

LHT52 - LoRaWAN Temperature & Humidity Sensor User Manual

last modified by Xiaoling

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1. Introduction

1.1 What is LHT52 Temperature & Humidity Sensor

The Dragino LHT52 Temperature & Humidity sensor is a Long Range LoRaWAN Sensor. It includes a **built-in Temperature & Humidity sensor** and has a USB Type-C sensor connector to connect to external sensors such as external Temperature Sensor.

LHT52 **senses environment temperature and humidity** and send these values via long-range wireless LoRaWAN protocol. It targets professional wireless sensor network applications such as food service, smart metering, smart cities, building automation, and so on.

LHT52 supports **2 x AAA batteries** and works for a long time up to several years. Use can replace the batteries easily after they are finished.

LHT52 is fully compatible with LoRaWAN v1.0.3 protocol, it can work with standard LoRaWAN gateway.

LHT52 supports **Datalog feature** to make sure users won't miss sensor data. It records sensor value for every uplink. These values can be retrieved by LoRaWAN server via downlink command.

LHT52 supports **temperature alarm feature**. It can uplink alarm in a short interval while temperature exceeds preset limits.

*Battery life depends how often to send data, please see battery analyzer.



Dash Board in Application Server

1.2 Features

- Wall Attachable.
- LoRaWAN v1.0.3 Class A protocol.
- Built-in Temperature & Humidity sensor
- Optional External Probe
- Frequency Bands: CN470/EU433/KR920/US915/EU868/AS923/AU915

- AT Commands to change parameters
- Remote configure parameters via LoRaWAN Downlink
- Firmware upgradable via program port
- Support 2 x AAA LR03 batteries.
- Datalog feature
- IP Rating: IP52

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: -20 ~ 50 °C

Built-in Humidity Sensor:

- Resolution: 0.1 %RH
- Accuracy Tolerance: Typ ±3 %RH
- Long Term Drift: < 0.02 °C/yr
- Operating Range: 0 ~ 99.0 %RH(no Dew)

1.4 Power Consumption

LHT52 (without external sensor): Idle: 5uA, Transmit: max 110mA

LHT52 + External Temperature Probe (AS-01): Idle: 6uA, Transmit: max 110mA.

1.5 Storage & Operation Temperature

-20°C to +50°C

1.6 Applications

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

2. Operation Mode

2.1 How it work?

Each LHT52 is shipped with a worldwide unique set of LoRaWAN OTAA keys. To use LHT52 in a LoRaWAN network, user needs to input the OTAA keys in LoRaWAN network server. After this, if LHT52 is under this LoRaWAN network coverage, LHT52 can join the LoRaWAN network and start to transmit sensor data. The default period for each uplink is **20 minutes**.

2.2 How to Activate LHT52?

1. Open enclosure from below position.



2. Insert 2 x AAA LR03 batteries.



3. Press the reset button to activate device.



User can check <u>LED Status</u> to know the working state of LHT52.

2.3 Example to join LoRaWAN network

This section shows an example for how to join the <u>TheThingsNetwork</u> LoRaWAN IoT server. Usages with other LoRaWAN IoT servers are of similar procedure.

Use LHT52 in TTN and Datacake



Dash Board in Datacake

Assume the DLOS8 is already set to connect to TTN V3 network. We need to add the LHT52 device in TTN V3 portal.

Step 1: Create a device in TTN V3 with the OTAA keys from LHT52.

Each LHT52 is shipped with a sticker with the default DEV EUI as below:



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

Add APP EUI in the application.

choose to create the device manually.

Add APP KEY	and DEV EUI				
s 🕅	THE THINGS STACK Community Edition	Uverview	Applications	🔒 Gateways	📫 Orga
	Add applicat	tion			
	davidhuang			· •	
	Application ID*				
	my-new-application				
	Application name				
	My new application				
	Description				
	Description for my ner	wapplication			
	Optional application de	scription; can also b	e used to save notes a	bout the applicatio	п



WIR MINISTER	S Owner	C Applement	🖷 Geleveya	25. Organizations					Contract of the second
🖬 มศรม_กระ				Applications y D4732_71	67				
G Ormane				LHT52_TI	EST				
L. Endlewins				 Nonecent activity O 				A blockerner 20,1 Columners De 0.471	ieys.
Live data				General Information			* Live data	Security and active	u
3 Payload formatters	2			Application 10	11452005		O 11(10(2) 20082002	Canada application	
(, telegrations				Created at	Dec 10, 2023 13(9)(29				
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Default mode OTAA

*****	•		
nt	LHTS2_TEST		Applications > LHTS2_TEST > End devices > Register manually
	Overview		Register end device
٨	End devices		From The LoRaWAN Device Repository Manually
63	Live data		Frequency plan () *
<>	Payload formatters	*	Europe 863-870 MHz (SF12 for RX2)
t.	Integrations	v	LoRaWAN version © *
45	Collaborators		MAC V1.0.3
07	API keys		Regional Parameters version \oplus^*
\$	General settings		PHYVLA3REVA 🗸
			Show advanced activation, LoRaWAN class and cluster settings ~
			Dev£UI© *
			25 32 12 45 65 26 12 35 🖉 Generate 0/50 used
			AppEUI (D *
			25 32 12 45 65 26 32 16 Fill with zeros
			AppKey®*
			25 32 12 45 65 26 32 16 89 48 85 65 45 87 89 55
			End device ID 🗇 *
			Iht52test01
			This value is automatically prefilied using the DevEU
			After registration
			Register another end device of this type
< H	de sidebar		Register end device

Step 2: Use ACT button to activate LHT52 and it will auto join to the TTN V3 network. After join success, it will start to upload sensor data to TTN V3 and user can see in the panel.

