# Lora Calibrate Tool Operating Instruction v1.1

### **Table of Content**

1
2
3
5
5
8
11
13
15
18
20
23

# **1. LoRa Coordinator Driver Installation**

1. Users need to purchase the Netvox LoRa Coordinator, as shown in the Fig. below, and then install the Netvox LoRa Coordinator driver on your computer, as shown below.

Note: high-frequency equipment needs to be used with a high-frequency LoRa coordinator, and low-frequency equipment is used with a low-frequency LoRa coordinator.





2. After the driver is successfully installed, a com port will be automatically assigned on the computer. Open the Lora Calibrate calibration software; click the ComSet button; select the port corresponding to the LoRa coordinator and the serial transmission rate defaults to 115200 as shown in below figure, when the connection is successful, the status will show "Connected!".

ComSetForm  Com Port COM3 Baud Rate 115200 OK Cancel
ComSet

## 2. Power on and Add Devices in Network for

### Calibration

2.1 Please enter the device IEEE. Click the "Search" button to send calibration tool command to devices which are in [Engineering Test Mode].

Netvox-LORA	Calibrate		×
Input IEEE	00137A1000000238		Search
00137	A100000	)238	
SearchWaitFor annce	m device, unti	l be fou	8 nd
Status: conn	ComSet	Clear	

2.2. Please refer to the following table to operate the LoRa deviceto enter [Engineering Test Mode] for calibration. If the model is not mentioned in the form or if you have any questions, please contact customer service staff QQ: 4008917178.

	Model	Operation	Remark
1	R211	Press and hold the re-start key and power on the	
L		device at the same time.	
	R311 series		
	R312		
2	R312A	Press and hold any key and power on the device at	
2	RA02A	the same time.	
	RA02C		
	RB02I		
3	R602A	Press and hold any key and power on the device at	
5		the same time.	
4	R711	Press and hold any key and power on the device at	
4	R712	the same time.	
		Load batteries; press and hold the function key for 3	
5	R718X series	seconds to turn on. The first five seconds after	
		turning on, the device is in Engineering Test Mode.	
6	R809A	Press and hold on/off key and power on the device	
0		at the same time.	
7	RB11E	Press and hold both keys and power on the device	
		at the same time.	

Engineering Test Mode Operation:

2.3 To enter [Engineering Test Mode] :

After the device enters [Engineering Test Mode] successfully, the calibration tool will display the IEEE address code of the current device, as shown in the Fig. below:

Netvox-LORA Calibrate			
00137A1000066666			
ComSet Clear Status: connected!	.d		

# 3. LoRa Device Attribute Value Calibration

The following three examples illustrate the steps of calibration. For the calibration of other attributes, refer to the following steps, and the description will not be repeated here. After the device attribute value is successfully calibrated, power off / power on/ turn on the device to enter the normal working mode.

After the device is restored to the factory settings, the calibration value of the device will be retained. The attribute value reported after the device is connected to the network is the value after calibration.

#### 3.1 Temperature and Humidity Value Calibration

3.1.1 After selecting the IEEE code of the device, right click; in the pop-up function options, select the attribute that you need to calibrate and enter the calibration interface. For example, select the temperature and humidity attribute TempAndHum. Note:

1. If the device supports temperature and humidity values, the user selects

"Temperature" for temperature value calibration and then selects "Humidity" for humidity value calibration. This will erase the temperature calibration value when "Humidity" is selected for calibration. So when users want to calibrate the temperature and humidity values at the same time, be sure to select the "TempAndHum" item for calibration.

2. When the device only supports the temperature value, please select "Temperature" for temperature value calibration.

3. When the device only supports the humidity value, please select "Humidity" for humidity value calibration.

4. When the device supports temperature and humidity values, please select "TempAndHum" to calibrate the temperature and humidity values.

5. After the device property calibration value is restored to the factory settings, it will be retained. The attribute value reported after the network access is the value after calibration.



3.1.2 Enter the temperature and humidity value calibration interface, click the "read" button to read the temperature and humidity values currently collected by the device, as shown below:

Netvox-LORA Calibrate	X		
Input IEEE 00137A1000002F3D Search			
00137A1000002F3D			
TempAndHum	E		
temp value(°C) 20.88			
set value(°C) 0.00			
hum value(%) 50.13			
set value(%) 0.00			
read Cabibrate Cancel			
COMPACT CIAR			
Status: connected!	.d		

3.1.3 When the user thinks that the temperature and humidity values are incorrect and need to be calibrated, enter the standard temperature value in the temperature calibration input box, and enter the standard humidity value in the humidity calibration input box. For example, enter the temperature value: 30.50, enter 60.80 in humidity value and click "Calibrate" button to write the calibration values as shown below:

Netvox-LORA Calibrate	×	
Input IEEE 00137A1000002F3D Search		
00137A1000002F3D		
TempAndHum	B	
temp value(°C) 20.88 set value(°C) 30.50 		
	.cel	

3.1.4 During the calibration process, the button will become gray and unavailable. After the calibration is completed, the button color will be restored. Click the "read" button to read the temperature and humidity value after the calibration of the device.

