
LG01v2 -- LoRa Gateway User Manual

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1. Introduction

1.1 What is LG01v2

The LG01v2 is an **open-source single channel LoRa Gateway**. It lets you bridge LoRa wireless network to an IP network via **WiFi , Ethernet or Cellular Network** (via Optional 4G module). The LoRa wireless allows users to send data and reach extremely long ranges at low data rates.

LG01v2 is specially design for **peer to peer LoRa** protocol instead of LoRaWAN protocol. The LG01v2 use single channel LoRa module to minimize the deployment cost for a private p2p LoRa wireless network.

LG01v2 uses Open Source Linux system. User can modify the Linux part and develop customize software base on it. It has **1.2Ghz Quad-Core CPU** , **4GB eMMC storage** and **512MB RAM** for most application.

LG01v2 supports **remote management**. System Integrator can easy to remote monitor the gateway and maintain it.

1.2 Specifications

Hardware System:

- CPU: Quad-core Cortex-A7 1.2Ghz
- RAM: 512MB
- eMMC: 4GB

Interface:

- 10M/100M RJ45 Ports x 1
- WiFi 802.11 b/g/n

Operating Condition:

- Work Temperature: -20 ~ 65°C
- Storage Temperature: -20 ~ 65°C
- Power Input: 5V, 2A, DC

1.3 Features

- Open Source Debian system
- Managed by Web GUI, SSH via WAN or WiFi
- Remote Management
- Auto-provisioning for batch deployment and management
- LoRa Gateway
- Built-in *Node-Red* local Application server

1.4 Block Diagram

1.5 LED Indicators

LG01-V2 has totally four LEDs, They are:

Power LED: This RED LED will be solid if the device is properly powered

ETH LED: This RGB LED will blink GREEN when the ETH port is connecting

SYS LED: This RGB LED will show different colors in different states:

#SOLID GREEN: The device is alive with a LoRaWAN server connection.

#BLINKING GREEN: a) Device has internet connection but no LoRaWAN Connection. or b) Device is in booting stage, in this stage, it will BLINKING GREEN for several seconds and then with BLINKING GREEN together

#SOLID RED: Device doesn't have an Internet connection.

WIFI LED: This LED shows the WIFI interface connection status.

1.6 Button Intruction

LG01-V2 has a black toggle button, which is:

Long press 4-5s : the gateway will reload the Network and Initialize wifi configuration

LED status: ETH LED will BLINKIND BULE Until the reload is finished.

Long press more than 10s: the gateway will restore the factory settings.

LED status: ETH LED will SOLID BLUE Until the restore is finished.

2. Quick Start

The LG01-V2 supports network access via Ethernet or Wi-Fi connection and runs without a network.

In most cases, the first thing you need to do is make the LG01-v2 accessible to the network.

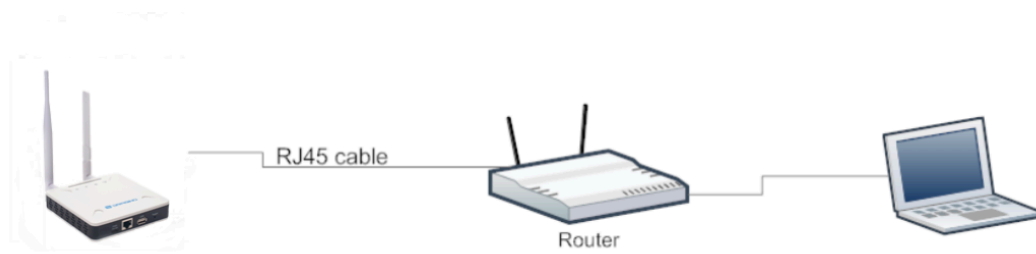
2.1 Access and Configure LG01-v2

2.1.1 Find IP address of LG01-v2

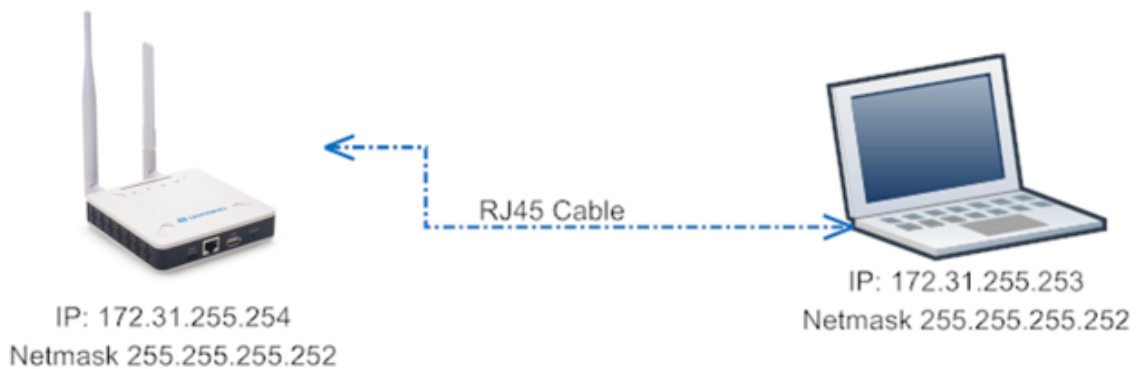
Method 1: Connect via Ethernet with DHCP IP from the router

Connect the LG01-V2 Ethernet port to your router and LG01-V2 can obtain an IP address from your router. In the router's management portal, you should be able to find what IP address the router has assigned to the LG01-V2.

