



LoRaWAN Distance Detection Sensor User Manual

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1. Introduction	4
1.1 What is LoRaWAN Distance Detection Sensor	4
1.2 Features	5
1.3 Specification	5
1.3.1 Rated environmental conditions	5
1.3.2 Effective measurement range Reference beam pattern	6
1.4 Applications	6
1.5 Pin mapping and power on	7
2. Configure LDD545 to connect to LoRaWAN network	8
2.1 How it works	8
2.2 Quick guide to connect to LoRaWAN server (OTAA)	9
2.3 Uplink Payload	15
2.3.1 Battery Info	15
2.3.2 Distance	15
2.3.3 Interrupt Pin	15
2.3.4 DS18B20 Temperature sensor	15
2.3.5 Sensor Flag	16
2.3.6 Decode payload in The Things Network	16
2.4 Uplink Interval	16
2.5 Show Data in Datacake IoT Server	17
2.6 Frequency Plans	20
2.6.1 EU863-870 (EU868)	20
2.6.2 US902-928(US915)	20
2.6.3 CN470-510 (CN470)	20
2.6.4 AU915-928(AU915)	21
2.6.5 AS920-923 & AS923-925 (AS923)	21
2.6.6 KR920-923 (KR920)	22
2.6.7 IN865-867 (IN865)	22
2.7 LED Indicator	22
2.8 Firmware Change Log	23
2.9 Mechanical	23
3. Battery & how to replace	23
3.1 Battery Type	23
3.2 Replace Battery	24
3.3 Power Consumption Analyze	24
3.3.1 Battery Note	25
3.3.2 Replace the battery	25
3.	26
4. Configure LDD545 via AT Command or LoRaWAN Downlink	26
4.1 Access AT Commands	26
4.2 Set Transmit Interval Time	27
4.3 Set Interrupt Mode	29
5. FAQ	30
5.1 What is the frequency plan for LDD545?	30
5.2 How to change the LoRa Frequency Bands/Region?	30
6. Trouble Shooting	30

6.1	AT Command input doesn't work	30
7.	Order Info	31
8.	Packing Info	31
9.	Support	31

1. Introduction

1.1 What is LoRaWAN Distance Detection Sensor

The Dragino LDDS45 is a **LoRaWAN Distance Detection Sensor** for Internet of Things solution. It is used to measure the distance between the sensor and a flat object. The distance detection sensor is a module that uses **ultrasonic sensing** technology for distance measurement, and **temperature compensation** is performed internally to improve the reliability of data. The LDDS45 can be applied to scenarios such as 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, etc.

It detects the distance **between the measured object and the sensor**, and uploads the value via wireless to LoRaWAN IoT Server.

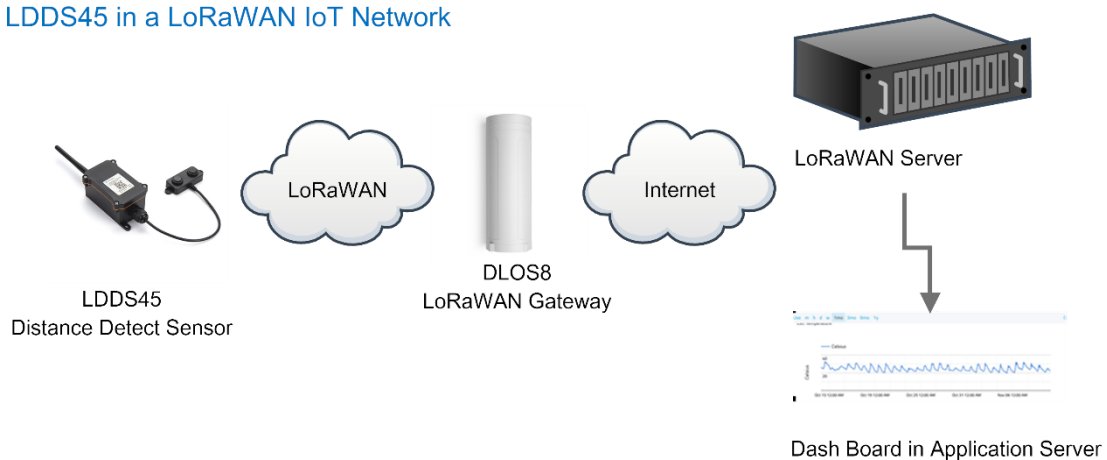
The LoRa wireless technology used in LDDS45 allows device to send data and reach extremely long ranges at low data-rates. It provides ultra-long range spread spectrum communication and high interference immunity whilst minimizing current consumption.

LDDS45 is powered by **8500mAh Li-SOCI2 battery**; It is designed for long term use up to 10 years*.

Each LDDS45 pre-loads with a set of unique keys for LoRaWAN registrations, register these keys to local LoRaWAN server and it will auto connect if there is network coverage, after power on.

*Actually lifetime depends on network coverage and uplink interval and other factors

LDDS45 in a LoRaWAN IoT Network



1.2 Features

- ✧ LoRaWAN 1.0.3 Class A
- ✧ Ultra-low power consumption
- ✧ Distance Detection by Ultrasonic technology
- ✧ Flat object range 30mm - 4500mm
- ✧ Accuracy: $\pm(1\text{cm}+S*0.3\%)$ (S: Distance)
- ✧ Measure Angle: 60°
- ✧ Cable Length : 25cm
- ✧ Bands: CN470/EU433/KR920/US915/EU868/AS923/AU915/IN865
- ✧ AT Commands to change parameters
- ✧ Uplink on periodically
- ✧ Downlink to change configure
- ✧ IP66 Waterproof Enclosure
- ✧ 8500mAh Battery for long term use

