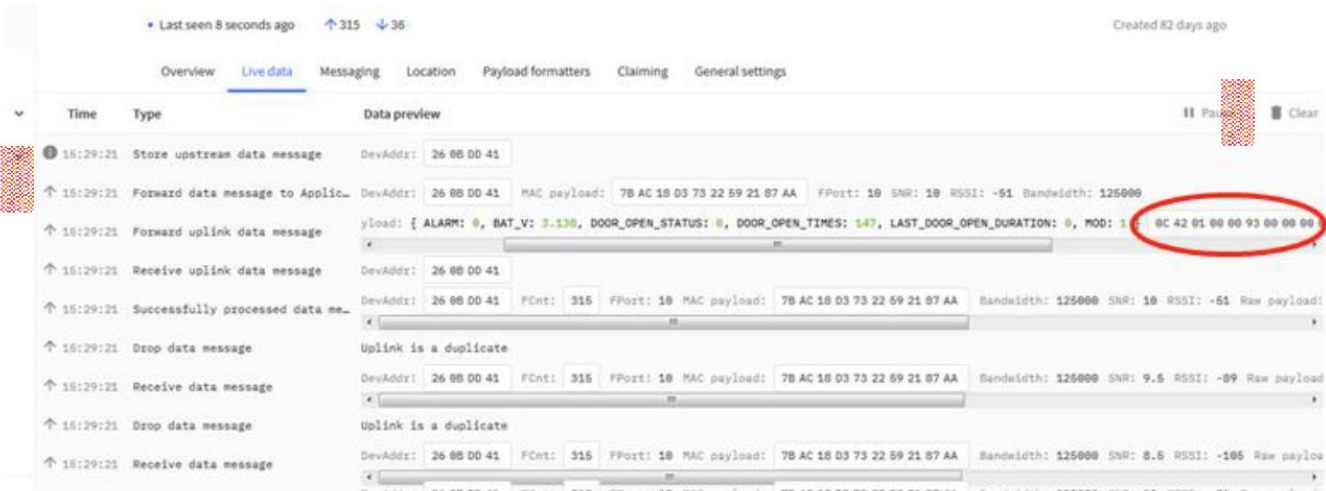
Uplink Payload

Uplink Payload total 10 bytes. Note: Alarm bit is added since firmware version v1.3

Size(bytes)	2	1	3	3	1
value	Status&BAT	MOD Always:0x01	Total open door events	Last door open duration (unit: min)	**Alarm**

Example:

LoRaWAN Door Sensor User Manual

Example Payload Decoder in TTN V3: **http://www.dragino.com**/downloads/index.php?
dir=LoRa_End_Node/LDS01/Payload/

Downlink Payload

Example Downlink payload setting in TTN V3:

Downlink Control Type	Type Code	Downlink payload size(bytes)
TDC (Transmit Time Interval—Keep Alive Interval)	0x01	4
RESET	0x04	2
Set confirmed mode	0x05	2
Clear Counting	0xA6	2
Enable/Disable Alarm	0xA7	2
Control ADR/DR	0xA8	3
Set Alarm Timeout	0xA9	4

Uplink   Downlink

Schedule downlink

Insert Mode

◉ Replace downlink queue

○ Push to downlink queue (append)

FPort *

1

Payload

01 00 00 3C

The desired payload bytes of the downlink message

☐ Confirmed downlink

Schedule downlink

ise grade, private LoRaWAN networks – The Things Industries

Type Code 0x01
If the payload=0100003C, means to control the LDS01's Keep Alive interval to 0x00003C=60(S)

Type Code 0x04
If payload = 0x04FF, it will reset the LDS01.

Type Code 0x05(Since firmware v1.2)
0x05 00: Set uplink to LoRaWAN unconfirmed mode
0x05 01: Set uplink to LoRaWAN confirmed mode

Type Code 0xA6
Example: 0xA601: Clear Counting For LDS01: reset both count number and time.

Type Code 0xA7 (Since firmware v1.2) 0xA7 01 : Equal to AT+DISALARM=1
0xA7 00 : Equal to AT+DISALARM=0

Type Code 0xA8 (Since firmware v1.2)

- Format: 0xA8 aa bb

- aa: 1 : Enable ADR ; 0 : Disable ADR (Same as AT+CADR

- bb: set DR (Same as AT+CDATARATE ,only valid after ADR=

- Example: 0x A8 00 02 : Set ADR=0 and DR=1


Type Code 0xA9 (Since firmware v1.3)

See Alarm Base Timeout for detail.