THE THINGS STACK	🗱 Overview 🗈 Applications 🚠 Gateways	A Operations	EU1 Community Fair une policy applies ①	Interong •
LHT52_TEST		Applications > UNTS2_TEST > End devices > BetS26eatt > Live data		
Cverview		b hts2test01		
End devices		↑1 4-inia + Laistattivity Saconda ago ① Overview Laistattivity Saconda ago ①		
Payload formatters ^	Time Type Ф 14:08:11 Perward uplink data message	bala prodes Pojisani į boti 5, Res_DMT, 50.0, Systimetany: 200004310, Tengs_DS: 207.07, Tengs_DMT; 20.09 } (0.09 (0.11 77 17 0.01) . Tengs 1 (0.12 matrix 197002)	Verbose stream ()) 8 SHR: 7.8 RISSI: -57	II Pause 📲 Clear
↓ Downlink	Φ 14:00:11. Successfully processed data message $\dot{\Psi}$ 14:00:04. Schedule data downlawk for transmiss	Developer 20 00 00 72 FOxty 1 FPerty 2 Data safes 9786425 500; 7.8 9551; 457. L. Rich Belley 8		
Collaborators	Φ 14:05:04. Forward uplick data message Φ 14:05:04. Successfully processed data message	Papleer: [Satjer: 2016, Fizeware,Version: "10", Free,Jacci 1, Sensor,Josefi 9, Satjerer 0] 00.00.00.00.00.00.00 J Prott: 0 Data inter 941206120 UM Develop: [20.00.072] Prott: 0 Data inter 941206120 UM: 9,8 80511-47	: 9-8 R151: +87	
API keys General settings	 Ф 14:04:59 Розмала јолл-восерт мевење 60 14:04:57 Ассерт јолл-зерџевт 			
	# 14:04:50 Console: Events cleazed	The events list has been cleared		

2.4 Uplink Payload

Uplink payloads include two types: Valid Sensor Value and other status / control command.

- Valid Sensor Value: Use FPORT=2
- Other control command: Use FPORT other than 2.

2.4.1 Uplink FPORT=5, Device Status

Uplink the device configures with FPORT=5. Once LHT52 Joined the network, it will uplink this message to the server. After first uplink, LHT52 will uplink Device Status every 12 hours.

Size(bytes)	1	2	1	1	2		
Value	Sensor Model	Firmware Version	Frequency Band	Sub-band	BAT		
LHT52_TEST							
Overview		Int52test01					
🙏 End devices		↑1 ↓ n/a • Last activity 49 set	econds ago 🗇				
II Live data		Overview Live data Messa	aging Location Payload formatters Claiming Gene	ral settings			
<> Payload formatters	Time Type	Data preview				Verbose stream	II Pause 🔳
↑ Uplink	↑ 14:85:11 Forward uplink	data message Payload: { Ext: 1, Hum_SHT	: 53.3, Systimestamp: 1640844310, TempC_DS: 327.67, Te	empC_SHT: 22.39 } 08 BF 02 15 7F FF 01 6	1 FPort: 2 Data rate: SF7	dW125 SNR: 7.8 RSSI: -57	
↓ Downlink	↑ 14:06:11 Successfully p	rocessed data message DevAddr: 26 08 5D 72 FCr	t: 1 FPort: 2 Data rate: SF78W128 SNR: 7.8 RSSI:	-67			
2. Integrations	ψ 14:05:04 Schedule data	downlink for transmissi. Rx1 Delay: 5					
	↑ 14:05:04 Forward uplin#	data message Payload: { Bat_nV: 2874, F	irmware_Version: "100", Freq_Band: 1, Sensor_Model: 9,	, Sub_Band: 0 } 09 01 00 01 00 0B 3A	FPort: 5 Data rate: SF128W125	SNR: 9.8 RSSI: -57	
Collaborators	↑ 14:05:04 Successfully p	rocessed data message DevAddr: 26 08 50 72 FPc	rt: 6 Data rate: \$F128W126 SNR: 9.8 RSSI: -67				
Or API keys	14:04:59 Forward join-a	ccept message					

Example Payload (FPort=5):



Sensor Model: For LHT52, this value is 0x09.

🖘 14:84:57 Accept join-request

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

Frequency Band:

*0x01: EU868

Ċ.

*0x02: US915

*0x03: IN865

*0x04: AU915

*0x05: KZ865

*0x06: RU864

*0x07: AS923

*0x08: AS923-1

*0x09: AS923-2

*0x0a: AS923-3

Sub-Band: value 0x00 ~ 0x08(only for CN470, AU915,US915. Others are0x00)

BAT: shows the battery voltage for LHT52.

Ex1: 0x0B3A = 2874mV

Use can also get the Device Status uplink through the downlink command:

Downlink: 0x2301

LHTS2_TEST			A	eplications > LHTS2_TEST > End devices > IhtS2teet01 > Live data		
				lht52test01		
Cverview				ID: Ihtsztesko1		
🙏 End devices			4	↑ 11		
Live data				Overview Live data Messaging Location Payload formatters Claiming General settings		
<> Payload formatters	v	Time	Туре	Data preview Verbo	se stream 🔿 II Pause	e 📲 Clear
犬 Integrations	~	↑ 16:07:23	Forward uplink data message	Payload: { Bet_M/: 2712, Firmware_Version: "100", Free_Band: 1, Sensor_Nodel: 9, Sub_Band: 0 } 09 01 00 01 00 04 98 FPort: 5 Bata rate: SF78w125 SNR: 10 RSSI: -	36	
🏂 мотт		↑ 16:07:23	Successfully processed data message	Dev/Addr: 26 08 C1 C2 FCot: 11 FPort: 6 Data rate: SF75m126 SNR: 10 RSSI: -36		
. Utobasta		↓ 16:07:18	Schedule data downlink for transmissi.	FPort: 1 Confirmed downlink MAC payload: 00 E6 Rx1 Delay: 5		
HEDROOKS		↑ 16:07:17	Forward uplink data message	Payload: { Ext: 1, Hum_SHT: 62.8, Systimestamp: 1640851637, TempC_DS: 327.67, TempC_SHT: 22.71 } 08 0F 02 10 7F FF 01 61 _ FPort: 2 Data rate: SF7BM126 SNR: 10 RE	SSI: -37	
Storage Integration		↑ 16:07:17	Successfully processed data message	DevAddr: 26 08 C1 C2 FCnt: 10 FPort: 2 Data rate: SF78M125 SNR: 10 RSSI: -37		
AWS IoT		↓ 16:05:38	Forward downlink data message	FPort: 1 Payload: 23 00		
🚖 Azure loT Hub		↑ 16:03:17	Forward uplink data message	Payload: { Ext: 1, Hum_SHT: 52.2, Systimestamp: 1640051397, TempC_DS: 327.67, TempC_SHT: 22.76 } 08 E4 02 DA 7F FF 01 61 PPort: 2 Data rate: SM78H125 SNR: 11 RU	SSI: -41	
🏇 LoRa Cloud		↑ 16:03:17	Successfully processed data message	DevAddr: 26 08 C1 C2 FCnt: 8 FPort: 2 Data rate: 8F78w125 SNR: 11 9SSI: -41		
Collaborators		↑ 16:01:17	Forward uplink data message	Payload: { Ext: 1, Hum_SHT: 52.6, Systimestamp: 1640851277, TempC_DS: 327.67, TempC_SHT: 22.82 } 08 EA 02 0E 7F F0161_ FPort: 2 Data rate: SF7BM125 SNR: 9.8 F	NSSI: -34	
Or API keys		↑ 16:01:17	Successfully processed data message	Dew/ddr: 26 08 C1 C2 FCnt: 7 FPort: 2 Data rate: \$F78w128 SNR: 9.8 RSSI: -34		
General settings		↑ 15:59:17	Forward uplink data message	Payload: { Ext: 1, Num_SMT: 62, Systimestamp: 1640851167, TempC_DS: 327.67, TempC_SMT: 22.91 } 00 F3 02 08 7F FF 01 61 _ FFort: 2 Data rate: SF786125 SNR: 10 RSS1	[: -37	

2.4.2 Uplink FPORT=2, Real time sensor value

LHT52 will send this uplink after Device Status uplink once join LoRaWAN network successfully. And it will periodically send this uplink. Default interval is 20 minutes and <u>can be changed</u>.