1.3 Specification

1.3.1 Rated environmental conditions

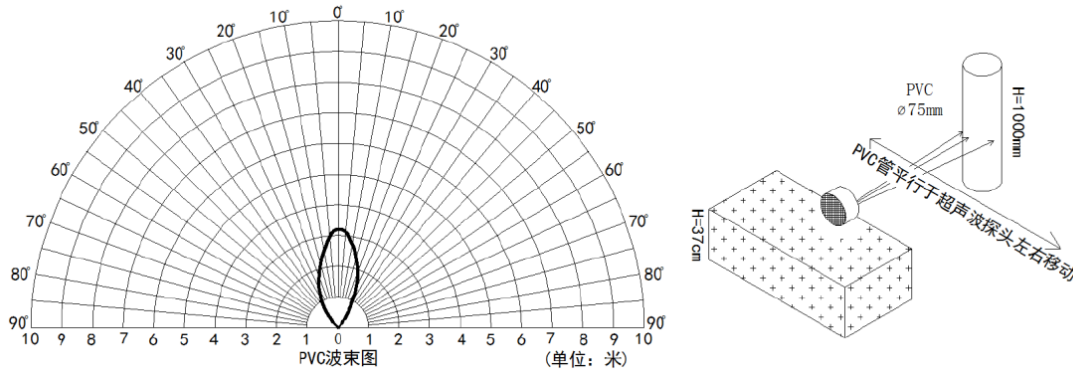
Item	Minimum value	Typical value	Maximum value	Unit	Remarks
Storage temperature	-25	25	80	°C	
Storage humidity		65%	90%	RH	(1)
Operating temperature	-15	25	60	°C	
Working humidity		65%	80%	RH	(1)

Remarks: (1) a. When the ambient temperature is 0-39 °C, the maximum humidity is 90% (non-condensing)

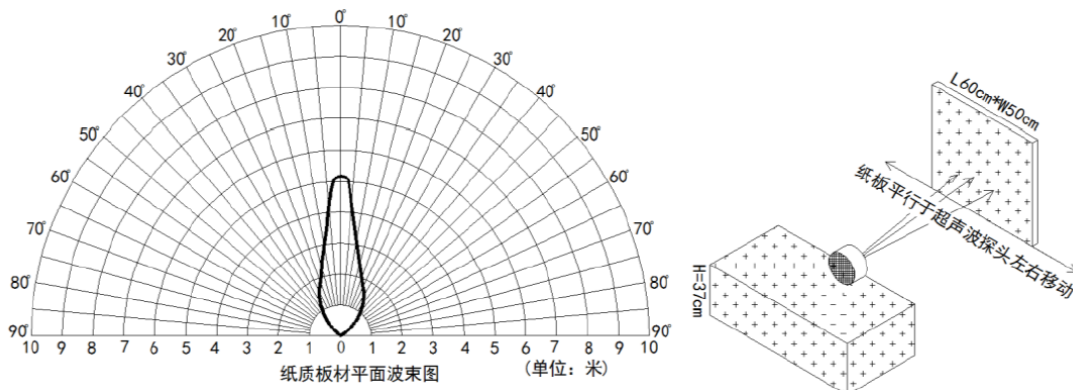
b. When the ambient temperature is 40-50 °C, the highest humidity is the highest humidity in the natural world at the current temperature (no condensation)

1.3.2 Effective measurement range Reference beam pattern

(1) The tested object is a white cylindrical tube made of PVC, with a height of 100cm and a diameter of 7.5cm.



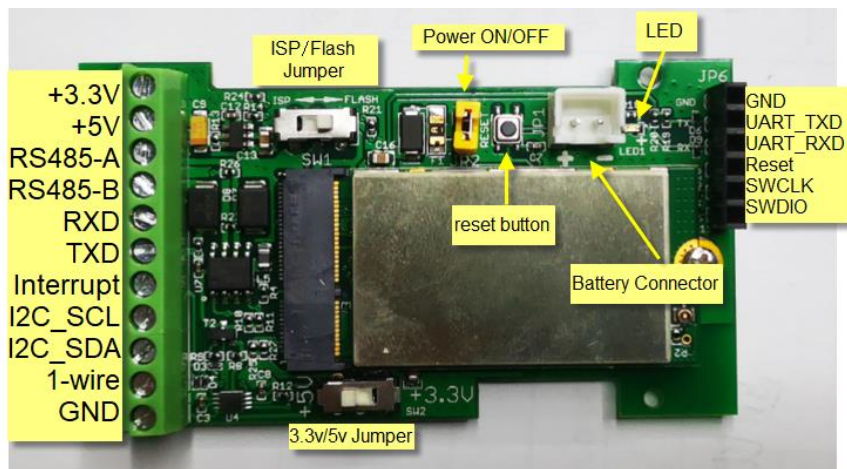
(2) The object to be tested is a "corrugated cardboard box" perpendicular to the central axis of 0°, and the length * width is 60cm * 50cm.



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 Pin mapping and power on



2. Configure LDDS45 to connect to LoRaWAN network

2.1 How it works

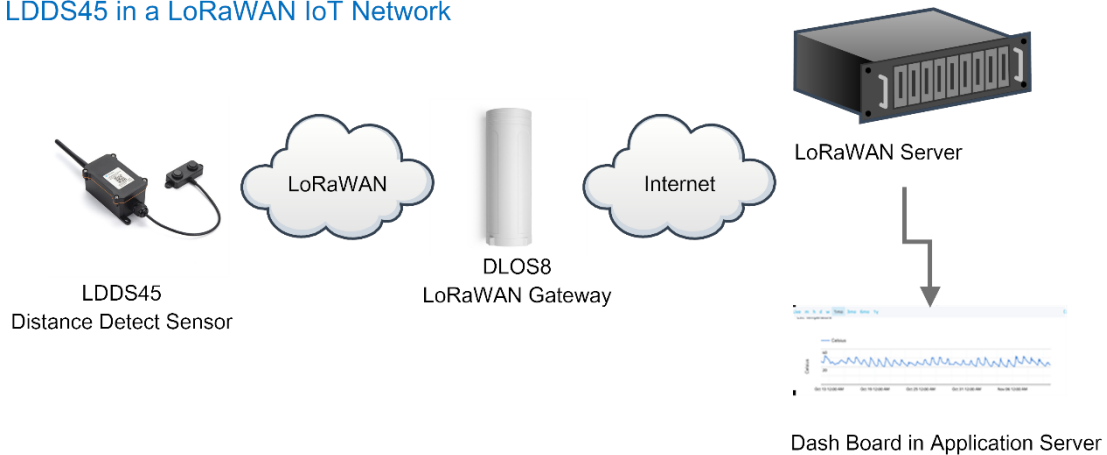
The LDDS45 is configured as LoRaWAN OTAA Class A mode by default. It has OTAA keys to join LoRaWAN network. To connect a LoRaWAN network, you need to input the OTAA keys in the LoRaWAN IoT server and power on the LDDS45. If there is coverage of the LoRaWAN network, it will automatically join the network via OTAA and start to send the sensor value

In case you can't set the OTAA keys in the LoRaWAN OTAA server, and you have to use the keys from the server, you can [use AT Commands](#) to set the keys in the LDDS45.