You can also use this IP to connect.



Method 2: Connect via LG01v2 Fallback IP



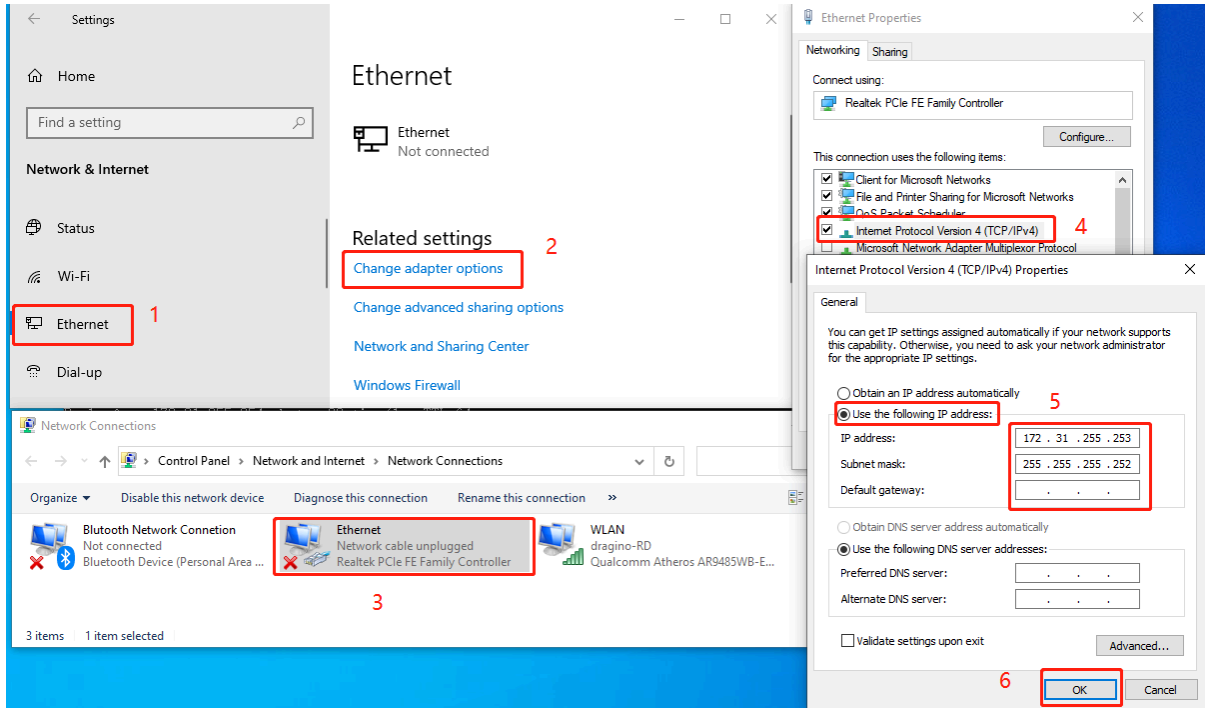
Steps to connect via fallback IP:

1. Connect the PC's Ethernet port to LG01v2's WAN port

2. Configure PC's Ethernet port has IP: 172.31.255.253 and Netmask: 255.255.255.252

Settings --> Network & Internet --> Ethernet --> Change advanced sharing options --> Double-click "Ethernet" --> Internet Protocol Version 4 (TCP/IPv4)

As in the below photo:



Configure computer Ethernet port steps video: [fallback ip.mp4](#)

If you still can't access the LG01v2 fallback ip, follow this connection to debug : [Trouble Shooting](#)

3. In the PC, use IP address 172.31.255.254 to access the LG01v2 via Web or Console.



Method 3: Connect via WiFi with DHCP IP from the router



Fill in the WiFi information by checking the box and clicking **Save&Apply**

DRAGINO Network System LogRead Home Logout

WiFi

WiFi WAN Client Settings

Enable WiFi WAN Client 1.

Host WiFi SSID WiFi Survey

Passphrase Proto Type

2.

3.