	Uplink uses FPORT=2 and every	y 20 minutes send one u	plink by default.
--	-------------------------------	-------------------------	-------------------

Size(bytes)	2	2	2	1	4
Value	Temperature	Humidity	External Temperature	Ext #	Unix TimeStamp

Temperature:

The things stack	🗱 Overview 🖸 Applications 🛋 Gateways	# Organizations		2	aberong *
UHTS2_TEST		Applications > 10732_TEST > End devices > 16852888121 > Uvit data			
E Overview		ID: htts2test01			
🙏 End devices		↑7 ↓ n/a • Last activity 59 seconds ago ①			
Live data		Overview Live data Hessaging Location Payload formatters Claiming General settings			
<> Payload formatters ~	Time Type	Data preview	Verbose stream 🕥	II Pause	Clear
 ↑ Uptick ↓ Downtrik ↓ Integrations ↓ Collaboration ← APSings ♥ Generalizatings 	4 14/3763 Feasile uplies data ensage 5 14/3762 Socientially processed data ensage 5 14/3762 Feasile uplies data ensage 5 14/3762 Feasile uplies data ensage 5 14/3762 Socientially processed data wessage 6 14/3762 Feasile uplies data ensage 6 14/3762 Feasile uplies data ensage 6 14/3762 Feasile uplies data ensage	Psylamic (Set: 3, Au_DMT) SiA.4, Spetimetane: SSB80000; 7empC_DHT 2014.0) TempC_DHT 2014.0] SIG DI 2017 // RL 61	598: 9.8 251: -66 398: 9.2 251: -65 8: 7 201: -26 988: 9.8 201: -26 988: 9.8 201: -26		
	↑ 14:07:02 Forward uplink data message	Phylod: { bit: 1, Hun_567; 83.3, Systematap: 160056421, TengC_05; 327.47, TengC_587; 22.33 } 00.09 02 13 7F FD 44 FPutt 2 Data rate: SF700125	SNR: 10 R551: -59		

Example Payload (FPort=2): 08 CD 02 20 7F FF 01 61 CD 4E DD

Temperature & External Temperature:

- Example1: 0x08CD/100=22.53°C
- Example2: (0xF5C6-65536)/100=-26.18°C

If payload is: F5C6 : (F5C6 & 8000 == 1) , temp = (F5C6 - 65536)/100 =-26.18°C

(F5C6 & 8000: Judge whether the highest bit is 1, when the highest bit is 1, it is negative)

Humidity:

• Humidity: 0x0220/10=54.4%

Extension

Bytes for External Sensor:

EXT # Value	External Sensor Probe
0x01	Sensor AS-01, Temperature

2.4.3 Uplink FPORT=3, Datalog sensor value

LHT52 stores sensor value and user can retrieve these history value via downlink command. The Datalog sensor value are sent via FPORT=3.

THE THINGS STACK Community Edition	II Overvie	w 🗖 Applications 🛋 Gateways 🏛	Bit Co Cognizations A Organizations	nounity applies ⑦	2 W	uherong
LHT52_TEST		A	pplications > LHTS2_TEST > End devices > UH52testo1 > Lwe data			
Uvervlew			Ibt52test01			
🙏 End devices			↑ 18 🔟 🔹 Last activity 34 seconds ago 🛞			
Live data			Overview Live data Messaging Location Psyload formatters. Claiming General settings			
<>> Payload formatters ~	Time	Туре	Data preview Verbose:	tream 🔿 🗙	II Pause	∎ c
J. Integrations	↑ 15:37:14	Forward uplink data message	Payload: { Ext: 1, Hum_SHT: 51, Systimestamp: 1640849833, TempC_DS: 327.67, TempC_SHT: 23.49 } 09 20 01 FE 7F FF 01 61 _ FPort: 2 Data rate: SF78M125 SNR: 6.5 RSSI:	-31		
🗯 мотт	↑ 15:37:14	Successfully processed data message	DevAddr: 26 08 C3 16 FCnt: 18 FPort: 2 Data rate: SF78H125 SNR: 6.6 RSSI: -31			
* Webhooks	↑ 15:35:20	Forward uplink data message	Payload: { Status: "Data retrieved, your need to parse it by the application server" } 7F FF 08 BF 02 15 41 61 FPort: 3 Data rate: SM7BM128 SNR: 7 MSSI: -36			
Staarse lateraties	↑ 15:35:20	Successfully processed data message	DevAddr: 26 08 C3 16 FCnt: 17 FPort: 3 Data rate: SF78M125 SNR: 7 RSSI: -36			
Juliage Integration	↓ 15:35:18	Schedule data downlink for transmissi.	FPort: 1. Confirmed downlink MAC payload: A8 FD D8 24 GE C2 C8 3A Rx1 Delay: 5			
AWS IoT	↓ 15:35:18	Forward downlink data message	FPort: 1 Payload: 31 61 CD 4C 16 61 CD 63 .			
🐅 Azure loT Hub	↑ 15:35:14	Forward uplink data message	Payload: { Ext: 1, Hum_SHT: 51.6, Systimestamp: 1640849713, TempC_OS: 327.67, TempC_SHT: 23.75 } 09 47 02 03 7F FF 01 61 _ FPort: 2 Data rate: SF784126 SHR: 10 RSSI	: -37		
🌲 LoRa Cloud	↑ 15:35:14	Successfully processed data message	DevAddr: 2606 C316 FCnt: 16 FPort: 2 Data rate: SF78H125 SNR: 18 RSSI: -37			
Collaborators	↑ 15:33:15	Forward uplink data message	Payload: { Ext: 1, Hum_SHT: 62.4, Systimestamp: 1640849694, TempC_DS: 22.12, TempC_SHT: 23.68 } 09 40 02 0C 08 44 01 61 _ FPort: 2 Data rate: SF7BH125 SUR: 10.5 RSS	E: -37		
Ov API keys	↑ 15:33:15	Successfully processed data message	DevAddr: 26 08 C3 16 FCnt: 18 FPort: 2 Data rate: SF78W128 SNR: 10.6 RSSI: -37			
General settings	↑ 15:31:15	Forward uplink data message	Payload: { Ext: 1, Hum_SHT: 52, Systimestamp: 1640849474, TempC_D5: 22.18, TempC_SHT: 23.61 } 09 39 02 08 08 AA 01 61 FPort: 2 Data rate: SF78M126 SNR: 7.8 RSSI:	-37		

• Each data entry is 11 bytes, to save airtime and battery, LHT52 will send max bytes according to the current DR and Frequency bands.