The temperature value after reading the calibration is 30.5; the humidity value is

60.84, which is in accordance with the calibration result. After the device attribute value is successfully calibrated, power off and power on the device to enter the normal mode. As shown below:

Netvox-LORA Calibrate	×	
Input IEEE 00137A1000002F3D	Search	
00137A1000002F3D		
TempAndHum		8
		~
temp value(°C) 30.5		
set value(°C) 30.50	* *	
hum value(%) 60.84		
set value(%) 60.80		
read Cabibrate	Cancel	
Comset Clear		
Status: connected!		

#### 3.2 Sunlight Value Calibration

3.2.1 After selecting the IEEE code of the device, right click, in the pop-up function options, select the property to be calibrated and enter the calibration interface. For example, select the Sunlight property to be calibrated, as shown in the Fig. below:

Netvox-LORA Calibrate			
00137A1000006666			
001011100000	Temperature		
	Humidity		
	Light		
	SunLight		
ComSet	Clear		
Status: connected!			

3.2.2 Enter the sunshine property calibration interface, click the "read" button to get the sunlight value returned by the current sampling device, as shown in the Fig. below:

Netvox-LORA Calibrate           00137A10000066666	X
SunLight Calibrate curr value (lux): 94 read dest value (lux): 0 Cabibrate Cancel	
ComSet Clear Status: connected!	

3.2.3 When the current value returned by the device is not accurate enough compared with the value measured by the standard source, the calibration can be made. For example, if the standard source value indicates that the current sunshine value should be 5000 lux, the dest value input box should be filled in 5000. Then click on the "Calibrate" button to write the calibration value, as shown in the Fig. below:

1	Netvox-LORA Calibrate	
	00137A1000006666	
SunLi	ight Calibrate	8
	urr value (lux): 94 read est value (lux): 5000	
	ComSet Clear Status: connected!	

3.2.4 After the calibration is completed, click the "read" button again to get the return value after the calibration of the device. As the following Fig. in below, the sunshine value returned after calibration is: 4953 lux, which has been modified to the standard source close value (within the error range). Then the calibration of the sunshine attribute value is successful. After the device attribute value is successfully calibrated, power off and power on the device to enter the normal working mode.

Netvox-LORA Calibrate	B
00137A10000	06666
SunLight Calibrate	
curr value (lux):	4953 read
dest value (lux):	5000
(1411)	
Cabibrate	Cancel
ComSet	Clear
Status: connected!	
status: connected!	.::

#### 3.3 Thermocouple Temperature Value Calibration

3.3.1 Right-click the device IEEE and select "MultiThermocouple" to enter the thermocouple temperature calibration interface, as shown in the Fig. below.

Netvox-LORA Calibra	ite 📧
	Temperature Humidity Light Sunlight MultiThermocouple
Com Status: connected!	Set Clear

3.3.2 After entering the thermocouple calibration interface, firstly select the way to calibrate the thermocouple. Selects "channel1" for the first thermocouple temperature calibration. Select "channel2" for the second thermocouple temperature calibration, and so on.

To read temperature value of the selected channel, as shown below, the current temperature value of the first thermocouple returned is  $33^{\circ}$  C, when the user thinks that the collected temperature value is not accurate, for example, the standard source temperature value is 80 ° C. At this time, the dest value temperature value should be written to the standard source temperature value of 80 ° C, and then click the "Calibrate" button to write the calibration temperature value.

Netvox-LORA Calibrate	
00137A100000319	
Thermocouple Calibrate	×
channel	
1 💿 channel1 🔘 channel2 🔘 channel3 🔘 channel4	
💿 channel5 💿 channel6 💿 channel7 💿 channel8	
curr value (°C): 33 🕗 🔽 read	
dest value (℃): 80.0 3	
(4) Cabibrate Cancel	
ComSet	1
Status: connected! .:	-

3.3.3 After temperature value calibration is successfu, click the "read" button again to re-read the return value after calibration. As shown in the figure below, the read temperature value of the first channel of the thermocouple has been calibrated to the standard source temperature value  $80^{\circ}$  C and so on.

