Node Location Solution Kit With TTN

Quick Start Guide V1.0

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1. Overview

This document describes how to connect to the LoRaWAN server TTN using RAK831+Pi3 gateways with RAK811 BreakBoard.

(The RAK811 TrackerBoard and RAK811 SensorNodeBoard are the same except GPS. Hereinafter referred to as BreakBoard)

Including the following :

How to register TTN account ?

How to register RAK831+Pi3 gateway in TTN ?

How to Add RAK811 BreakBoard Device to TTN Application Server ?

How to register myDevices account ?

How to import RAK811 BreakBoard data into Cayenne?

How to view data on phone via Cayenne APP ?

So let's get started !



2. Start Using

2.1 Register TTN

TTN is The Things Network, The Things Network is a proud contributor member of the LoRa Alliance, is the a LoRaWAN network solutions.

First let's open TTN home page: https://www.thethingsnetwork.org/

Then click the place pointed by the arrow. Enter register interface.



After entering the ThingParkPartner, click Try in the upper right to enter the registration interface. After filling out the information you can use Actility.

THE THINGS N E T W O R K
CREATE AN ACCOUNT Create an account for The Things Network and start exploring the world of Internet of Things with us.
USERNAME This will be your username – pick a good one because you will not be able to change it.
EMAIL ADDRESS You will occasionally receive account related emails. This email address is not public.
PASSWORD Use at least 6 characters.
Create account



2.2 Register Gateway to TTN

In this case the LoRa gateway used is a LoRaWAN network server composed of RAK831 + Ri3 + TTN. If you want to buy RAK831 + Ri3 kit please click: <u>https://www.aliexpress.com/store/2805180</u>

If you already have the RAK831 + Ri3 kit then you can check out here to learn how to connect the RAK831 + Ri3 to the TTN.

https://www.hackster.io/naresh-krish/getting-started-with-the-rak-831-lora-gateway-and-rpi3-e3351d

If you are a Chinese customer, then you can go to the official document download center to download the Chinese version of the tutorial.

http://www.rakwireless.com/cn/download/RAK831%20LoRa%20Gateway/%E8%BD%AF%E4%BB%B6%E5%BC% 80%E5%8F%91

2.3 Register your device to TTN

After successfully connecting the RAK831 + Ri3 to the TTN, your TTN gateway interface now has its own gateway, but you still need to set up your own application. So, back to the TTN application interface, click Create a new application.

Applications	
APPLICATIONS	add application
lora_button LoRa_Button	ttn-handler-eu 70 B3 D5 7E D0 00 7A C1
rak811_n_868mhz RAK811-N-868MHZ	ttn-handler-eu 70 B3 D5 7E D0 00 7D FA
rak811 n 915 RAK811-N 915	tin-handler-eu 70 83 D5 7E D0 00 7E C7

Enter the application settings interface, follow the prompts to fill in the information:

Application ID: The unique identifier of your application on the network,(When filling in this ID, capital letters and spaces can not be used)

Description: A human readable description of your new app,(Without limitation, you can fill in any description of your application)

Application EUI: This application EUI is assigned by default for TTN. Can not be manually modified.

Handler registration: Here you can default, can also be set as your own area.

After the setup is complete, click the Add application button and an application is created.

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Applications Gateways Support 💫 chace 🗸

Applications > Add Application

THETHINGS CONSOLE

Application ID The unique identifier of your application o	on the network	
rak811_breakboard		
Description A human readable description of your new	v app	
RAK811 BreakBoard		٥
	EUI issued by The Things Network	with the application sectings page.
Handler registration Select the handler you want to register thi	is application to	
ttn-handler-eu		٠

After the app is added, you need to add the devices under the Applocation, so click the Devices button.

APPLICATION OVERVIEW	Overview	Devices	Payload Formats	Integrations	Data	
APPLICATION OVERVIEW					Data	Settings
Application ID rak811_breakboard Description RAK811 BreakBoard Created 6 minutes ago Handler ttn-handler-eu (current handler)					<u>dor</u>	cumentation
APPLICATION EUIS					o n	nanage euis
↔ ≒ 70 B3 D5 7E D0 00 86 E2						
DEVICES				register device	✿ <u>man</u>	age devices



Then click Register Device.

THE N E T	THINGS WORK						Applications	Gateways	Support	A chace	~
Ap	plications	> 🥪 rak811_breakbo	ard > Devices								
					Overview	Devices	Payload Formats	Integrations	Data	Settings	
c	DEVICE	S						-	ne of the second	gister device	
			Appl	lication rak811_breakb <u>Get started</u>	oard does not hav	ve any device <u>e!</u>	s yet.				