For example, in US915 band, the max payload for different DR is:

- 1. DR0: max is 11 bytes so one entry of data
- 2. DR1: max is 53 bytes so devices will upload 4 entries of data (total 44 bytes)
- 3. DR2: total payload includes 11 entries of data
- 4. DR3: total payload includes 22 entries of data.

Notice: LHT52 will save 178 set of history data, If device doesn't have any data in the polling time. Device will uplink 11 bytes of 0.

See more info about the **Datalog feature**.

2.4.4 Uplink FPORT=4, DS18B20 ID

User can get external DS18B20 ID through the downlink command.

Downlink: 0x2302



Example Payload (FPort=4): 28 86 63 B2 00 00 09 F

The External DS18B20 ID is 0x28 86 63 B2 00 00 00 9F

2.4.5 Decoder in TTN V3

In LoRaWAN protocol, the uplink payload is HEX format, user need to add a payload formatter/decoder in LoRaWAN Server to get human friendly string.

In TTN , add formatter as below:

	Communit	K STACK	S Overview	Applications	🛋 Gateways	AL Organizations	EU1 Community No support plan	(2) 10
LHT52	2_TEST					Applications > UHTS2_TEST > Phyload formathers > Uplink		
Overvie	ew					Default uplink payload formatter		
🎝 End de	evices					You can use the "Phyload formatter" tab of individual end devices to test uplink payload formatters and to define individual payload formatter settings per end device.		
 Live da Payloa 	ata ad formatters					Setup		
↑ Upin	nk					Formatter type* prescript		
4 Dow	mlink					Formatter parameter		
t Integra	orators ys	v				<pre>c descine str_ma((proc) set des = %) set des = %) set des = 2 descine(%); set des = 2 descine(%); set des = 2 descine(%); set des = descine(%); }</pre>	1	
🎗 Genera	al settings					<pre>numerical interesting test, setting {</pre>		
						Sive charges		

Please check the decoder from this link: https://github.com/dragino/dragino-end-node-decoder

2.5 Show data on Datacake

Datacake IoT platform provides a human friendly interface to show the sensor data in charts, 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.

1. Add Datacake:

2. Select default key as Access Key:

3. In Datacake console (https://datacake.co/), add LHT52:

Please refer to the figure below

THE THINGS STACK	S Overview Applic	ations 🗳 Gateways	25 Organizations				EU1 Commo No SLA applica
LHT52_TEST			Applications > LHTS2_TEST > Webhooks	> Add			
Overview			Choose webhook templ	ate			
End devices Uve data Payload formatters Integrations	1				自		
MQTT Webhooks Storage Integration			Akenza Core Integrate with Akenza Core	AnyViz Visualize, monitor and analyze da	AllThingsTalk Maker Your accessible IoT Platform for ra	Blockbax Integrate with Blockbax	
 AWS lot Azure loT Hub LoRa Cloud 			Cayenne	CLOUD STUDIO	Ø	de Zem	
. Collaboratora r API keys 1 General settings			Cayenne Drag-and-Drop IoT Project Builder	Cloud Studio Integrate with Cloud Studio IoT pl	Datacake Send data to Datacake via TTI ada	deZem Integrate with the deZem data pla	
			0	in a Box-	(# Ginese		
			Homey	IoTinaBox**	MClimate	Qubitro	

Log in to DATACAKE, copy the API under the account

kazike lu 459550896@qq.com > kazike lu 1 Derices 2 Members mgtt test 0 Derices 1 Members	DATACAKE Fleet > Devices Devices	Q, treach Columns -
Add Workspace Edit Profile	LDSD2WARKSN4LU	SUM I LIVIY
Logout ©* Rules	Showing 1 to 1 of 1 results	50 per page 👻 🔤
 		
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General settings

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LDS02WA865IN-LU					
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	Particle API	D Zero	D Zero LTE PINCODE
STEP 1 Product	STEP 2 Network Server	STEP 3 Devices	STEP 4 Plan
Datacake Pro You can add dev one of the templ more) between c	pouct ices to an existing product on l ates. Products allow you to sha levices.	Datacake, create a are the same confi	new empty product or start wi guration (fields, dashboard and
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Network Server

Please choose the LoRaWAN Network Server that your devices are connected to.

	The Things Stack V3 TTN V3 / Things Industries	Uplinks	Downlinks
O THE THIN	The Things Network V2 The old Things Network	Uplinks	Downlinks
🔿 🥝 heli	um Helium	Uplinks	Downlinks
	LORIOT	Uplinks	Downlinks
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TE PINCODE
STEP 4 Plan
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kazike lu a	Ø DATACAKE					
+ Add Dashboard	Fleet > Devices		Q Search	Columns	v 🕞	Add Device
🐑 Devices	BEVICE	LOCATION				
🗎 Reports	LDS07WAB65IN-LU					
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ۻ Rules	Showing 1 to 2 of 2 results			50 per page 🔍	Previous	Next
Workspace						
Integrations White Label						
<u>itho</u> Billing						

kazike lu 😄	ØDATACAKE
42A220B3elbdd-com	Fleet > LHT52
+ Add Dashboard	LHT52
Devices	Serial Number Last update
🗟 Reports	2332124565291225 Tue Jan 04 2022 17:06:14 0Mf+0800
¹ g ¹ Galeways	12 Dushboard 11 History 11 Downlinks 🖉 Configuration 3, Debug 42, Rules 11 Permissions
24 Members	
۠ Rules	
Workspace Workspace	
E Integrations	\bigcirc
S White Label	\odot
的 Billing	This device does not have a dashboard, yet. Start by activating the edit mode using the switch in the top right.