Integrate with Datacake
Datacake provides a human friendly interface to show the sensor data, once we have 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 network at this time.
Step 2: To configure the Application to forward data to Datacake you will need to add integration. To add the Datacake integration, perform the following steps:
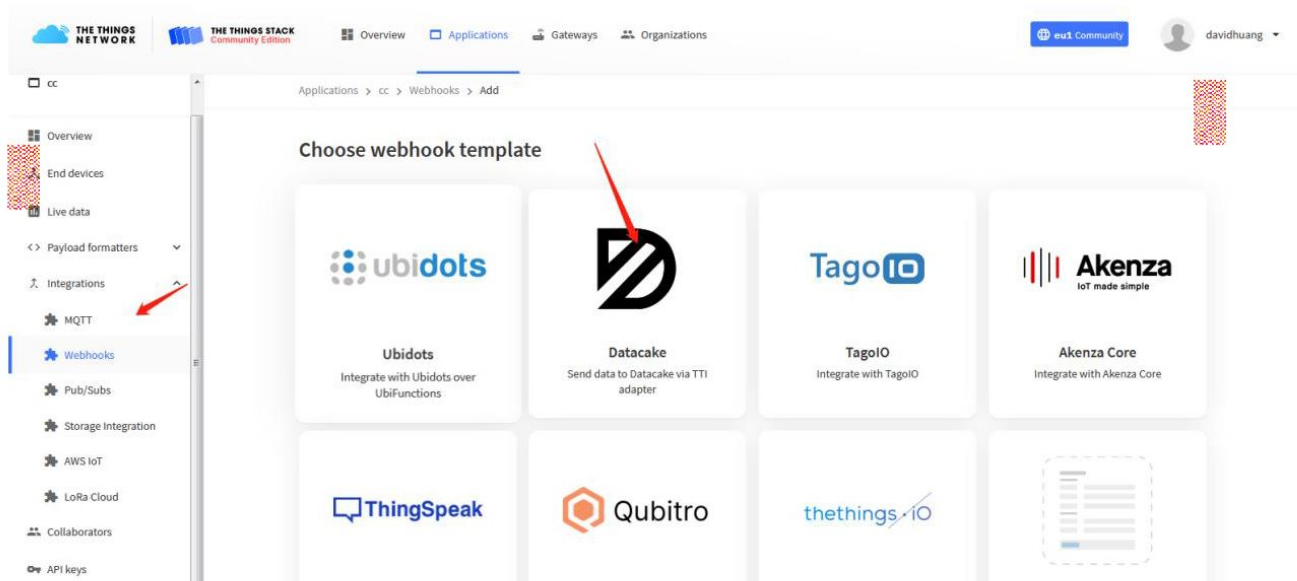
Template information