In the device registration interface, follow the prompts to fill in the information:

Device ID: This is the unique identifier for the device in this app. The device ID will be immutable.(The ID does not support capital letters and spaces).

Device EUI: The device EUI is the unique identifier for this device on the network. You can change the EUI later.(8-byte number)

App Key: The App Key will be used to secure the communication between you device and the network.(By TTN default setting)

App EUI: Default setting.

After setting, click the register button.

			Overview	Devices	Payload Formats	Integrations	Data	Setting
REGISTER DEVICE							bulk imp	ort device
Device ID This is the unique identifier	for the device in this app. Th	e device ID will be immuta	able.					
rak811_breakboard_000	020							0
The device EUI is the uniqu 60 C5 A8 FF EE App Key The App Key will be used to	e identifier for this device on 00 00 20 9 secure the communication t	the network. You can char between you device and th	nge the EUI late	r.			08	bytes
1		this field wi	ill be generated					
App EUI								



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Device registration is successful, you can see the device is very important three parameters, Devices EUI, App EUI, App key,(If you do not see it, click on the arrow to show it).

THE THINGS CONSOLE NETWORK COMMUNITY EDITION		Applications	Gateways S	upport	A chace	
Applications > 🤘 rako11_break	coard > Devices > and rak811_breakboard_000020					
			Overview	Data	Settings	
DEVICE OVERVIEW						
Application ID	rak811_breakboard					
Device ID	ak811_breakboard_000020					
Activation Method	OTAA					
Device EUI	<> ☆ 60 C5 A8 FF EE 00 00 20 🗄					
Application EUI	<> 与 70 B3 D5 7E D0 00 86 E2 僅					
Арр Кеу	<> = 19 A1 E6 F6 77 C4 BE 5E AC DE 57 29 1F 86 8C 3B					
Status	never seen					
Frames up	reset frame counters					
Frames down						

After obtaining three parameters of Devices EUI, App EUI and App key, open the ClassA project of RAK811 BreakBoard open source code and modify these three parameters. Then compile the download process.





After the program download is complete, reset the RAK811 BreakBoard device, you can see the following information

in the serial port of the device's Micro USB interface.

••	CommUart Assistant	→ - □ ×	
COM Settings	Data receive	SAVAGE V4.2.3	
PortNum COM41 💌	RAK811 BreakBoard soft version: 1.0.2		
BaudR 115200 💌	Selected LoraWAN 1.0.2 Region: EV868		
DPaity NONE -			
DataB 8 💌	0TAA: Dev RIT: 60 C5 AS FF EE 00 00 20		
StopB 1	AppEui: 70 B3 D5 7E D0 00 86 E2		
	AppKey: 19 A1 E6 F6 77 C4 BE 5E AC DE 57 29 1F 86 8C 3B		
Close	OTAA Join Start		
- Real Orthings	[Debug]: latitude: 0.000000, longitude: 0.000000 , altitudeGp	s: -1	
Recv options			
Auto linefeed			
Show timestamp			
T Receive as hex			
Fause receive			
Save Clear			
Send Options			
🔽 Data from file			
🧮 Auto checksum			
🧮 Auto clear input			
Send as hex	$1.0\text{CD} \bullet 2.\text{RXD} \bullet 3.1\text{XD} \bullet 4.01\text{R} \bullet 5.\text{GND} \bullet 6.0\text{SR} \bullet 7.\text{RTS} \bullet$	8.CIS • 9.RI •	
Period 5000 ms		Send	
Load Clear			
🕼 Ready!	TX:0 RX:1058	B Reset //	

In the TTN interface, you can also see the device to join the request and reply.

					Overview	Data	Sottings
					Overview	Data	Settings
APPLICA	ION DATA					II paus	e 🍵 <u>clear</u>
Filters	plink downlink	activation ac	k error				
ti	me counter	port					
1 6:34	31 0	0	payload: [not provided]				
16:34	26		dev addr: 26 01 2C D0 app eui: 70 B3 D5 7E	D0 00 86 E2 dev eui: 60 C5	A8 FF EE 00 00 2	20	



2.4 Register myDevices

myDevices is an Internet of Things solutions company. They created Cayenne – the world's first drag-and drop IoT project builder. Cayenne enables engineers, makers, network operators and system integrators to quickly and easily develop and deploy IoT solutions across a wide variety of verticals.

First let's open myDevices home page: <u>https://mydevices.com/</u>

Then click the SIGN UP FREE button at the top right to start registering.