2.2 Quick guide to connect to LoRaWAN server (OTAA)

Following is an example for how to join the [TTN V3 LoRaWAN Network](#). Below is the network structure; we use the [LG308](#) as a LoRaWAN gateway in this example.

LDDS45 in a LoRaWAN IoT Network



The LG308 is already set to connected to [TTN V3 network](#), so what we need to now is configure the TTN V3 server.

Step 1: Create a device in TTN V3 with the OTAA keys from LDDS45.

Each LDDS45 is shipped with a sticker with the default device keys, user can find this sticker in the box. it looks like below.



For OTAA registration, we need to set **APP EUI/ APP KEY/ DEV EUI**. Some server might no need to set APP EUI.

Enter these keys in the LoRaWAN Server portal. Below is TTN V3 screen shot:

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 *

▼

Cannot find your exact end device? [Device registration.](#)

2. Enter registration data

Please choose an end device first to enter registration data

Register end device

LBT1
⌵

LDDS20
LDDS75
LDS01
LGT92
LHT65
LSE01
LSN50-V2

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 zeros.

Choose LDDS75 instead of LDDS45 is ok. They are of the same payload

You can also choose to create the device manually.

Register end device

From The LoRaWAN Device Repository

Manually

Preparation

Activation mode *

- ☒ Over the air activation (OTAA)
- ☐ Activation by personalization (ABP)
- ☐ Multicast
- ☐ Do not configure activation

LoRaWAN version ? *

Select...



Network Server address

eu1.cloud.thethings.network

Application Server address

eu1.cloud.thethings.network

External Join Server ?

Add APP KEY and DEV EUI

2. Enter registration data

Frequency plan ⓘ *

Europe 863-870 MHz (SF12 for RX2)

The frequency plan used by the end device

AppEUI ⓘ *

..... 00

The AppEUI uniquely identifies the owner of the end device. If no AppEUI is provided by the device manufacturer (usually for dev

DevEUI ⓘ *

.....

The DevEUI is the unique identifier for this end device

AppKey ⓘ *

.....

The root key to derive session keys to secure communication between the end device and the application

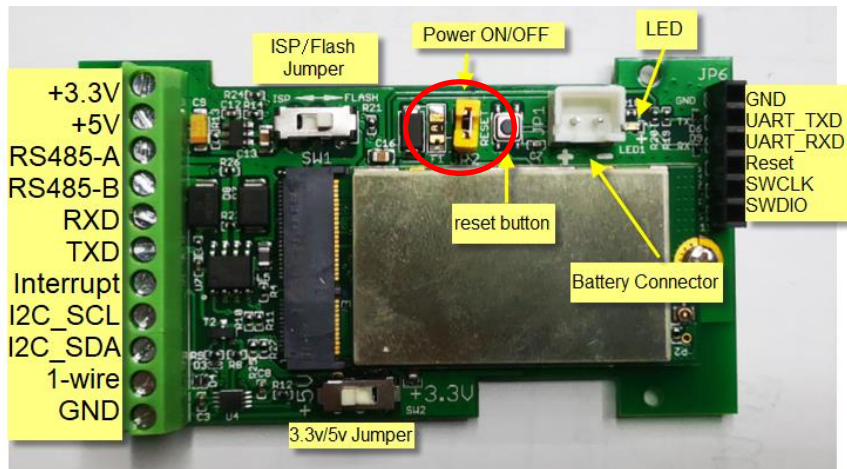
End device ID *

my-new-device

After registration

Step 2: Power on LDDS45

Put a Jumper on JP2 to power on the device. (The switch must be set in FLASH position).



Step 3: The LDDS45 will auto join to the TTN V3 network. After join success, it will start to upload messages to TTN V3 and you can see the messages in the panel.

↑ 10:35:00 Forward data message to Applic...	DevAddr: 26 08 52 6E	MAC payload: 17 BF BD 86 C1	FPort: 2 SNR: 9.5 RSSI: -53 Bandwidth: 125000
↑ 10:35:00 Forward uplink data message	DevAddr: 26 08 52 6E	Payload: { bat: 3.35, distance: 2671 3 80 16 8A 6F 08 }	FPort: 2 SNR: 9.5 RSSI: -53 Bandwidth: 125000
↑ 10:35:00 Receive uplink data message	DevAddr: 26 08 52 6E		
↑ 10:35:00 Successfully processed data me...	DevAddr: 26 08 52 6E	FCnt: 14778 FPort: 2 MAC payload: 17 BF BD 86 C1	Bandwidth: 125000 SNR: 9.5 RSSI: -53 Raw payload: 48 e
↑ 10:35:00 Drop data message	Uplink is a duplicate		
↑ 10:35:00 Receive data message	DevAddr: 26 08 52 6E	FCnt: 14778 FPort: 2 MAC payload: 17 BF BD 86 C1	Bandwidth: 125000 SNR: 9.5 RSSI: -58 Raw payload: 48 e
↑ 10:35:00 Receive data message	DevAddr: 26 08 52 6E	FCnt: 14778 FPort: 2 MAC payload: 17 BF BD 86 C1	Bandwidth: 125000 SNR: 9.5 RSSI: -53 Raw payload: 48 e

2.3 Uplink Payload

LDDS45 will uplink payload via LoRaWAN with below payload format:

Uplink payload includes in total 8 bytes.