Wi-Fi configuration successful

DRAGINO Network System LogRead Home Logout

WiFi

WiFi WAN Client Settings

Enable WiFi WAN Client

Host WiFi SSID WiFi Survey

Passphrase Proto Type

[2K Device 'wlan0' successfully activated with '4965960c-3967-4f12-a3d6-a764fa9ded06']

2.1.2 Access Configure Web UI

Web Interface

Open a browser on the PC and type the LG01v2 ip address (depends on your connect method)

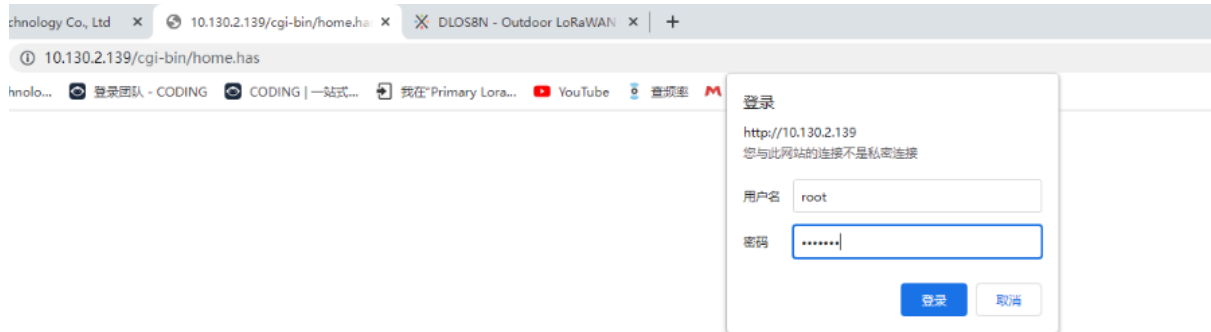
http://IP_ADDRESS or <http://172.31.255.254>(Fallback IP)

You will see the login interface of LG01v2 as shown below.

The account details for Web Login are:

User Name: root

Password: dragino



3. Web Configure Pages

3.1 Home

Shows the system running status:



3.2 Network Settings

3.2.1 Network --> WiFi

WiFi

WiFi WAN Client Settings

Enable WiFi WAN Client

Host WiFi SSID: WiFi Survey:

Passphrase: Proto Type:

3.4.2 Network --> System Status

System Status

Network / WiFi Status

```
fallback: connected (externally) to fallback
"fallback"
macvlan, DE:BD:F0:3B:27:6C, sw, mtu 1500
inet4 172.31.255.254/30
route4 172.31.255.252/30 metric 0
inet6 fe80::1c79:50ff:fec7:4656/64
route6 fe80::/64 metric 256

eth0: connecting (getting IP configuration) to Wired connection 1
"eth0"
ethernet (dwmac-sun8i), 02:81:9F:D0:D8:54, hw, mtu 1500

wlan0: disconnected
"Ralink MT7601U"
wifi (mt7601u), C4:3C:B0:DE:28:A0, hw, mtu 1500

lo: unmanaged
"lo"
loopback (unknown), 00:00:00:00:00:00, sw, mtu 65536

Use "nmcli device show" to get complete information about known devices and
"nmcli connection show" to get an overview on active connection profiles.

Consult nmcli(1) and nmcli-examples(7) manual pages for complete usage details.
fallback: connected (externally) to fallback
"fallback"
macvlan, DE:BD:F0:3B:27:6C, sw, mtu 1500
inet4 172.31.255.254/30
route4 172.31.255.252/30 metric 0
inet6 fe80::1c79:50ff:fec7:4656/64
route6 fe80::/64 metric 256

eth0: connecting (getting IP configuration) to Wired connection 1
"eth0"
ethernet (dwmac-sun8i), 02:81:9F:D0:D8:54, hw, mtu 1500
```

3.5 System

3.5.1 System --> System Overview

Shows the system info:

System Overview

Device Model: LG01-V2
Hostname: dragino-123456
FWD version:
Cellular : Not Detected
System Time: Sat May 6 03:36:55 UTC 2023
Uptime: 33 min
Load Avg: 0.25, 0.31
Memory: Free Memory: 44108 / Total Memory: 503640kB
IoT Service: lorawan
ETH0 MAC: 02:81:9f:d0:d8:54
WiFi MAC: c4:3c:b0:de:28:a0

Internet Connection OK



3.5.2 System --> Backup/Restore

Backup/Restore

Click "Generate archive" to download a tar archive of the current configuration files."

Download backup:

Generate_archive

[Download Backup File](#)

To restore configuration files, you can upload a previously generated backup archive here.

Restore backup:

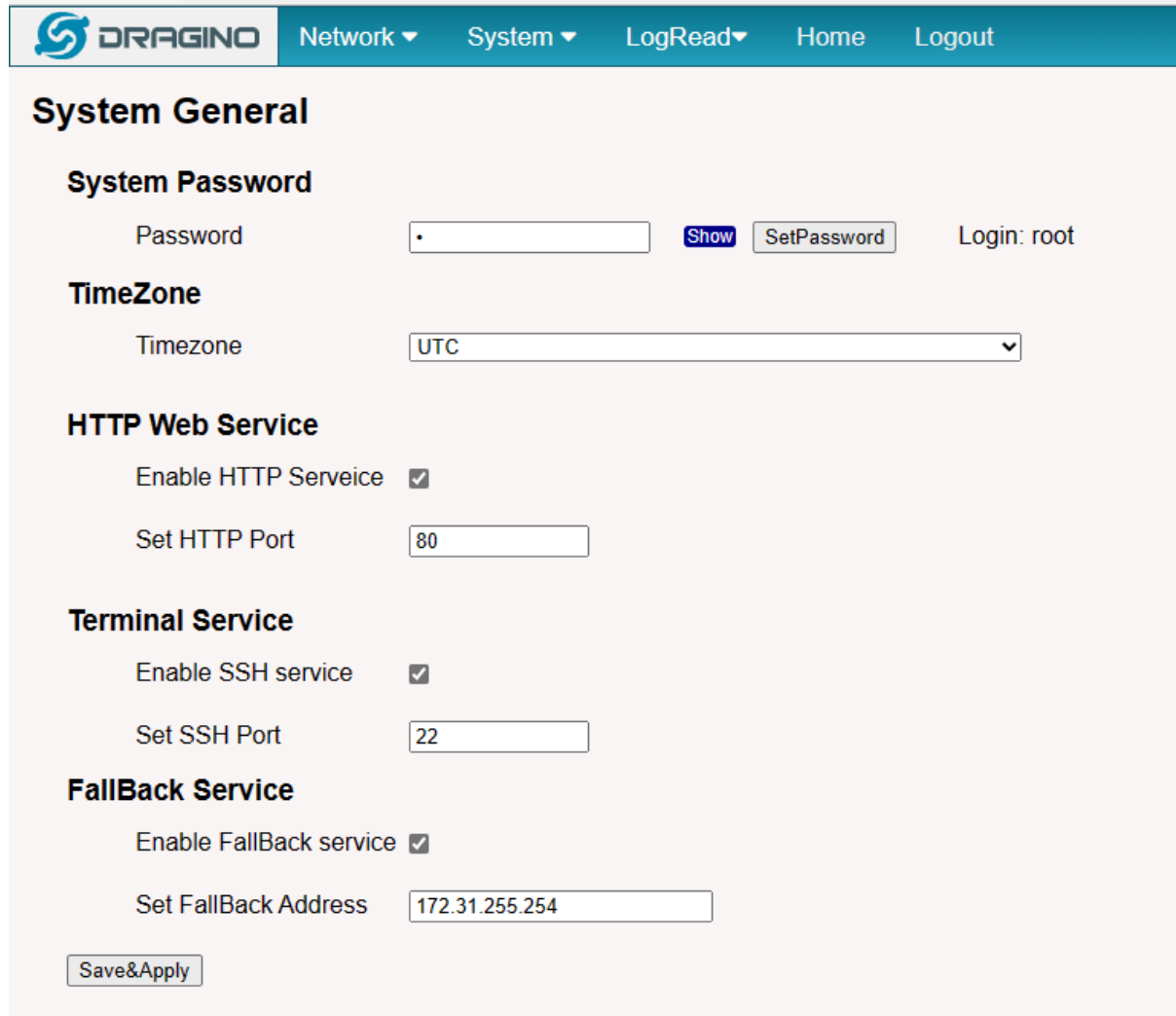
选择文件 未选择文件

Upload_archive

3.5.3 System --> System General

In the **System-> System General** interface, Users can customize the configuration System Password and set Timezone.

In addition, Users can customize the FallBack IP address.



The screenshot shows the DRAGINO System General configuration page. The navigation bar at the top includes the DRAGINO logo and menu items: Network, System, LogRead, Home, and Logout. The main content area is titled "System General" and contains several sections:


- System Password:** A password field with a "Show" button and a "SetPassword" button. The login user is "root".
- TimeZone:** A dropdown menu currently set to "UTC".
- HTTP Web Service:** A checkbox for "Enable HTTP Service" is checked. The "Set HTTP Port" is set to "80".
- Terminal Service:** A checkbox for "Enable SSH service" is checked. The "Set SSH Port" is set to "22".
- FallBack Service:** A checkbox for "Enable FallBack service" is checked. The "Set FallBack Address" is set to "172.31.255.254".


A "Save&Apply" button is located at the bottom left of the configuration area.

3.5.4 System --> Remoteit


In the **System-> Remoteit** interface, users can configure the gateway to be accessed remotely via Remote.it.

the users can refer to this link to configure them: [Monitor & Remote Access Gateway](#)

 DRAGINO Network ▾ System ▾ LogRead ▾ Home Logout

Remote.it 

1. Install Remote.it

2. Register 

Bulk ID Code / Licence Key

3. Remove

 To change registration, please Remove and Install again.

Status

Remoteit is not installed

Device is not registered

3.5.5 System --> Package Management

In the **System --> Package Management** interface, Users can check the current version of Core Packages.