	All projects My Pi Project +	IOT IN A BOX [™] CAYEN	INE A IUT READY"	MARKETPLACE			Project (
~	O number Michaeluling () Triggers	8 Alerts					
~	Dama Baird		de O De	mo Board	ite Ø	Jemo Board	
^	Processor			femory		Storage	
	Live m h d w 1mo 3mo 6mo 1y						
	40						
	30		- ·				Diek
		mplify the	<u>Conne</u> ct	ed Worl	d TM	3.7 G	Disk B / 14.6 GB
	» 20 10	mplify the Quickly design, prot	Connect	ed Worl	d™ %	3.7G	Disk B / 14.6 GB
	30 20 10 1465753 1665754 1465754	Cuickly design, prot	e Connect otype, and commerc	ed World	d,™ %	3.7 G	Disk B / 14.6 GB
	30 28 10 10 165753 165754 165754 Dems Basel	Quickly design, prot 165735 165755 1	e Connect otype, and commerc system tests Get started	ed Worl	d TM	3.7G 2	Disk B / 14.6 GB
	30 20 Sin 10 10 10 10 10 10 10 10 10 10 10 10 10	Quickly design, prot 14575 14575 1	e Connect otype, and commerc (x5735 1 (x5735 GET STARTED	ed World	d mB NS	37G	Disk 8714.5 GB 5%
	20 20 10 14.5753 14.5754 14.5754 Dense Reset Laminosity Sensor	Quickly design, prot 14575 14375 1	e Connect otype, and commerc 45756 145755 GET STARTED	ed World	d m %	37G 2	Disk 8714.5 GB 5%
	30 28 10 10 14.5753 14.5754 14.5754 Dense Brandf Luminosity Sensor	Cuickly design, prot 16373 16373 1	e Connect otype, and commerc (45736 145736 GET STARTED	ed World	d TM	3.7 <i>G</i> 2	Disk 8/14.6 GB
	30 20 10 10 10 10 10 10 10 10 10 10 10 10 10	And Strain Strai	e Connect otype, and commerc 163750 GET STARTED	ed World	d TM	3.7G 2	Disk B/14.6 GB
	30 20 50 10 10 10 10 10 10 10 10 10 10 10 10 10	Cuickly design, prot 14373 14373 1 Market Barry Market Barry Market Barry Market Barry Market Barry Market Barry Market Barry Market Barry Market Barry	e Connect otype, and commerc (65735 (667 STARTED	ed World	d IIM S	376	Disk B / 146 GB

In accordance with the requirements, fill in the information, you can create a myDevices account.

ြ႐ို my Devices	IOT IN A BOX™	CAYENNE ^	IOT READY™	MARKETPLACE	SIGN IN	SIGN UP FREE	
-----------------	---------------	-----------	------------	-------------	---------	--------------	--

Sign Up for Cayenne

First Name	Last Name		
Email Address	Password		
I agree to the myDevices Cayenne terms.			
GET STA	RTED FREE		



2.5 Export the data to Cayenne

After registering myDevices account, log in to your account and you will see your Cayenne Dashboard. Since the device we want to add is a LoRa device, select the LoRa icon Click.

V enne Powered by myDevices			हिं 🗘 🖓 ट्रि Create App Submit Project Community Docs	≡ User Menu
Step 1: Choose a device to start a p	roject	/		
A CONTRACTOR			Cayenne API	
Raspberry Pi	Arduino	LoRa	Bring Your Own Thing	
Need One?	Need One?	What's This?	What's This?	
•••				
All Devices				I

After entering, first select the left LoRaWAN network provider, here select TheThingsNetwork. Next, select the sensor device, so choose the device: Cayenne LPP.

Cayenne Powered by myDevices	+ Create new proj					Ga Create App Submit Project Community Docs User Menu
Add new 👻	DEVICES Single Board Computers	>		Abeeway		LPP Cavenne Low Power Payload
💈 Netvox Technology Lig 💉	MicroControllers	>	A LAND	Low Power Industrial GPS Tracker	>	This device uses Cayenne LPP
💈 Netvox Technology Te 👽	Sensors	~		AcSiP EK-S76SXB		Cayenne LPP
💈 RAK Multi-Purpose Se 🗸 🗸	Actuators Extensions	č		S76S EVB in X-Bee Form Factor		DevEUI
-	LoRa (Beta)	~		AcSiP S76S	>	Activation Mode Already Registered
	Acklio		~	LoRa development board		Tracking
	Everynet			Adeunis Demonstrator	>	This device moves
	Loriot			GPS		Add device
	machineQ Objenious			Adeunis Field Test Device Temperature, Accelerometer,	>	
	OrbiWise Pixel Networks		9 9	GPS		
	Sagemcom			Adeunis Pulse Water, gas, electricity & heat meters	>	
	Senet		10-1 1			
	Stream Swisscom			Adeunis Sensors Analog Sensor	>	
Q Search Devices	The Things Network					

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You can see the need to fill in some of the parameters of the device, described in detail below:

DevEUI: The DevEUI is a unique device 64-bits identifier. This parameter can be acquire in TTN.