Size(bytes)	2	2	1	2	1
Value	BAT	Distance (unit: mm)	Digital Interrupt (Optional)	Temperature (Optional)	Sensor Flag

↑ 10:35:00 Forward data message to Applic...	DevAddr: 26 0B 52 6E	MAC payload: 17 BF BD 86 C1	FPort: 2 SNR: 9.5 RSSI: -53 Bandwidth: 125000
↑ 10:35:00 Forward uplink data message	DevAddr: 26 0B 52 6E	Payload: { bat: 3.35, distance: 2671, 80 16 0A 6F 00 }	FPort: 2 SNR: 9.5 RSSI: -53 Bandwidth: 125000
↑ 10:35:00 Receive uplink data message	DevAddr: 26 0B 52 6E		
↑ 10:35:00 Successfully processed data me...	DevAddr: 26 0B 52 6E	Fcnt: 14770 FPort: 2 MAC payload: 17 BF BD 86 C1	Bandwidth: 125000 SNR: 9.5 RSSI: -53 Raw payload: 48 00 00 00 00 00 00 00
↑ 10:35:00 Drop data message	Uplink is a duplicate		
↑ 10:35:00 Receive data message	DevAddr: 26 0B 52 6E	Fcnt: 14770 FPort: 2 MAC payload: 17 BF BD 86 C1	Bandwidth: 125000 SNR: 9.5 RSSI: -58 Raw payload: 48 00 00 00 00 00 00 00
↑ 10:35:00 Receive data message	DevAddr: 26 0B 52 6E	Fcnt: 14770 FPort: 2 MAC payload: 17 BF BD 86 C1	Bandwidth: 125000 SNR: 9.5 RSSI: -53 Raw payload: 48 00 00 00 00 00 00 00

2.3.1 Battery Info

Check the battery voltage for LDDS45.

Ex1: 0x0B45 = 2885mV

Ex2: 0x0B49 = 2889mV

2.3.2 Distance

Get the distance. Flat object range 30mm - 4500mm.

For example, if the data you get from the register is 0x0B 0x05, the distance between the sensor and the measured object is

0B05(H) = 2821 (D) = 2821 mm.

- If the sensor value is 0x0000, it means system doesn't detect ultrasonic sensor.
- If the sensor value lower than 0x001E (30mm), the sensor value will be 0x00.

2.3.3 Interrupt Pin

This data field shows if this packet is generated by interrupt or not. [Click here](#) for the hardware and software set up.

Example:

0x00: Normal uplink packet.

0x01: Interrupt Uplink Packet.

2.3.4 DS18B20 Temperature sensor

This is optional, user can connect external DS18B20 sensor to the [+3.3v, 1-wire and GND pin](#) . and this field will report temperature.

Example:

If payload is: 0105H: (0105 & FC00 == 0), temp = 0105H /10 = 26.1 degree

If payload is: FF3FH : (FF3F & FC00 == 1) , temp = (FF3FH - 65536)/10 = -19.3 degrees.

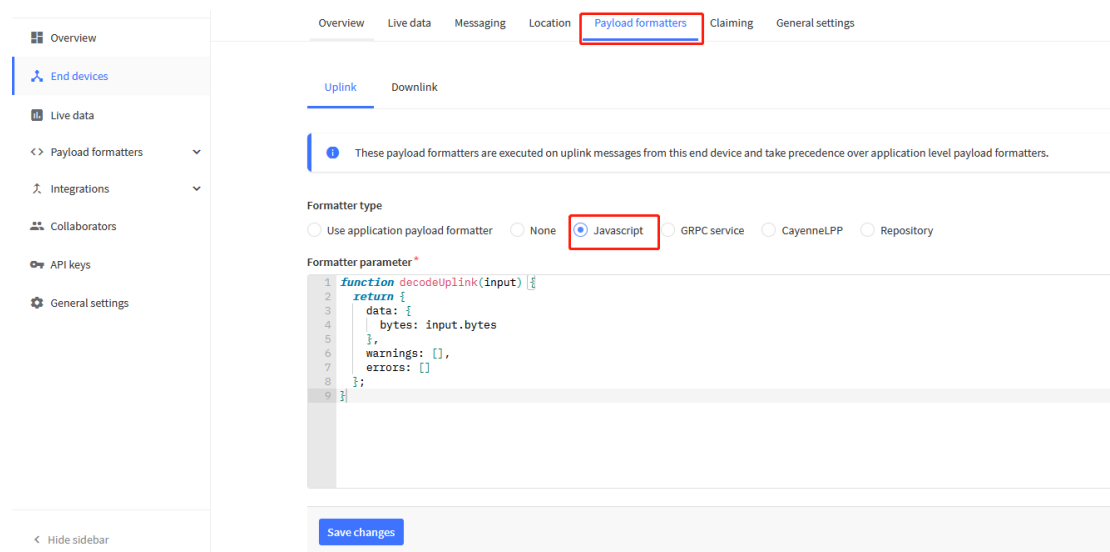
2.3.5 Sensor Flag

0x01: Detect Ultrasonic Sensor

0x00: No Ultrasonic Sensor

2.3.6 Decode payload in The Things Network

While using TTN V3 network, you can add the payload format to decode the payload.



The screenshot shows the 'Payload formatters' configuration page in the Dragino web interface. The 'Formatter type' section has three radio buttons: 'Use application payload formatter', 'None', and 'Javascript' (which is selected). Below this, the 'Formatter parameter' field contains the following JavaScript code:

```
1 function decodeUplink(input) {
2   return {
3     data: {
4       bytes: input.bytes
5     },
6     warnings: [],
7     errors: []
8   };
9 }
```

At the bottom of the configuration area, there is a 'Save changes' button.