Copy and paste the <u>TTN decoder</u> here and save

Payload Decoder			Product-wide setting
When your devices sends data, the payload will be passed to the payload decoder 1 - function Becoder (swyload, port) (2 - free for the field of t	r, alongside the event's name. The payload decoder then transforms it to measu	rements.	
Payload		Port	
Payload	console.log Output	Recognized measurements	 Try Decoder
•			

Visual widgets please read the DATACAKE documentation

HT52					
LITIJZ					
Serial Number		Last update			
532124565261235		Mon Jan 03 2022 16:50	26 GMT+0800		
Dashboard	tory III Downlinks	Configuration S	Debug 🍕 Rules	** Permission	5
TempC_SHT 4 minutes ago					
25 T					
20	****************				2022年1月3日 GMT+8 下午4:30
10					TempC_SHT: 25.06
5-					
		- temperat	41		
TempC_DS 4 minutes ago		◆ renpc.34	41		
TempC_OS 4 minutes ago		◆ renpus			
TempC_DS 4 minutes ago 200 - 150 -		• respuss			/
TempC_DS 4 minutes ago 2004 150- 100- 50-		• respects	41		/
TempC_DS 4 minutes ago 200 150 100 50 0		• respects			/
TempC_DS 4 minutes ago 200 150 50 0 08:00:00 08:30:00 09:00:	00 09:30:00 10:00:00 10:30:0	◆ Tempecar 0 11:00:00 11:30:00 12:30:00	12.30.00 13.00.00 13.30	20 14:00:00 14:30:00	1 15:00:00 15:30:00 16:00:00 18:3
TempC_DS 4 minutes ago 200- 150- 100- 50- 0- 08:00:00 08:30:00 09:00:	00 09:30:00 10:00:00 10:30:0	 ✓ TempC_SI 0 11.00.00 11:30:00 12:00:00 ✓ TempC_D 	11 12:30:00 13:00:00 13:30 S	0 1400:00 14:30:00	1 15:00:00 15:30:00 16:00:00 16:3

2.6 Datalog Feature

When user want to retrieve sensor value, he can send a poll command from the IoT platform to ask sensor to send value in the required time slot.

2.6.1 Unix TimeStamp

Unix TimeStamp shows the sampling time of uplink payload. format base on

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

Figure 10 : DeviceTimeAns payload format

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

For example: if the Unix Timestamp we got is hex 0x60137afd, we can convert it to Decimal: 1611889405. and then convert to the time: 2021 – Jan -- 29 Friday 03:03:25 (GMT)



2.6.2 Poll sensor value

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

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

For example, downlink command

31 <mark>5FC5F350</mark> 5FC6 0160 05

Is to check 2020/12/1 07:40:00 to 2020/12/1 08:40:00's data

Uplink Internal =5s, means LHT52 will send one packet every 5s. range 5~255s.

2.6.3 Datalog Uplink payload

See Uplink FPORT=3, Datalog sensor value

2.7 Alarm Mode

When device is in Alarm mode, it will check the built-in sensor temperature in a short interval. If the temperature exceeds the pre-configure range, it will send an uplink immediately.

The alarm mode can be modified by AT command or downlink, Alarm mode is disabled by default.

If you need to enable the Alarm mode, please refer to the following

Note: Alarm mode will increase the power consumption, we recommend extending the normal uplink time (20 minutes default) when enable this feature.

AT Commands for Alarm mode:

AT+WMOD=1: Enable/Disable Alarm Mode. (0:Disable, 1: Enable), need to reset the node to take effect

AT+CITEMP=1: The interval to check temperature for Alarm. (Unit: minute)

AT+ARTEMP=-40,125: Set the normal temperature range from -40°C to 125°C

Suppose you want to set the normal temperature from 15°C to 50°C, and turn on the alarm mode, and check the temperature every 2 minutes. Please refer to the following

Serial Port Utility		-		×
File Edit View Tools Help				
📄 🍋 🔚 🚥 🕂 — 🜗				
Serial Port Setting Port USB 串行设(COM3) ▼ Baudrate 115200 ▼ Data Bits 8 ▼ Parity None ▼ Stop Bits 1 ▼ Flow Type None ▼ Receive Setting ● Text ○ Hex □ Display Send □ Display Time Send Setting ● Text ○ Hex □ Loop 1000 ♀ ms	123456 Incorrect Password 123456 Correct Password AT+ARTEMP=15,50 OK AT+CITEMP=2 OK AT+CITEMP=2 OK AT+VHOD=1 Attention:Take effect after A OK ATZ Dragino LHT52 Device Image Version:v1.0 LoRaWan Stack:DR-LWS-005 Evenue on Pool EU050			^
	Frequency Band: EU868 DevEui= 70 B3 D5 7E D0 04 8E 69 Enter Password to Active AT Commands ***** UpLinkCounter= 0 ***** TX on freq 868100000 Hz at DR 5 txDone RX on freq 868100000 Hz at DR 5 rxDone			~
	ATZ		Sen	d
	ni			-
COM3 OPENED 115200 8 NONE 1	OFF Rx: 1.449 Bytes Tx: 74 Bytes			Ξ.
	+PNM= 1			
Receive Setting	AT+PWORD=123456			
Tayt Hay	AT+EXT=1			
ante Real L	AI+IUC=3000000 AT+TIMESTAMP=1641058572 2822 1 12 3 36 12			
Auto Feed Line	AT+RJTDC=20			
🗹 Display Send	AT+DDETECT-0,1440			

Send Setting ● Text ○ Hex

🗌 Display Time

Modification via downlink, Take TTN_V3 as an example(downlink commands, please refer to the downlink command set for details)

In order to ensure that the node is indeed modified by downlink, I reset the node to factory settings first.