Activation Mode: The Default setting Already Registered.

Location: Set according to your equipment.



Finally click Add Device, the device is added successfully. Next you need to set the parameters of the TTN interface.



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Return to the TTN application interface, Click Integrations and click Add.

	Y EDITION				Applicati	ons Gatewa	ys Support	A chace	~
Applications >	rak811_brcakboard > Into	grations							
			Overview	Devices	Payload Formats	Integrations	Data Set	ttings	
INTEGRATIO	NS						G add integ	ration	
		There are no integrations for Get started	r application rak	811_brcakboa	rd.				
Then you can see the	Cayenne interfa	ce.click it.							
COMMUNIT	YEDITION				Applicati	ons Gatewa	ays Support	Chace	~
Applications > 🤤	rak811_breakboard > Inte	grations							
			Overview	Devices	Payload Formats	Integrations	Data Sc	ettings	
ADD INTEGRA	TION	/							
AllThingsTa Maker V2.5.2 AllThingsTall	k Cayenne v24.0 myDevices	Data Storage v20.1 The Things Industries BV.	YTHNG 2 YTHNG	HTTP Integration v2.5.1 The Things Industries B.V.	IFTTT Maker v2.4.0 The Thin Industrie B.V.		OpenSensors 2.5.0 he Things ndustrics B.V.		

After entering the setting interface, the Process ID can fill in any name,eg: lora_button. The Access Key is set defaylt key..then click Add Integrations. So Cayenne is added.

Applications > 😸 rak	811_brcakboard >	Integrations						
			Overview	Devices	Payload Formats	Integrations	Data	Settings
ADD INTEGRATI	ON							
	Cayenne	(v2.4.0)						
	myDevices Quickly design	, prototype and comn	mercialize IoT solutions with m	yDevices Ca	/enne			
	documentation	<u>n</u>						
Cayenne	documentation	<u>n</u>						
Cayenne Process ID The unique identifier	documentation	n process						
Process ID The unique identifier rak811_breakboard	documentation	n process						•
Process ID The unique identifier rak811_breakboard	documentation of the new integration	a process						٠
Cayenne Process ID The unique identifier rak811_breakboard Access Key The access key used for default key dences	documentation of the new integration or downlink message	n process						•
Process ID The unique identifier rak811_breakboard Access Key The access key used for default key devices	documentation of the new integration or downlink messages	a process						•
Cocycloses ID The unique Identifier rak811_breakboard Access Key The access key used for default key devices	documentation of the new integration or downlink messages	n process						•

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However, at this time, Cayenne does not recognize the data format, so you also need to set the Payload Formats. Click to enter the Payload Formats interface and select Payload Format as the Cayenne LPP.

THE THINGS CONSOLE COMMUNITY EDITION	Applications Gateways Support Octace
Applications > 😂 rak811_brcakboard > Payload Formats	
	Overview Devices Payload Formats Integrations Data Settings
PAYLOAD FORMATS	
Payload Format The payload format sent by your devices	
Cayenne LPP	٥
	Cancel save

The TTN Cayenne is set up, After waiting for the device to be positioned, you will see in the Cayenne interface as shown below:



(This is the RAK811 TrackerBoard Data information, the RAK811 SensorNodeBoard will not have GPS data.)



2.6 Watch the data on the phone

After the data has been successfully imported into the Cayenne, you can view the sensor data on your phone just by downloading the Cayenne mobile app. Mobile APP supports IOS and Android platform. If you are an Apple phone, go to the Apple Store and search for Cayenne. If you are an Android phone, go to Google Store and search for Cayenne. (If you are a Chinese user, may not be able to access these, then you may need to VPN proxy). The usage method of mobile phone APP is similar to the webpage, and will not be described in detail.

ull中国移动 令 王	18:35 Devices	@ Ø 88% = +
Netvox Technology Ter	mperature & Humidit	y Sensor >
Netvox Technology Mc	tion Detector	>
Cayenne LPP		>
Netvox Technology Lig	ht Sensor	>
RAK Multi-Purpose Se	nsor	>
Netvox Technology Wi	ndow & Door Sensor	





3. Contact information

Shanghai

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4. Revision History

Version	Date	Change	Author
V1.0	2017-11-28	First release	Chace