Netvox-LORA Calibrate	X
00137A10000	00319
hermocouple Calibrate	2
channel	14
🧿 channeli 🔘 channel2 🔘	channel3 🔘 channel4
🔘 channel5 🔘 channel6 🔘	channel7 🔘 channel8
curr value (°C):	80 read
dest value (℃):	80.0
Cabibrate	Cancel
ComSet	Clear
Status: connected!	

The calibration of other channels is the same. The calibration operation of other attributes is the same as the attribute calibration operation of the example. It is not repeated. After the device attribute value is successfully calibrated, power on and power off to enter normal working mode.

After the device calibration value is restored to the factory settings, it will be retained. The attribute value reported after the device is connected to the network is the value after calibration.

### 4. LoRa Low Frequency Device Frequency Point Modification

Right-click the device IEEE, right click and select "CN470Channel" to enter the frequency setting interface, as shown in the Fig. below:

Vetvox-LORA Calibrate Input IEEE 00137A10		Search
00137A10	Common	
	CN470Channel	
	Temperature	
	Humidity	
	Light	
	SunLight	
	MultiThermocouple	
	BandsConfig	
	NewDefaultChannel	
	NLPPCustomdataCon	fig
ComSe	t	
Status: connected!		

Set the interface at the frequency point, click the "Read" button, you can read the current frequency information of the device, as shown in the Fig. below:

C	N470Channel		8
	VpChannelCount: 8	×	
	VpChannelBase : 470300000		нz
	RX1ChannelBase : 500300000		нz
	RX2Channel : 500300000		нz
	Read	Set	

Input device uplink frequency point UpChannelCount, the default value is generally 8 frequency points; input the uplink starting frequency point UpChannelBase; note that the unit here is HZ; input the downlink starting frequency point RX1ChannelBase; input the downlink RX2Channel frequency point, and then click "Set" button to enter the set value. After the setting is successful, there will be an "operate success" window prompt. After the setting is successful, click the "Read" button to read the value returned after setting, as shown in the following Fig.:

Netvox-LOF	RA Cal		[
Input IEE		operate success!	Search
CN47	70Cha	确定	B
Up	Channel	Count: 8	
Մբ	Channel	Base : 472300000	нг
RX	1Channe	1Base : 502300000	нг
RX	2Channe	1 : 505300000	нг
	Re	Set	]
	c	omSet Clear	
Status: cor			

### 5. LoRa High Frequency Device Bands Modified

Note: Bands modification only supports software in the US915 and AU915 bands. After the device is successfully connected to the network, right-click and select the "BandsConfig" option to enter the Band modification interface, as shown in the Fig. below:

Netvox-LORA	Calibrate	x
Input IEEE	00137A100000082	Search
00137	CN470Channel Temperature Humidity Light SunLight MultiThermocouple	e
	BandsConfig NewDefaultChanne NLPPCustomdataC	100 B
	ComSet	
Status: conn	ected!	

After entering the Band modification interface, click the "Read" button to read the current Bands information of the return device. The default device shipment is usually band1~band8, as shown in the Fig. below:

Input I	EEE 00137A1000000	0082	Search
01	37A1000	000082	
Ba	ndsConfig		×
	🔽 bandRatel	<b>V</b> bandRate2	
	🔽 bandRate3 🔽 bandRate5	📝 bandRate4 📝 bandRate6	
	👿 bandRate7	🔽 bandRate8	
	Read	Set	
	·		
	ComSet	Clear	1.
1967.	connected!		

Note: The difference between each band is only the uplink frequency point, and the downlink frequency points are the same. Therefore, only the uplink frequency points are marked as follows:

```
US915 Band1 uplink frequency points as below:
902.3MHz, 902.5MHz, 902.7MHz, 902.9MHz, 903.1MHz, 903.3MHz, 903.5MHz,
903.7MHz
           903.0MHz(@BW500
US915 Band2 uplink frequency points as below:
903.9MHz, 904.1MHz, 904.3MHz, 904.5MHz, 904.7MHz, 904.9MHz, 905.1MHz,
905.3MHz
           904.6MHz(@BW500
US915 Band3 uplink frequency points as below:
905.5MHz, 905.7MHz, 905.9MHz, 906.1MHz, 906.3MHz, 906.5MHz, 906.7MHz,
906.9MHz
           906.2MHz(@BW500
US915 Band4 uplink frequency points as below:
907.1MHz, 907.3MHz, 907.5MHz, 907.7MHz, 907.9MHz, 908.1MHz, 908.3MHz,
908.5MHz
           907.8MHz(@BW500
US915 Band5 uplink frequency points as below:
908.7MHz, 908.9MHz, 909.1MHz, 909.3MHz, 909.5MHz, 909.7MHz, 909.9MHz,
910.1MHz 909.4MHz(@BW500
```