AT+WMOD=1 AT+CITEMP=2 AT+ARTEMP=15,50 OK

Receive Setting	<pre>'*R22WTD=0 '*R22EVTD=6 '*R22EVTD=6 '*R22EVTD=6 '*R22EVTD=6 '*FCU=6 '*FCU=6 '*FCD=6 '*CFS=6 '*FVMS=6 '*DCS=6 '*PNM=1 '*PW0RD=123456 '*EXT=1 '*TDC=12080808 '*TIMESTAMP=13 1970 1 1 0 0 13 '*RJTDC=20 '*VMOD=6 '*CITEMP=1 '*ARTEMP=-40,125 '*</pre>
Time Type	Data preview Verbose stream 🕞
\checkmark 414:16:35 Schedule data downlink for transmissi	FPort: 1 Confirmed downlink MAC payload: 07 FE 92 51 2C Rx1 Delay: 5
\uparrow 14:16:35 Forward uplink data message	Payload: { Ext: 1, Hum_SHT: 60.8, Systimestamp: 1641960194, TempC_DS: 327.67, TempC_SHT: 21.62 } 08 68 01 FC 7F FF 01 61 _ FPort: 2 Data rate: SF78m125 SNR: -3 RSS
↑ 14:16:35 Successfully processed data message	DevAddr: 26 08 6A 14 FCnt: 6 FFort: 2 Data rate: SF78W125 SNR: -3 RSSI: -120
14:16:20 Console: Stream reconnected	The stream connection has been re-established
ψ 14:16:19 Forward downlink data message	FPort: 1 Payload: 47 00 0F 00 52 Set normal temperature range
14:16:15 Console: Network error	The stream connection was lost due to a network error
↓ 14:16:08 Forward downlink data message	FPort: 1 Payload: A7 00 0F 00 32
14:14:35 Fail to send webhook	Error:undefined:undefined
ψ 14:14:35 Schedule data downlink for transmissi	FPort: 1 Confirmed downlink MAC payload: P1744A Rx1 Delay: 5
↑ 14:14:35 Forward uplink data message	Payload: { Ext: 1, Hum_SHT: 61.2, Systimestamp: 1641968074, TempC_DS: 327.67, TempC_SHT: 21.47 } 08 63 02 00 7F FF 01 61_ FPort: 2 Data rate: SF78M125 SNR: -1.5 R
↑ 14:14:35 Successfully processed data message	DevAddr: 26 08 64 14 FCnt: 5 FFort: 2 Data rate: SF78W125 SNR: -1.5 RSSI: -120
ψ 14:13:09 Forward downlink data message	FPort: 1 Payload: A6 00 02
14:12:35 Fail to send webhook	Error:undefined;undefined
Ψ 14:12:35 Schedule data downlink for transmissi	FPort: 1 Confirmed downlink MAC payload: 93 FD Rx1 Delay: 5
↑ 14:12:35 Forward uplink data message	Payload: { Ext: 1, Hum_SHT: 49.9, Systimestamp: 1641967964, TempC_DS: 327.67, TempC_SHT: 21.43 } 08 6F 01 F3 7F FF 01 61 _ FPort: 2 Data zate: SF780126 SNR: 9.6 RS
↑ 14:12:35 Successfully processed data message	DevAddr: 26 08 6A 14 FCnt: 4 FPort: 2 Data rate: SF7BM125 SNR: 9.5 RSSI: -36
↓ 14:11:08 Forward downlink data message	FPort: 1 Payload: A5 01 Enable alarm mode

AT+CFG	[AI+KJIDC=28 AT+DDFTFCT=8.1448 AT+WHOD=1 AT+CITEMP=2 AT+ARTEMP=15,58 OK	
		AT+CFG	

Or use a downlink directly: AA010002000F0032 (See command info)

14:24:19	Fail to send webhook	Errorrundefined
↓ 14:24:19	Schedule data downlink for transmissi	FPort: 1 Confirmed downlink MAC payload: 08 83 73 08 30 09 05 76 Rx1 Delay: 5
个 14:24:19	Forward uplink data message	Payload: { Ext: 1, Hum SHT: 51, Systimestamp: 1641960668, TempC_DS: 327.67, TempC_SHT: 21.77 } 08 81 01 FF 7F 61 61 FPort: 2 Data rate: SF7BW125 SNR: 9.2 RSSI: -29
↑ 14:24:19	Successfully processed data message	DevAddr: 26 08 6A 14 FCnt: 9 FPort: 2 Data rate: SF7BM125 SNR: 9.2 RSSI: -29
↓ 14:22:46	Forward downlink data message	FPort: 1 Payload AA 01 00 02 00 0F 00 32
0 14:22:19	Fail to send webhook	Error:undefined

2.8 LED Indicator

The LHT52 has a triple color LED which for easy showing different stage.

In a normal working state:

- When the node is restarted, GREEN, RED and BLUE are sequentially lit.
- During OTAA Join:
 - For each Join Request uplink: the GREEN LED will blink once.
 - Once Join Successful: the GREEN LED will be solid on for 5 seconds.
- After joined, for each uplink, the **BLUE LED** or **GREEN LED** will blink once.
 - BLUE LED when external sensor is connected
 - GREEN LED when external sensor is not connected
- For each success downlink, the PURPLE LED will blink once

In AT Command Mode:

If user use console cable to send AT Command to LHT52, the RED LED will always on until:

- Power off/on LHT52
- Press reset button of LHT52.
- Send an AT Command: AT+CLPM=1

2.9 Button

Press the button LHT52 will reset and join network again.

3. Configure LHT52 via AT command or LoRaWAN downlink

Use can configure LHT52 via AT Command or LoRaWAN Downlink.

- AT Command Connection: See FAQ.
- LoRaWAN Downlink instruction for different platforms: IoT LoRaWAN Server

There are two kinds of commands to configure LHT52, they are:

General Commands:

These commands are to configure:

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

They are the same for all Dragino Devices which supports DLWS-005 LoRaWAN Stack(Note**). These commands can be found on the wiki: End Device Downlink Command

• Commands special design for LHT52

These commands are only valid for LHT52, as below:

3.1 Downlink Command Set

Command Example	Function	Response	Downlink
AT+TDC=?	View current TDC time	1200000	Default 1200000(ms)
		OK	
AT+TDC=300000	Set TDC time	ОК	0X0100012C: 01:fixed command 00012C:0X00012C=300(seconds)
ATZ	Reset node		0x04FF
AT+FDR	Restore factory settings		0X04FE
AT+CFM=?	View the current confirmation mode status	0 OK	Default 0
AT+CFM=1	Turn on confirmation mode	ОК	0x0500:close 0x0501:open 05:fixed command
AT+CHE=?	View the current sub-band select 0-7, the default is 0	0 OK	Default 0
AT+CHE=2	Set subband to 2 (CN470,US915,AU915)	Attention:Take effect after ATZ OK	0X0702: 07:fixed command 02:Select subband 2
AT+WMOD=?	View the current alarm mode status	0	Default 0