Package Management

General Settings

Enable update every boot

Enable update every day midnight

SAVE

Core Packages

Name	Current Version
dragino-httpd :	2022-12-02
dragino-ui :	2023-02-12
draginofwd :	
draginoups :	2023-01-06
dragino-fallback :	23.01.05
armbian-bsp-cli-draginohp0z :	23.02.6

Manual_Update

Package Auto-Update Log

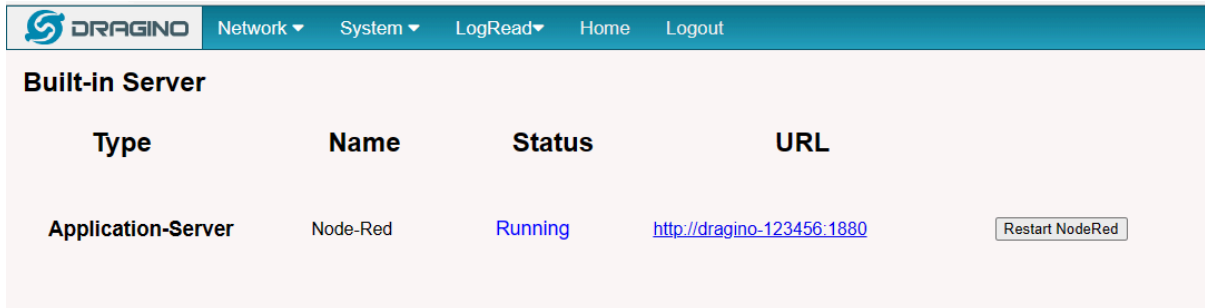
```
(Reading database ... 75%
(Reading database ... 75%
(Reading database ... 80%
(Reading database ... 85%
(Reading database ... 90%
(Reading database ... 95%
(Reading database ... 100%
(Reading database ... 37834 files and directories currently installed.)
Preparing to unpack .../dragino-ui_2023-02-08_all.deb ...
Unpacking dragino-ui (2023-02-08) over (2023-02-07) ...
Setting up dragino-ui (2023-02-08) ...
=====
2023-02-09 06:31
installed dragino-ui

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

Reading package lists...
Building dependency tree...
Reading state information...
The following packages will be upgraded:
  dragino-ui
1 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 1,781 kB of archives.
After this operation, 0 B of additional disk space will be used.
Get:1 http://repo.dragino.com jammy-lg01/main armhf dragino-ui all 2023-02-09 [1,781 kB]
debconf: unable to initialize frontend: Dialog
debconf: (TERM is not set, so the dialog frontend is not usable.)
debconf: falling back to frontend: Readline
debconf: unable to initialize frontend: Readline
debconf: (This frontend requires a controlling tty.)
debconf: falling back to frontend: Teletype
```


4. Build in Server

The default factory version of LG01-V2 is installed with the built-in Applicant server: **Node-Red**



The screenshot shows the DRAGINO web interface. At the top, there is a navigation bar with the DRAGINO logo and menu items: Network, System, LogRead, Home, and Logout. Below the navigation bar, the page title is "Built-in Server". The main content area contains a table with the following columns: Type, Name, Status, and URL. There is also a "Restart NodeRed" button next to the URL.

Type	Name	Status	URL
Application-Server	Node-Red	Running	http://dragino-123456:1880

Note:

Path: System --> Built-in Server

Troubleshooting:

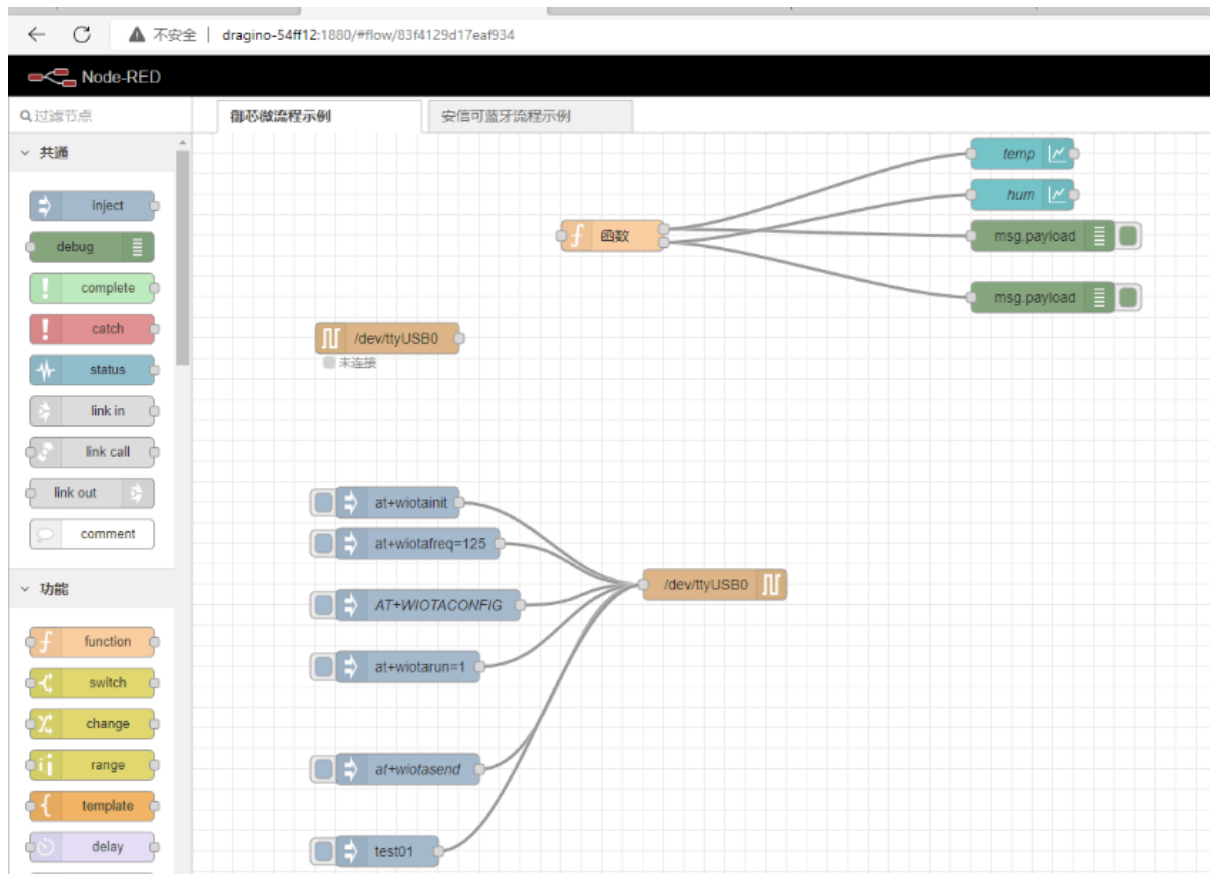
1. URL does not jump properly

For the Node-Red, you can use the local IP address and the port is 1880 to access it.

4.1 Application Server -- Node-Red

You can access the gateway's built-in AS server of **Node-Red** via the URL (<http://<hostname>:1880> or <http://<local-IPV4-address>>) in your browser.

Such as <http://dragino-54ff12:1880> or <http://<Local-IPV4-Address>>



5. How to configure the Lora Gateway

5.1 Configure and Debug LoRa wireless of LG01v2

First, the user needs to access the Linux console of LG01v2 via ssh

IP address: [IP address of LG01v2](#)

Port: [22](#)

User Name: [root](#)

Password: [dragino\(default\)](#)

```

10.130.2.24 x
Welcome to Armbian 23.02.6 Jammy with Linux 5.15.43-draginohp0z
System load: 34%      Up time: 21 min
Memory usage: 44% of 491M    Zram usage: 28% of 245M    IP: 172.18.0.1 172.17.0.1 10.130.2.24 172.31.255.254
CPU temp: 54°C      Usage of /: 96% of 3.5G
root@dragino-240057:~#

```

Users can access the Lora configuration page by running the following command, then select the option **"serial port setup"**:

```
root@dragino-2406ef:~# minicom -s
```

```

10.130.2.138 x
+-----[configuration]-----+
|  Filenames and paths          |
|  File transfer protocols      |
|  Serial port setup          |
|  Modem and dialing           |
|  Screen and keyboard         |
|  Save setup as df1           |
|  Save setup as..             |
|  Exit                         |
|  Exit from Minicom           |
+-----+

```

And then, change the setting:

Serial Device : /dev/ttyUSB0

Bps/Par/Bits : 9600 8N1

Note: Enter the corresponding letter to change the configuration, like A,B,C

A terminal window with a title bar showing a green checkmark, the IP address '10.130.2.138', and a close button. The terminal content is enclosed in a dashed box and lists the following configuration options:

```
A - Serial Device      : /dev/ttyUSB0
B - Lockfile Location  : /var/lock
C - Callin Program    :
D - Callout Program   :
E - Bps/Par/Bits      : 9600 8N1
F - Hardware Flow Control : No
G - Software Flow Control : No
H - RS485 Enable      : No
I - RS485 Rts On Send : No
J - RS485 Rts After Send : No
K - RS485 Rx During Tx : No
L - RS485 Terminate Bus : No
M - RS485 Delay Rts Before: 0
N - RS485 Delay Rts After : 0

Change which setting?
```

Enter **AT+CFG** in the interface to get the configuration,

AT+FRE=868.100,868.100	---> TX and RX frequency
AT+GROUPMOD=0,0	---> TX and RX group
AT+BW=0,0	---> TX and RX Bandwidth
AT+SF=12,12	---> TX and RX Spreading Factor
AT+POWER=14	---> TX Power Range
AT+CRC=1,1	---> TX and RX CRC Type
AT+HEADER=0,0	---> TX and RX Header Type
AT+CR=1,1	---> TX and RX Coding Rate
AT+IQ=0,0	---> TX and RX InvertIQ
AT+PREAMBLE=8,8	---> TX and RX Preamble Length
AT+SYNCWORD=0	---> Syncword(0: private, 1: public)
AT+RXMOD=65535,0	---> Rx Timeout and Reply mode
AT+RXDAFORM=1	

5.2 Example: LG01v2

5.2.1 Introduce for the example:



In this example, there are two devices:

- **LA66 Shield + UNO + DHT11**: The UNO will get the temperature and humidity and broadcast the value via LoRa protocol.
- **LG01v2**: LG01v2 is set to listening the LoRa Channel which LA66 is broadcasting. When LG01v2 get the data from LA66, LG01v2 will plot the data in built-in IoT server.