The payload decoder function for TTN V3 is here:

LDDS45 TTN V3 Payload Decoder:

http://www.dragino.com/downloads/index.php?dir=LoRa_End_Node/LDDS75/Payload_Decoder/

2.4 Uplink Interval

The LDDS45 by default uplink the sensor data every 20 minutes. User can change this interval by AT Command or LoRaWAN Downlink Command. See this link:

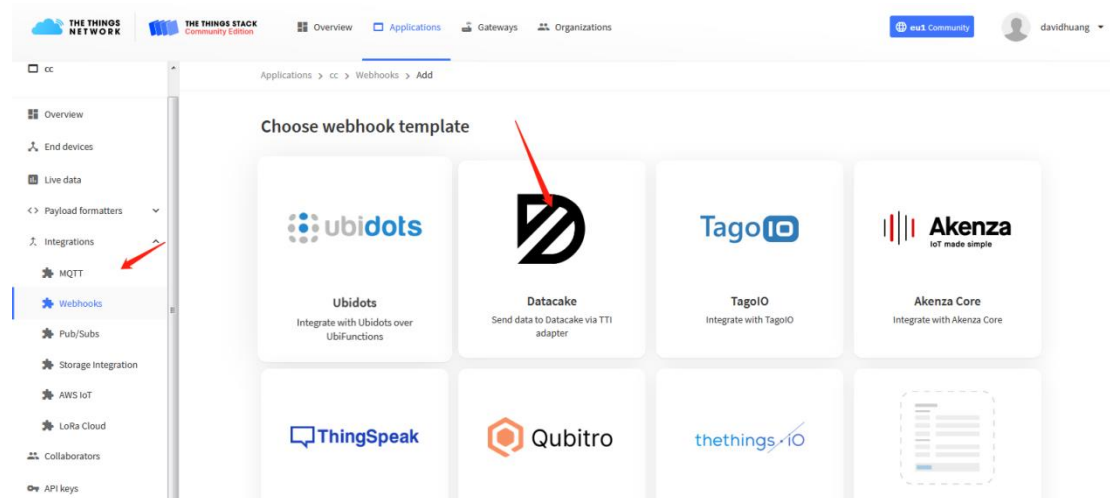
http://wiki.dragino.com/index.php?title=End_Device_AT_Commands_and_Downlink_Commands#Change_Uplink_Interval

2.5 Show Data in Datacake IoT Server

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:



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

Step 3: Create an account or log in Datacake.

Step 4: Search the LDDS45 and add DevEUI.

Complex Configuration and Setup.

ACAKE

ces

DEVICE

dds75-test

ds01

gt92

gt9222

ht65

ht65-test

se01

se01-v3

sn50

it

LT22222

Search

All Manufacturers

☒ Dragino LSE01
Dragino

☐ Dragino LT-22222-L
Dragino

☐ Dragino LWL01
Dragino

☐ ESP32-Paxcounter
cyberman54

☐ Elsys ELT-2
Elsys.se

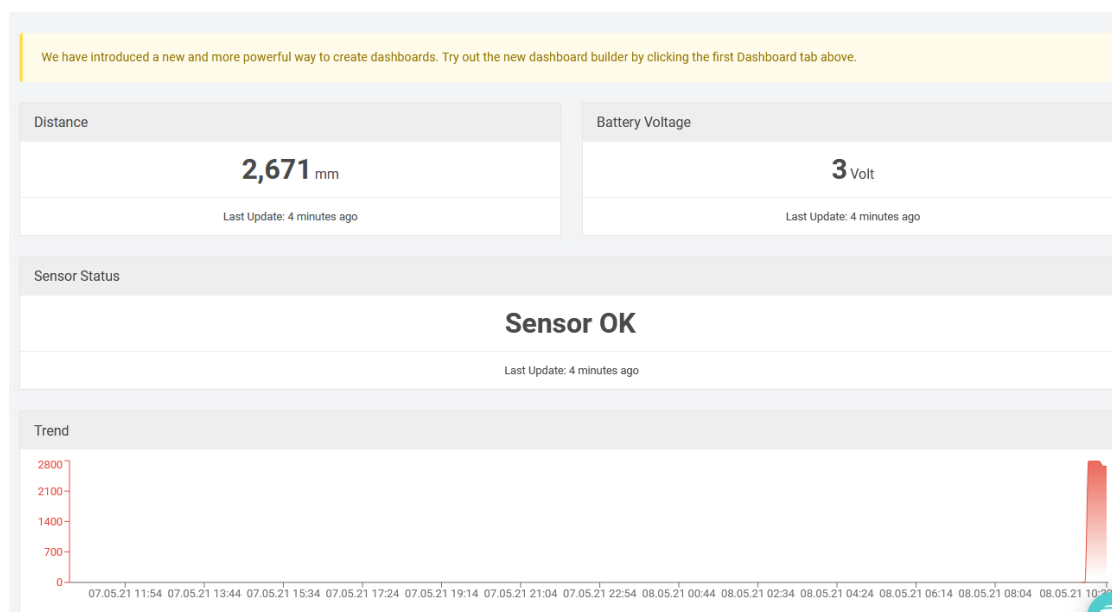
Showing 26 to 30 of 79 results

Previous

Next

Next

After added, the sensor data arrive TTN V3, it will also arrive and show in Datacake.



2.6 Frequency Plans

The LDDS45 uses OTAA mode and below frequency plans by default. If user want to use it with different frequency plan, please refer the AT command sets.

2.6.1 EU863-870 (EU868)

Uplink:

868.1 - SF7BW125 to SF12BW125
868.3 - SF7BW125 to SF12BW125 and SF7BW250
868.5 - SF7BW125 to SF12BW125
867.1 - SF7BW125 to SF12BW125
867.3 - SF7BW125 to SF12BW125
867.5 - SF7BW125 to SF12BW125
867.7 - SF7BW125 to SF12BW125
867.9 - SF7BW125 to SF12BW125
868.8 - FSK

Downlink:

Uplink channels 1-9 (RX1)
869.525 - SF9BW125 (RX2 downlink only)

2.6.2 US902-928(US915)

Used in USA, Canada and South America. Default use CHE=2

Uplink:

903.9 - SF7BW125 to SF10BW125
904.1 - SF7BW125 to SF10BW125
904.3 - SF7BW125 to SF10BW125
904.5 - SF7BW125 to SF10BW125
904.7 - SF7BW125 to SF10BW125
904.9 - SF7BW125 to SF10BW125
905.1 - SF7BW125 to SF10BW125
905.3 - SF7BW125 to SF10BW125

Downlink:

923.3 - SF7BW500 to SF12BW500
923.9 - SF7BW500 to SF12BW500
924.5 - SF7BW500 to SF12BW500
925.1 - SF7BW500 to SF12BW500
925.7 - SF7BW500 to SF12BW500
926.3 - SF7BW500 to SF12BW500
926.9 - SF7BW500 to SF12BW500
927.5 - SF7BW500 to SF12BW500
923.3 - SF12BW500(RX2 downlink only)