		OK	
AT+WMOD=1	Turn on alarm mode	Attention:Take effect after ATZ OK	0xA501:open 0XA500:close A5:fixed command
AT+CITEMP=?	View the current temperature detection time interval	1 OK	Default 1(min)
AT+CITEMP=2	Set the temperature detection time interval to 2min	ОК	0XA70002 A7:fixed command 0002:0X0002=2(min)
AT+NJM=?	Check the current network connection method	1 OK	Default 1
AT+NJM=0	Change the network connection method to ABP	Attention:Take effect after ATZ OK	0X2000:ABP 0x2001:OTAA 20:fixed command
AT+RPL=?	View current RPL settings	0 OK	Default 0
AT+RPL=1	set RPL=1	ОК	0x2101: 21:fixed command 01:for details, check wiki
AT+ADR=?	View current ADR status	1 OK	Default 0
AT+ADR=0	Set the ADR state to off	ОК	0x2200:close 0x2201:open 22:fixed command
AT+DR=?	View the current DR settings	ОК	
AT+DR=1	set DR to 1 It takes effect only when ADR=0	ОК	0X22000101: 00:ADR=0 01:DR=1 01:TXP=1 22:fixed command
AT+TXP=?	View the current TXP	OK	
AT+TXP=1	set TXP to 1 It takes effect only when ADR=0	ОК	0X22000101: 00:ADR=0 01:DR=1 01:TXP=1

			22:fixed command
	Upload node configuration or DS18B20 ID		0X2301:Upload node configuration 0x2302:Upload DS18B20 ID 23:fixed command
AT+DWELL=?	Check the high-rate upload settings	1 OK	Default 1
AT+DWELL=1	Set high rate upload (AS923,AU915)	Attention:Take effect after ATZ OK	0x2501:close 0x2500:open 25:fixed command for details, check wiki
AT+RJTDC=?	View current RJTDC set time	20 OK	Default 20(min)
AT+RJTDC=10	Set RJTDC time interval	ОК	0X26000A: 26:fixed command 000A:0X000A=10(min) for details, check wiki
	Retrieve stored data for a specified period of time		0X3161DE7C7061DE8A800A: 31:fixed command 61DE7C70:0X61DE7C70=2022/1/12 15:00:00 61DE8A80:0X61DE8A80=2022/1/12 16:00:00 0A:0X0A=10(second) View details 2.6.2
AT+DDETECT=?	View the current DDETECT setting status and time	0,1440 OK	Default 0,1440(min)
AT+DDETECT=1,1440	Set DDETECT setting status and time (When the node does not receive the downlink packet within the set time, it will re-enter the network)	ОК	0X320005A0:close 0X320105A0:open 32:fixed command 05A0:0X05A0=1440(min)
	Downlink Modification Alarm Mode (AT+WMOD,AT+CITEMP,AT +ARTEMP)		0XAA010002000F00032: AA:fixed command 01:0X01=1(AT+MOD) 0002:0X0002=2(AT+CITEMP) 000F:0X000F=15(AT+ARTEMP) 0032:0X0032=50(AT+ARTEMP)

3.2 Set Password

Feature: Set device password, max 9 digits.

AT Command: AT+PWORD

Command Example	Function	Response
AT+PWORD=?	Show password	123456
		ОК
AT+PWORD=999999	Set password	ОК

Downlink Command:

No downlink command for this feature.

4. Battery & How to replace

4.1 Battery Type and replace

LHT52 uses $2 \times AAA LR03(1.5v)$ batteries. If the batteries running low (shows 2.1v in the platform). User can buy generic AAA battery and replace it.

Note:

1. The LHT52 doesn't have any screw, use can use nail to open it by the middle.



2. Make sure the direction is correct when install the AAA batteries.



4.2 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.

S	DRAGINO	How to use: 1.Please do not modify t 2.After selecting the pro 3.Explanation of abbrevi	he formula in the table duct number and model, then ations:WD>Watchdog TX	select the TDC unit, and f	inally enter the TDC, yo eive	u can get the predicted	battery life			
Dattery L	Product	hattery capacity(mah)	1	1		т				
	LHT52_LoRaWAN_Temperature _Humidity_Sensor	1000		CUITTEN	San	x R X	R X			
	UNIT	TDC (Uplink Interval)	Work Mode		w Pir	1	2 W			
	min	20	EXT=1	, ₹,	D sleep 🗖		D s	leep		`
		Sleep power (mA*ms)	Sampling power (mA*ms)	TX power (mA*ms)	RX1 power (mA*ms)	RX2 power (mA*ms)	Watchdog power (mA*n	Average power (mA)	Detect power (mA*ms)	Life expectancy (yr)
EU868	DR5_SF7_125K_14dB	8400	787.31488	7367.8544	880.58488	4097.083	757.1706667	0.018567657	0	5.5
	DR4_SF8_125K_14dB	8400	787.31488	13210.2528	950.0943	4097.083	757.1706667	0.023491202	0	4.4
	DR3_SF9_125K_14dB	8400	787.31488	23652.608	1068.0336	4097.083	757.1706667	0.032284892	0	3.3
	DR2_SF10_125K_14dB	8400	787.31488	42244.125	1461.4876	4097.083	757.1706667	0.048089509	0	2.3
	DR1_SF11_125K_14dB	8400	787.31488	94013.4	2230.4828	4097.083	757.1706667	0.091803712	0	1.2
	DR0_SF12_125K_14dB	8400	787.31488	168081	4097.083	4097.083	757.1706667	0.1549162	0	0.7
US915	DR3_SF7_125K_20dB	8400	787.31488	8441.476	681.61989	1587.135	757.1706667	0.01720746	0	5.9
	DR2_SF8_125K_20dB	8400	787.31488	15170.785	913.6491	1587.135	757.1706667	0.02300594	0	4.5
	DR1_SF9_125K_20dB	8400	787.31488	27254.383	941.388	1587.135	757.1706667	0.033092867	0	3.2
	DR0_SF10_125K_20dB	8400	787.31488	48745.32	995.2243	1587.135	757.1706667	0.051032452	0	2.1

5. Sensors and Accessories

5.1 Temperature Probe (AS-01)

External Temperature Probe base on DS18B20. (note: Default Package doesn't include AS-01)

AS-01 Temperature Probe





External Temperature Probe (AS-01):

- Resolution: 0.0625 °C
- + ± 0.5 °C accuracy from -10 °C to +85 °C
- ±2°C accuracy from -55°C to +125°C
- Operating Range: -55 °C ~ 125 °C
- Cable Length: 2 meters

5.2 Program Converter (AS-02)

AS-02 is an optional accessory, it is USB Type-C converter. AS-02 provide below feature:

- 1. Access AT console of LHT52 when used with USB-TTL adapter. See this link.
- 2. Update firmware to LHT52 when used with DAP-Link adapter. See this link.

AS-02 USB Type-C Converter



6. FAQ

6.1 How to use AT Command to configure LHT52

LHT52 supports AT Command set. User can use a USB to TTL adapter plus the Program Cable to connect to LHT52 for using AT command, as below.