5.2.2 Set Up LA66 Shield + UNO

Set up LA66 Module

LA66 Module is loaded with the firmware [LA66 Peer-to-Peer firmware](#) and user can use AT Command to set up LA66 with below parameters:

LA66 Shield as Sender:

LA66 Shield configuration:

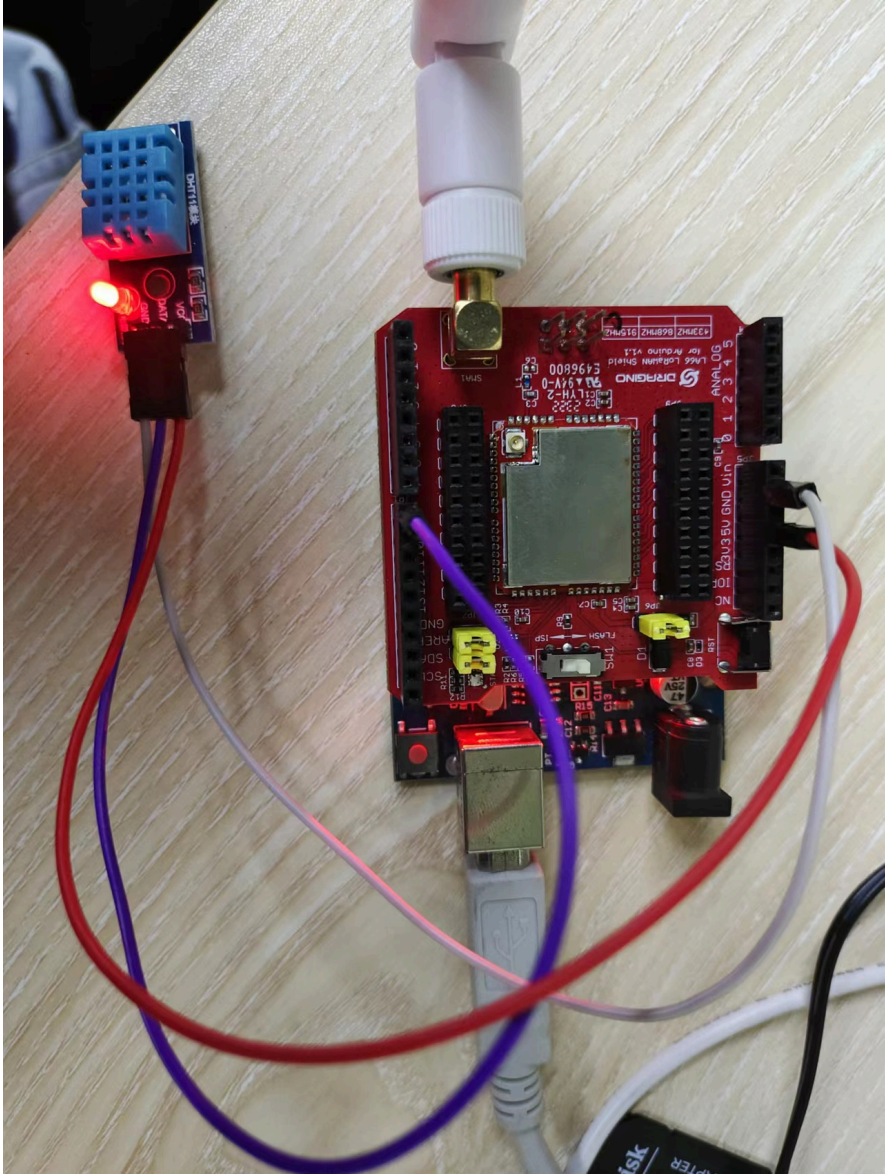
AT+FRE=868.100,868.100	---> TX and RX frequency set: 868100000
AT+BW=0,0	---> TX and RX Bandwidth set: 125kHz
AT+SF=12,12	---> TX and RX Spreading Factor set: SF12
AT+POWER=14	---> TX Power Range set: 14dBm
AT+CRC=1,1	---> TX and RX CRC Type
AT+HEADER=0,0	---> TX and RX Header Type
AT+CR=1,1	---> TX and RX Coding Rate
AT+IQ=0,0	---> TX and RX InvertIQ
AT+PREAMBLE=8,8	---> TX and RX Preamble Length set: 8
AT+SYNCWORD=0	---> Syncwo(0: private, 1: public)
AT+RXMOD=6,0	---> Rx Timeout and Reply mode