2.6.3 CN470-510 (CN470)

Used in China, Default use CHE=1

Uplink:

486.3 - SF7BW125 to SF12BW125
486.5 - SF7BW125 to SF12BW125
486.7 - SF7BW125 to SF12BW125
486.9 - SF7BW125 to SF12BW125
487.1 - SF7BW125 to SF12BW125

487.3 - SF7BW125 to SF12BW125
487.5 - SF7BW125 to SF12BW125
487.7 - SF7BW125 to SF12BW125

Downlink:

506.7 - SF7BW125 to SF12BW125
506.9 - SF7BW125 to SF12BW125
507.1 - SF7BW125 to SF12BW125
507.3 - SF7BW125 to SF12BW125
507.5 - SF7BW125 to SF12BW125
507.7 - SF7BW125 to SF12BW125
507.9 - SF7BW125 to SF12BW125
508.1 - SF7BW125 to SF12BW125
505.3 - SF12BW125 (RX2 downlink only)

2.6.4 AU915-928(AU915)

Default use CHE=2

Uplink:

916.8 - SF7BW125 to SF12BW125
917.0 - SF7BW125 to SF12BW125
917.2 - SF7BW125 to SF12BW125
917.4 - SF7BW125 to SF12BW125
917.6 - SF7BW125 to SF12BW125
917.8 - SF7BW125 to SF12BW125
918.0 - SF7BW125 to SF12BW125
918.2 - SF7BW125 to SF12BW125

Downlink:

923.3 - SF7BW500 to SF12BW500
923.9 - SF7BW500 to SF12BW500
924.5 - SF7BW500 to SF12BW500
925.1 - SF7BW500 to SF12BW500
925.7 - SF7BW500 to SF12BW500
926.3 - SF7BW500 to SF12BW500
926.9 - SF7BW500 to SF12BW500
927.5 - SF7BW500 to SF12BW500
923.3 - SF12BW500(RX2 downlink only)

2.6.5 AS920-923 & AS923-925 (AS923)

Default Uplink channel:

923.2 - SF7BW125 to SF10BW125
923.4 - SF7BW125 to SF10BW125

Additional Uplink Channel:

(OTAA mode, channel added by JoinAccept message)

AS920~AS923 for Japan, Malaysia, Singapore:

922.2 - SF7BW125 to SF10BW125
922.4 - SF7BW125 to SF10BW125
922.6 - SF7BW125 to SF10BW125
922.8 - SF7BW125 to SF10BW125
923.0 - SF7BW125 to SF10BW125
922.0 - SF7BW125 to SF10BW125

AS923 ~ AS925 for Brunei, Cambodia, Hong Kong, Indonesia, Laos, Taiwan, Thailand,

Vietnam:

923.6 - SF7BW125 to SF10BW125
923.8 - SF7BW125 to SF10BW125
924.0 - SF7BW125 to SF10BW125
924.2 - SF7BW125 to SF10BW125
924.4 - SF7BW125 to SF10BW125
924.6 - SF7BW125 to SF10BW125

Downlink:

Uplink channels 1-8 (RX1)
923.2 - SF10BW125 (RX2)

2.6.6 KR920-923 (KR920)

Default channel:

922.1 - SF7BW125 to SF12BW125
922.3 - SF7BW125 to SF12BW125
922.5 - SF7BW125 to SF12BW125

Uplink: (OTAA mode, channel added by JoinAccept message)

922.1 - SF7BW125 to SF12BW125
922.3 - SF7BW125 to SF12BW125
922.5 - SF7BW125 to SF12BW125
922.7 - SF7BW125 to SF12BW125
922.9 - SF7BW125 to SF12BW125
923.1 - SF7BW125 to SF12BW125
923.3 - SF7BW125 to SF12BW125

Downlink:

Uplink channels 1-7(RX1)
921.9 - SF12BW125 (RX2 downlink only; SF12BW125 might be changed to SF9BW125)

2.6.7 IN865-867 (IN865)

Uplink:

865.0625 - SF7BW125 to SF12BW125
865.4025 - SF7BW125 to SF12BW125
865.9850 - SF7BW125 to SF12BW125

Downlink:

Uplink channels 1-3 (RX1)
866.550 - SF10BW125 (RX2)

2.7 LED Indicator

The LDDS45 has an internal LED which is to show the status of different state.

- Blink once when device power on.
- The device detects the sensor and flashes 5 times.

- Solid ON for 5 seconds once device successful Join the network.
- Blink once when device transmit a packet.

2.8 Firmware Change Log

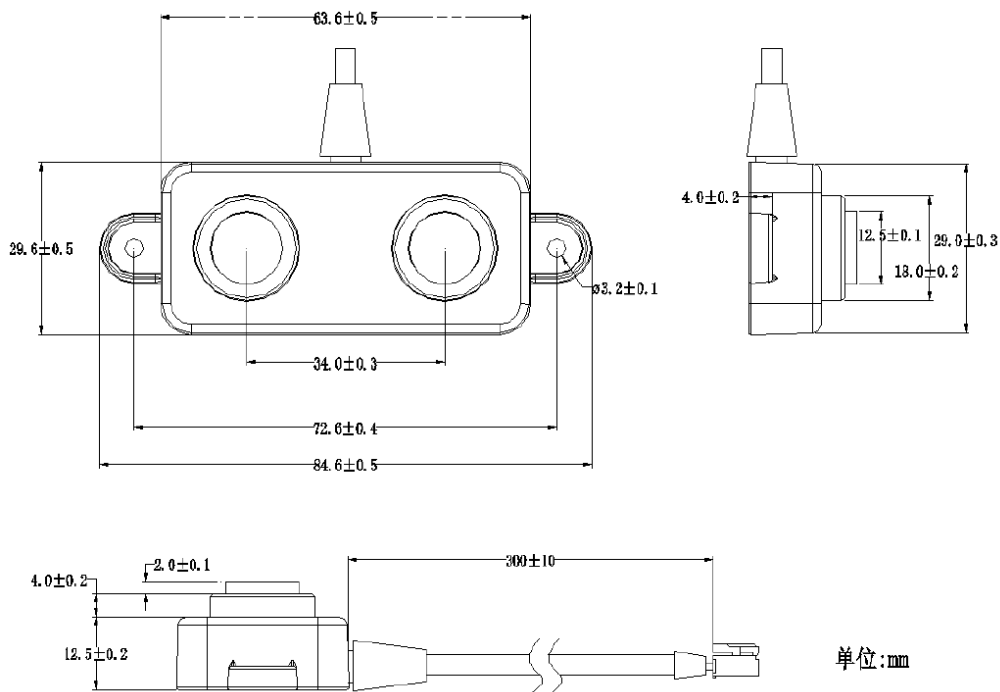
Firmware download link:

http://www.dragino.com/downloads/index.php?dir=LoRa_End_Node/LDDS75/Firmware/

Firmware Upgrade Method:

http://wiki.dragino.com/index.php?title=Firmware_Upgrade_Instruction_for_STM32_base_products#Introduction

2.9 Mechanical



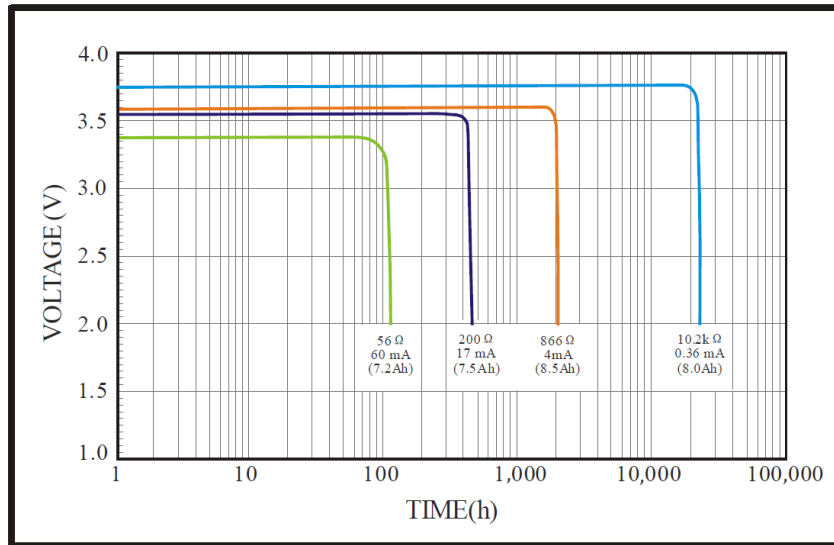
3. Battery & how to replace

3.1 Battery Type

LDDS45 is equipped with a [8500mAH ER26500 Li-SOCI2 battery](#). The battery is un-rechargeable battery with low discharge rate targeting for 8~10 years use. This type of battery is commonly used in IoT target for long-term running, such as water meter.

The discharge curve is not linear so can't simply use percentage to show the battery level. Below is the battery performance.

1. Typical discharge profile at +20 °C (Typical value)



Minimum Working Voltage for the LDDS45:
LDDS45: 2.45v ~ 3.6v

3.2 Replace Battery

Any battery with range 2.45 ~ 3.6v can be a replacement. We recommend to use Li-SOCl₂ Battery. And make sure the positive and negative pins match.

3.3 Power Consumption Analyze

Dragino Battery powered product are all runs in Low Power mode. We have an update battery calculator which base on the measurement of the real device. User can use this calculator to check the battery life and calculate the battery life if want to use different transmit interval.

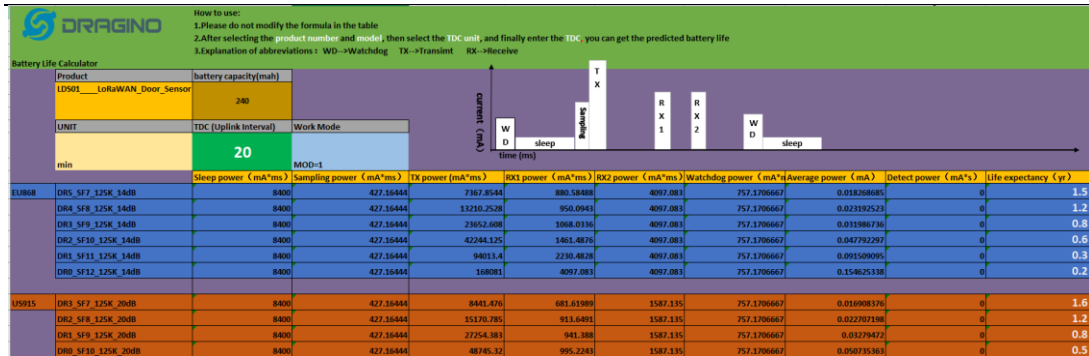
Instruction to use as below:

Step 1: Downlink the up-to-date DRAGINO_Battery_Life_Prediction_Table.xlsx from:
https://www.dragino.com/downloads/index.php?dir=LoRa_End_Node/Battery_Analyze/

Step 2: Open it and choose

- Product Model
- Uplink Interval
- Working Mode

And the Life expectation in difference case will be shown on the right.



The battery related documents as below:

- [Battery Dimension](#),
- [Lithium-Thionyl Chloride Battery](#) datasheet, [Tech Spec](#)
- [Lithium-ion Battery-Capacitor](#) datasheet, [Tech Spec](#)



3.3.1 Battery Note

The Li-SiCO battery is designed for small current / long period application. It is not good to use a high current, short period transmit method. The recommended minimum period for use of this battery is 5 minutes. If you use a shorter period time to transmit LoRa, then the battery life may be decreased.

3.3.2 Replace the battery

You can change the battery in the LD501. The type of battery is not limited as long as the output is between 3v to 3.6v. On the main board, there is a diode (D1) between the battery and the main circuit. If you need to use a battery with less than 3.3v, please remove the D1 and shortcut the two pads of it so there won't be voltage drop between battery and main board.

The default battery pack of LD501 includes a ER26500 plus super capacitor. If user can't find this pack locally, they can find ER26500 or equivalence, which will also work in most case. The SPC can enlarge the battery life for high frequency use (update period below 5 minutes)

3.