Connection:

- USB to TTL GND <--> Program Converter GND pin
 USB to TTL RXD <--> Program Converter D+ pin
 USB to TTL TXD <--> Program Converter A11 pin

It is also possible to connect using DAPLink



Connection:

- USB to DAP-LINK GND <--> Program Converter GND pin
 USB to DAP-LINK RXD <--> Program Converter D+ pin
 USB to DAP-LINK TXD <--> Program Converter A11 pin

In PC, User needs to set serial tool(such as putty, SecureCRT) baud rate to 115200 to access to access serial console for LHT52. The AT commands are disable by default and need to enter password (default:123456) to active it. Timeout to input AT Command is 5 min, after 5-minute, user need to input password again.

Input password and ATZ to activate LHT52,As shown below:

User Manual for LoRaWAN End Nodes - LHT52 -LoRaWAN Temperature & Humidity Sensor User Manual

Serial Port Utility		_		×
<u>File E</u> dit <u>V</u> iew <u>T</u> ools <u>H</u> el	0			
📷 💫 🔚 🔤 🕂 —				
Serial Port Setting Port Silicon(COM6) Baudrate 115200 Data Bits 8 Parity None Stop Bits 1 Flow Type None Receive Setting © Text O Hex Display Send Display Time Send Setting © Text O Hex Loop 1000 Tmms	 123456 Incorrect Password 123456 Correct Password AT2 Dragino LHT52 Device Image Version:v1.0 LoRaWan Stack:DR-LWS-005 Frequency Band: EU868 DevEui= 25 32 12 45 65 26 12 35 Enter Password to Active AT Commands ****** UpLinkCounter= 0 ***** TX on freq 868100000 Hz at DR 5 txDone RX on freq 868100000 Hz at DR 5 txDone AT on freq 867500000 Hz at DR 0 txDone RX on freq 867500000 Hz at DR 0 txDone RX on freq 867500000 Hz at DR 0 txDone ATZ 			~
			Ser	ıd
	P14			•
COM6 OPENED, 115200, 8, NON	E, 1, OFF Rx: 1,626 Bytes Tx: 23 Bytes			

6.2 AT Command and Downlink

Sending ATZ will reboot the node

Sending AT+FDR will restore the node to factory settings

Get the node's AT command setting by sending AT+CFG

Example: AT+VER=EU868 v1.0 AT+NJM=1 AT+DEUI=25 32 12 45 65 26 12 35 AT+APPEUI=25 32 12 45 65 26 32 16 AT+APPKEY=25 32 12 45 65 26 32 16 89 48 85 65 45 87 89 55 AT+DADDR=00 00 00 00 AT+NWKID=00 00 00 13 AT+ADR=1 AT+DR=5 AT+TXP=1 AT+CHS=0 AT+CLASS=A AT+CFM=0 AT+JN1DL=5000 AT+JN2DL=6000 AT+RX1DL=5000 AT+RX2DL=6000 AT+RX1WTO=24 AT+RX2WTO=6 AT+RX2FQ=869525000 AT+RX2DR=0 AT+RPL=0 AT+FCU=6 AT+FCD=0 AT+CFS=0 AT+NJS=1 AT+DCS=0 AT+PNM=1 AT+PWORD=123456 AT+EXT=1 AT+TDC=120000 AT+TIMESTAMP=1640851037 2021 12 30 7 57 17 AT+RJTDC=20 AT+DDETECT=0,1440 AT+WMOD=0 AT+CITEMP=1 AT+ARTEMP=-40,125 Send AT+PDTA=? to get the stored 174 data

Example:

User Manual for LoRaWAN End Nodes - LHT52 - LoRaWAN Temperature & Humidity Sensor User Manual

Serial Port Utility		-		×
<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>T</u> ools <u>H</u> elp				
📷 📔 🔤 🕂 — 🕨 🖬 🜌	>			
Serial Port Setting AT+PDTA=?				^
Port Silicon(COM6) 🔻				
Baudrate 115200	0F 00 01 00 00 09 5C 02 16 09 40 7F FF 01F310 3B 00 01 00 00 09 75 02 18 09 4D 7F FF 01F320			
Data Bits 8	67 00 01 00 00 09 6A 02 13 09 4D 7F FF 01F330			
Barity Nana T 61 D3 F6	93 00 01 00 00 09 68 02 0F 09 47 7F FF 01F340 RF 00 01 00 00 09 67 02 08 09 40 7F FF 01F350			
61 D3 F8	EB 00 01 00 00 09 6A 01 F5 09 47 7F FF 01F360			
Stop Bits 1 • 61 D3 FA	17 00 01 00 00 09 71 01 F3 09 40 7F FF 01F370			
Flow Type None - 61 D3 FB	43 88 81 88 88 89 87 81 F0 89 22 7F FF 81F388 6F 88 81 88 88 89 78 81 FD 89 3A 7F FF 81F398			
Receive Setting 61 D3 FD	9B 00 01 00 00 09 74 01 EE 09 3A 7F FF 01F3A0			
Text O Hex 61 D3 FE 61 D3 FF	C7 00 01 00 00 09 72 01 E5 09 40 7F FF 01F3B0 F3 88 81 88 88 89 6C 81 F9 89 3A 7F FF 81F3C8			
Auto Feed Line 61 D4 81	1F 00 01 00 00 09 6B 01 EF 09 34 7F FF 01F3D0			
61 D4 02	48 00 01 00 00 09 6C 01 F0 09 34 7F FF 01F3E0 77 00 01 00 00 00 60 01 FC 00 24 7F FF 01F3E0			
Display Time 61 D4 04	A3 00 01 00 00 09 6A 01 F6 09 34 7F FF 01F400			
61 D3 36	70 00 01 00 00 08 2A 02 AB 08 08 7F FF 01F410			
Send Setting 61 D3 37	9C 00 01 00 00 08 2A 02 AB 08 08 7F FF 01F420			~
Text O Hex AT+PDTA=?				
Loop 1000 🜩 ms			Sen	d
NT . I DI V				-
COM6 OPENED, 115200, 8, NONE, 1, OFF	Rx: 9,862 Bytes Tx: 13 Bytes			

6.3 How to upgrade the firmware?

LHT52 requires a program converter to upload images to LHT52, which is used to upload image to LHT52 for:

- · Support new features
- For bug fix
- Change LoRaWAN bands.

User can check this link for the detail of operation of firmware upgrade: Firmware Upgrade Instruction

6.4 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.

7. Order Info

7.1 Main Device

Part Number: LHT65N-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

7.2 Accessories

Note: below accessories are not include in the main device package, need to order separately.

Temperature Probe: AS-01

Program Converter: AS-02

8. Packing Info

Package Includes:

• LHT52 Temperature & Humidity Sensor x 1

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 <u>support@dragino.com</u>.

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.