Datacake

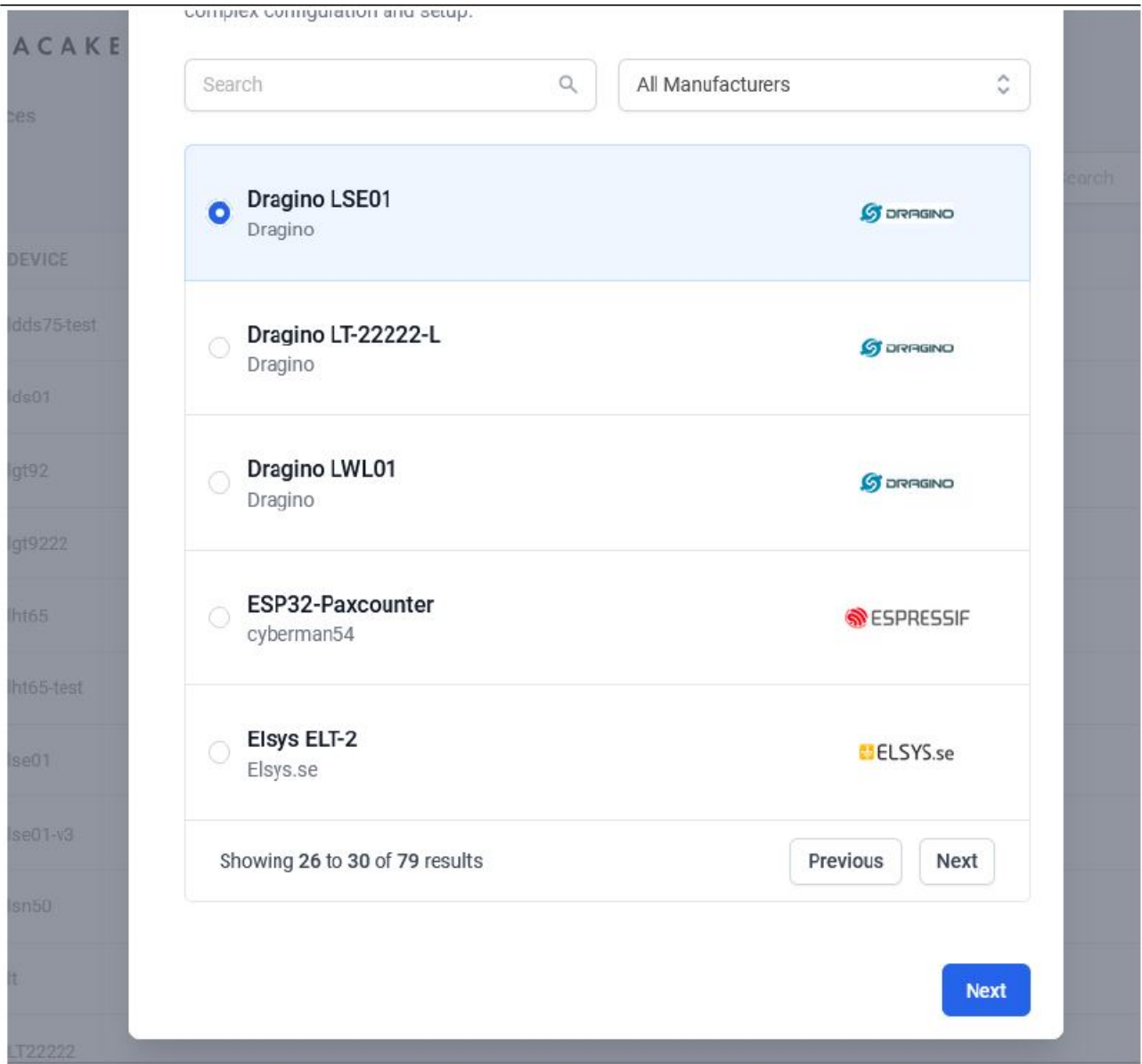Send data to Datacake via TTI adapter

About Datacake ⬀ | Documentation ⬀

Template settings

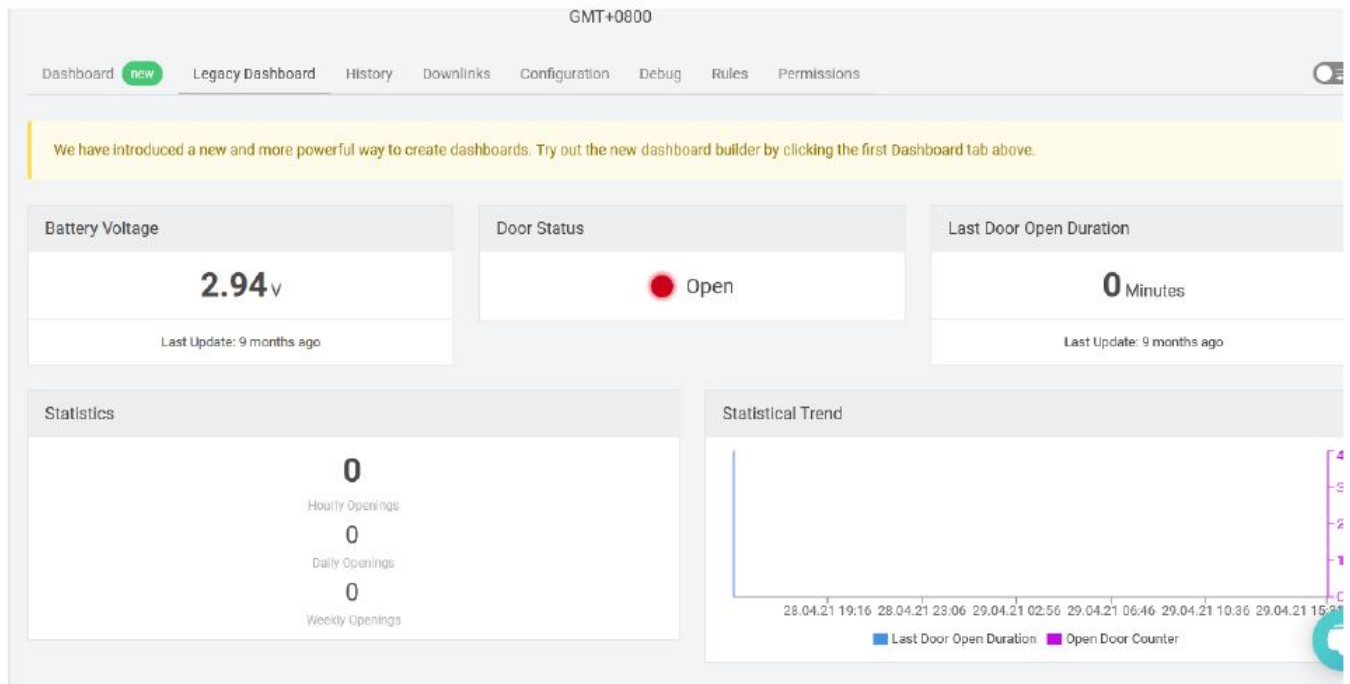**Webhook ID** *

> my-new-datacake-webhook

Token *

Datacake API Token

Create datacake webhook

Step 3: Create an account or log in Datacake.

Step 4: Search LDS01 and add DevEUI.

Alarm Base on Timeout

Since firmware v1.3, LDS01 can monitor the timeout for a status change, this feature can be used to monitor some event such as open fridge too long etc. User configure this feature by using:

AT Command to configure:

- AT+TTRIG=1,30   When status change from close to open, and device keep in open status for more than 30 seconds. LDS01 will send an uplink packet, the Alarm bit (the lowest bit of 10 10th byte of payload) on this uplink packet is set to 1.
- AT+ TTIG=0,0   Default Value, disab le timeout Alarm.

Downlink Command to configure:

- Command:
- 0x A9 aa bb cc A9: Command Type Code

  aa: status to be monitor
- bb cc: timeout.

  If user send 0xA9 01 00 1E: equal to AT+TTRIG=1,30 Or 0xA9 00 00 00: Equal to AT+TTRIG=0,0. Disable timeout Alarm.

LEDs

Action	LED behavior
Power On	GREEN on 1s, RED on 1s, BLUE on 1s
Joined successful	GRENN LED on 5s
Send an uplink message	GREEN LED blinks once
Got a downlink message	BLUE LED blinks once

Battery

LDS01 is powered by a CR2032 coin battery, when running in deep sleep mode, the device power consumption is ~5uA.

The main power consumption is transmitting an uplink message. Depends on LoRaWAN network signal strength, the device can send different number of uplink messages.

1. In poor network coverage and US915 band. The device will transmit at SF10 at max power. in this case, it can uplink about ~1,300 messages.

2. In good network coverage and EU868 band, the device will transmit at SF7, and can uplink as many as 12,000 messages.

When battery voltage is below 2.75v, the LDS01 can't send uplink message.

Note: It is recommended to change battery when it reaches 2.8v. After change the battery, make sure to PRESS RESET button to active the low power mode. Below shows the battery placement:

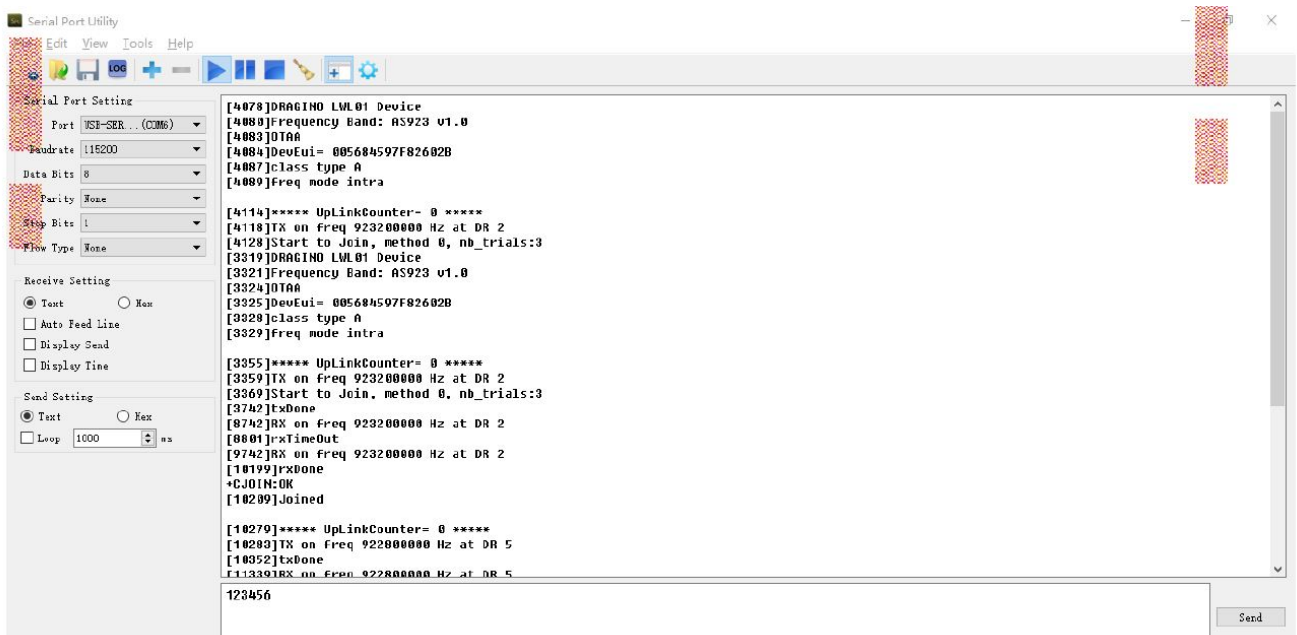## Use AT Command

Access AT Command

LDS01 supports AT Command set. User can use a USB to TTL adapter to configure LDS01 via use AT command, as below.

- USB to TTL <- -> LDS01

- RX <- -> TX

- TX <- -> RX

- GND <- -> GND

  In PC, User needs to set serial tool(such as putty, SecureCRT) baud rate to 115200 to access to access serial console of LWL01. Below is the output for reference: The AT Access password is 123456.

Each AT Command need to add an ENTER at the end before send. When entering the first command, the RED LED will on and user can now input AT Commands. After input all needed AT Commands, Please input AT+CLPM=1 to set the device to work in Low Power mode and RED LED will be off.

More detail AT Command manual can be found at AT Command Manual LoRaWAN Door Sensor User Manual

FAQ

How to upgrade the image?
User can upgrade the firmware of LWL01 for bug fix, new features, or change working region. The upgrade instruction are here: **http://wiki.dragino.com/index.php?title=Firmware_Upgrade_Instruction**

6.2 How to change the LoRa Frequency Bands/Region?

User can follow the introduction for how to upgrade image. When download the images, choose the required image file for download.

6.3 Can I disable uplink for each event to save battery life?

Yes, since firmware version v1.2, this feature is supported, User can use below method to disable this:

via AT Command:

- AT+DISALARM=1, End node will only send packet in TDC time.
- AT+DISALARM=0, End node will send packet in TDC time or status change for door sensor.

via LoRaWAN downlink Command:

- 0xA701 : Equal to AT+DISALARM=1
- 0xA700 : Equal to AT+DISALARM=0

Order Info

**Part Number: LDS01-XXX |
XXX**

- EU433: frequency bands EU433
- EU868: frequency bands EU868
- KR920: frequency bands KR920
- CN470: frequency bands CN470
- AS923: frequency bands AS923
- AU915: frequency bands AU915
- US915: frequency bands US915
- IN865: frequency bands IN865
- CN779: frequency bands CN779

Packing Info

Package Includes:
✓ LDS01 x 1

Dimension and weight:

- Device Size: 64 x 30 x 14 mm

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.com**

Documents / Resources

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DRAGINO LDS01 LoRaWAN Door Sensor [pdf] User Manual
LDS01 LoRaWAN Door Sensor, LDS01, LoRaWAN Door Sensor

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References

- ⚙ **Dragino :: Open Source WiFi, Linux Appliance**
- ⚙ **Dragino Download Server ./downloads/LoRa_End_Node/LDS01/**
- ⚙ **Dragino Download Server ./downloads/LoRa_End_Node/LDS01/Firmware/**
- ⚙ **Dragino Download Server ./downloads/LoRa_End_Node/LDS01/Payload/**
- 🏛 **The Things Network Console**
- 🌐 **Download PuTTY: latest release (0.78)**