US915 Band6 uplink frequency points as below: 910.3MHz, 910.5MHz, 910.7MHz, 910.9MHz, 911.1MHz, 911.3MHz, 911.5MHz, 911.7MHz 911.0MHz(@BW500

US915 Band7 uplink frequency points as below: 911.9MHz, 912.1MHz, 912.3MHz, 912.5MHz, 912.7MHz, 912.9MHz, 913.1MHz, 913.3MHz 912.6MHz(@BW500

US915 Band8 uplink frequency points as below: 913.5MHz, 913.7MHz, 913.9MHz, 914.1MHz, 914.3MHz, 914.5MHz, 914.7MHz, 914.9MHz 914.2MHz(@BW500

AU915 Band1 uplink frequency points as below: 915.2MHz, 915.4MHz, 915.6MHz, 915.8MHz, 916.0MHz, 916.2MHz, 916.4MHz, 916.6MHz 915.9MHz(@BW500

AU915 Band2 uplink frequency points as below: 916.8MHz, 917.0MHz, 917.2MHz, 917.4MHz, 917.6MHz, 917.8MHz, 918.0MHz, 918.2MHz 917.5MHz(@BW500

AU915 Band3 uplink frequency points as below: 918.4MHz, 918.6MHz, 918.8MHz, 919.0MHz, 919.2MHz, 919.4MHz, 919.6MHz, 919.8MHz 919.1MHz(@BW500

AU915 Band4 uplink frequency points as below: 920.0MHz, 920.2MHz, 920.4MHz, 920.6MHz, 920.8MHz, 921.0MHz, 921.2MHz, 921.4MHz 920.7MHz(@BW500

AU915 Band5 uplink frequency points as below: 921.6MHz, 921.8MHz, 922.0MHz, 922.2MHz, 922.4MHz, 922.6MHz, 922.8MHz, 923.0MHz 922.3MHz(@BW500

AU915 Band6 uplink frequency points as below: 923.2MHz, 923.4MHz, 923.6MHz, 923.8MHz, 924.0MHz, 924.2MHz, 924.4MHz, 924.6MHz 923.9MHz(@BW500

AU915 Band7 uplink frequency points as below: 924.8MHz, 925.0MHz, 925.2MHz, 925.4MHz, 925.6MHz, 925.8MHz, 926.0MHz, 926.2MHz 925.5MHz(@BW500

AU915 Band8 uplink frequency points as below: 926.4MHz, 926.6MHz, 926.8MHz, 927.0MHz, 927.2MHz, 927.4MHz, 927.6MHz,

#### 927.8MHz 927.1MHz(@BW500

Click to select the required Band, click to remove the unwanted Band, and then click the "Set" button to write into the device. After the setting is successful, there will be an "operate success" window prompt. After the setting is successful, click the "Read" button to read information returned after setting, as shown in the Fig. below:

nput IEEE 001		Search
0137A	operate success!	
BandsCon	确定	B
	andRatel 🦳 bandRate2	
	andRate3 📝 bandRate4 andRate5 🥅 bandRate6	
<b>b</b>	andRate7 📝 bandRate8	
	Read Set	
	ComSet Clear	

#### 6. LoRa High Frequency Device Frequency Point Modification

Note: The frequency point modification only supports the software of AS923, KR920 and IN865 frequency bands.

After the device is successfully connected to the network, right click and select the "NewDefaultChannel" option to enter the frequency setting interface, as shown in the Fig. below:

Input IEEE	00137A1	Search			
0137	A10	0000082			
/0101	111	Common			
		CN470Channel			
		Temperature			
		Humidity			
		Light			
		SunLight			
		MultiThermocouple			
		BandsConfig			
		NewDefaultChannel			
		NLPPCustomdataConfig			
	ComS	et Clear			

For example, to modify the frequency of the AS923 band as an example, the AS923 band must have two frequency points by default, as follows:

#### AS923 (frequency range 920MHz~928MHz).

The default must have two frequency points: 923200000 Hz and 923400000 Hz. These two frequencies do not need to be set.