4. Configure LDDS45 via AT Command or LoRaWAN Downlink

User can configure LDDS45 via AT Command or LoRaWAN Downlink.

- AT Command Connection: See [FAQ](#).
- LoRaWAN Downlink instruction for different platforms:

http://wiki.dragino.com/index.php?title=Main_Page#Use_Note_for_Server

There are two kinds of commands to configure LDDS45, they are:

- **General Commands.**

These commands are to configure:

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

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

http://wiki.dragino.com/index.php?title=End_Device_Downlink_Command

- **Commands special design for LDDS45**

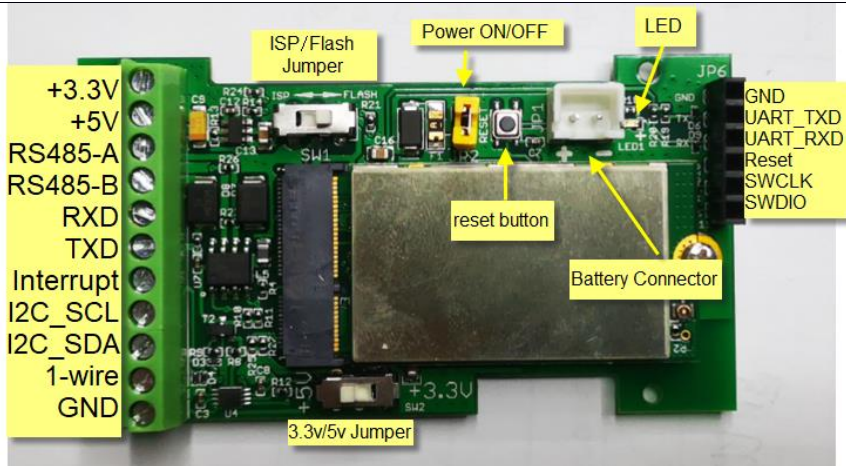
These commands only valid for LDDS45, as below:

4.1 Access AT Commands

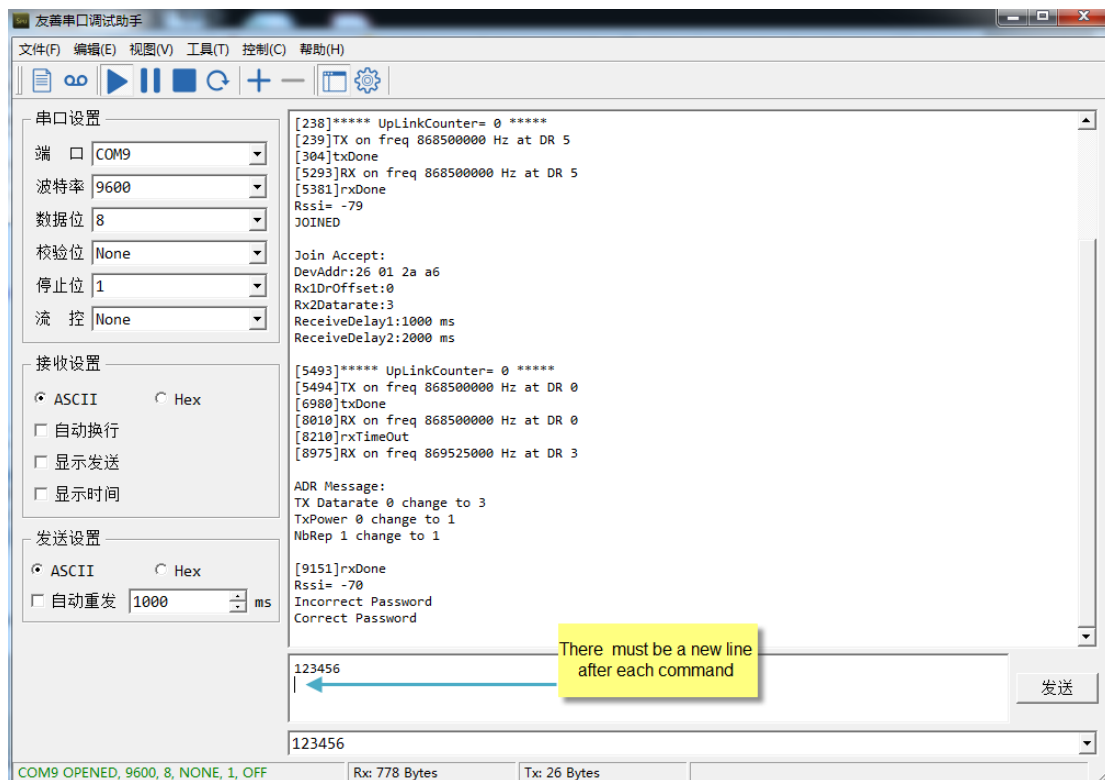
User can use a USB to TTL adapter to connect to LDDS45 and access the console to enter AT Commands. Note the TXD/RXD can use 3.3v or 5v.

Pins for console is:

- UART_TXD to USB TTL Adapter's RXD
- UART_RXD to USB TTL Adapter's TXD
- GND to USB TTL Adapter's GND



In the PC, you need to set the serial baud rate to **9600** to access the serial console for LDD45. LDD45 will output system info once power on as below:



4.2 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 Command: 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 Set Interrupt Mode

Feature, Set Interrupt mode for GPIO_EXIT.

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 Set transmit interval to 60000ms = 60 seconds

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

5. FAQ

5.1 What is the frequency plan for LDDS45?

LDDS45 use the same frequency as other Dragino products. User can see the detail from this link:

http://wiki.dragino.com/index.php?title=End_Device_Frequency_Band#Introduction

5.2 How to change the LoRa Frequency Bands/Region?

You can follow the instructions for [how to upgrade image](#).

When downloading the images, choose the required image file for download.

6. Trouble Shooting

6.1 AT Command input doesn't work

In the case if user can see the console output but can't type input to the device. Please check if you already include the **ENTER** while sending out the command. Some serial tool doesn't send **ENTER** while press the send key, user need to add ENTER in their string.

7. Order Info

Part Number: **LDDS45-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

8. Packing Info

Package Includes:

- LDDS45 LoRaWAN Distance Detection x 1

Dimension and weight:

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

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.com