Then in the setting interface, select channel1~channel6, input the remaining 6 frequency points; click the "Set" button to complete the setting. After the setting is successful, there will be "operate success" window prompt; then click "Read" button to read information returned after setting as the Fig. below:

📝 channel1	923600000	нz	🔽 channel2	923800000	нz
📝 channel3	924000000	нz	📝 channel4	924200000	нz
📝 channel5	924400000	нz	📝 channel6	924600000	нz
📄 channel7		HZ.	channel8		нz
📄 channel9		23	channel10	)	нz
📄 channeli			channel12	2	нz
📃 channell	operate suce	cess!	channel14	í	HZ
channel1			channel16	5	нz
		确定		_	

# 7. LoRa Device CustomData Modification

Note: Different devices have different CustomData definitions. For details, please consult the software developer.

The Cus Data description of the R311A device is as follows:

The 1-2th byte: ACK (reverse write), open as: 0100, off: 0000 (factory default)

The 3-4th byte: ADR (reverse write), open to: 0100 (factory default), off: 0000

5-6th byte: resume (reverse write), save network information: 0100, do not save network information: 0000 (factory default)

7-8th byte: minimum time (reverse write), set value is hexadecimal, for example, 100E means 1 hour (factory default)

9-10th byte: maximum time (reverse write), set value is hexadecimal, for example, 100E means 1 hour (factory default)

11-16th byte: reserved

Note: "Reverse Write" means that the low byte is in the front and the high byte is after. For example, 1 hour (3600 seconds), converted to hexadecimal 0E10, here reversed, it is expressed as 100E.

After the device is successfully connected to the network, right-click and select the NLPPCustomdataConfig option to enter the Customdata modification interface, as shown in the following Fig.:

Input IEEE 00137A10	00000082	Search
00137A10	Common CN470Channel Temperature Humidity Light SunLight MultiThermocoup BandsConfig NewDefaultChann	nel
ComSe	t Clear	]

After entering the Customdata modification interface, click the "Read" button to read the current programming value of the device, as shown in the Fig. below:

Netvox-LORA Calibrate	X
Input IEEE 00137A10000718C2	Search
00137A10000718C2	
NLPPCustomData	
ACK ADR Resu Min: 900 (S) Max: 900 CustomData: 000001000008403840300160000000 Read Set	me (S)
ComSet Clear	

For example, read the factory default Customdata value of the R718CK2 device: 000001000008403840300160000000

The factory default ACK bit of the device is: off (0x0000, reverse write). ADR bit is on (0x0100, reverse write). Resume saves network bit as off (0x0000, reverse write). Mintime defaults to be 900 seconds (0x8403, reverse write). Maxtime defaults to 900 seconds (0x8403, reverse write).

To change the ACK to on, ADR to off. Save Network to On, report minimum time to 60 seconds, and maximum time to 180 seconds. Customdata settings are as follows:

Input IEEE		Search
00137	A operate success! 确定	
PPCustomData	00000001003C00B4000000000000000	et

After selecting the desired setting item, click the "Set" button to write the device. After the setting is successful, there will be "operate success" window prompt, or click the "Read" button to read the information returned after setting, as shown below:

	Netvox-LORA Calibrate	X
	Input IEEE 00137A10000718C2	Search
	00137A10000718C9	
NLP	PCustomData operate success!	•
Cu	Min:	(s)
	ComSet Clear	
	Status: connected!	.::

## 8. LoRa Device Screening Information Modification

After the device is successfully connected to the network, right click and select the "Common" option to enter the screening information setting interface, as shown in the Fig. below:

Input IEEE 00137A10	000000082 Search
00137A1(	Common
	CN470Channel
	Temperature
	Humidity
	Light
	SunLight
	MultiThermocouple
	BandsConfig
	NewDefaultChannel
	NLPPCustomdataConfig
ComSe	t

After entering the screening information setting interface, click the "Read" button to read the screening mode and screening information of the current device that is being programmed, as shown in the Fig. below:

mmon					
Join Mode	e 💿 OT.	AA 🔘	APB		
APPEUI:	00137A100	000000			
APPKEY :	5A6967426	565416C6C69	616 <b>E</b> 636530	39	
NWKSKEY :					
APPSKEY :					
DEVADDR:	_			84	51
	Rea	.d		Set	

For example, to modify the device to ABP mode, select ABP mode, enter NWSKEY, APPSKEY, DEVADDR information content, click the "Set" button to complete the setting, after the setting is successful, there will be "operate success" window prompt; then click "Read" button to read information returned after setting, as shown in the Fig. below:

mmon		00082	
Foin Mode 🔘	OTAA 💿 APB		
APPEUI: 00137A1	.0000000000		
APPKEY: 5469674	26565416C6C69616E	63653039	
WKSKEY : 5A69674	26565416C6C69616E	63653039	
APPSKEY : 5A69674	126565416C6C69616E	63653039	
DEVADDR: 1A2B3C4			_
		Set	
operate	e success!		