Set up Arduino UNO

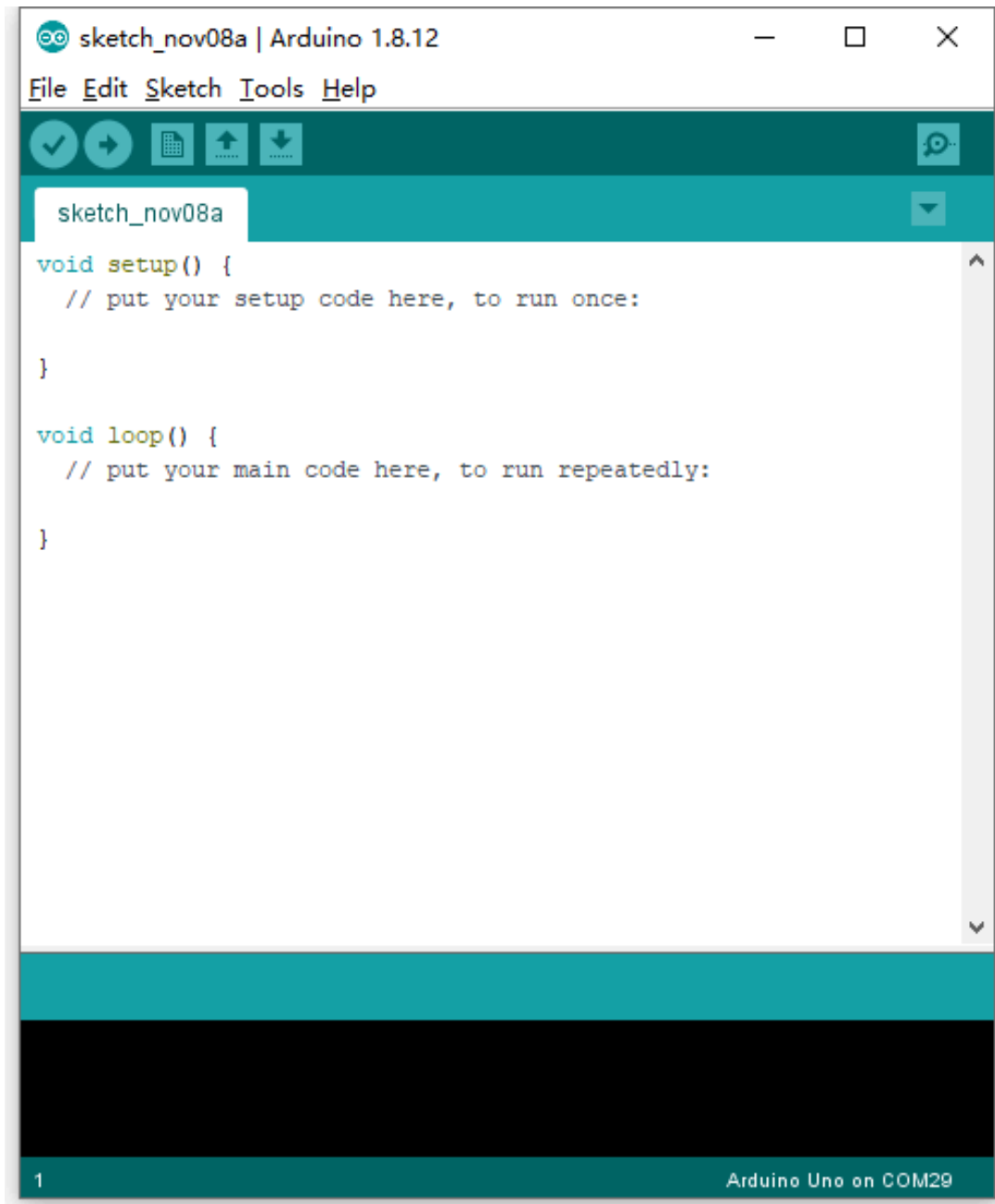
Hardware Connection

The DHT11 sensor connects to the LA66 Shield:

VCC <---> 3.3V (Red line)
 DATA <---> PIN8 (Purple line)
 GND <---> GND (White line)



1. Open Arduino IDE



2. Open project

Users can download Arduino files from this link: [Log-Temperature-Sensor-and-send-data-to-Node-red.ino](#)

Then click Compile and Upload to LA66 Shield,

The screenshot shows the Arduino IDE interface. The title bar reads "Log-Temperature-Sensor-and-send-data-to-TTN | Arduino 1.8.12". The menu bar includes "File", "Edit", "Sketch", "Tools", and "Help". The toolbar contains icons for "Run" (a play button), "Verify" (a checkmark), "New" (a document), "Open" (an upward arrow), and "Save" (a downward arrow). The "Run" icon is highlighted with a red box. Below the toolbar, the sketch name "Log-Temperature-Sensor-and-send-data-to-TTN" is displayed. The main editor area contains the following C++ code:

```
#include <SoftwareSerial.h>
#include <Adafruit_Sensor.h>
#include <DHT.h>
#include <DHT_U.h>
/*
*/

#define DHTPIN 8 // Digital pin connected to the DHT sensor
#define DHTTYPE DHT11 // DHT 11
DHT_Unified dht(DHTPIN, DHTTYPE);

String inputString = ""; // a String to hold incoming data
bool stringComplete = false; // whether the string is complete

long old_time=millis();
long new_time;

long uplink_interval=30000; //ms

float DHT11_temp;
float DHT11_hum;

SoftwareSerial ss(10, 11); // Arduino RX, TX ,

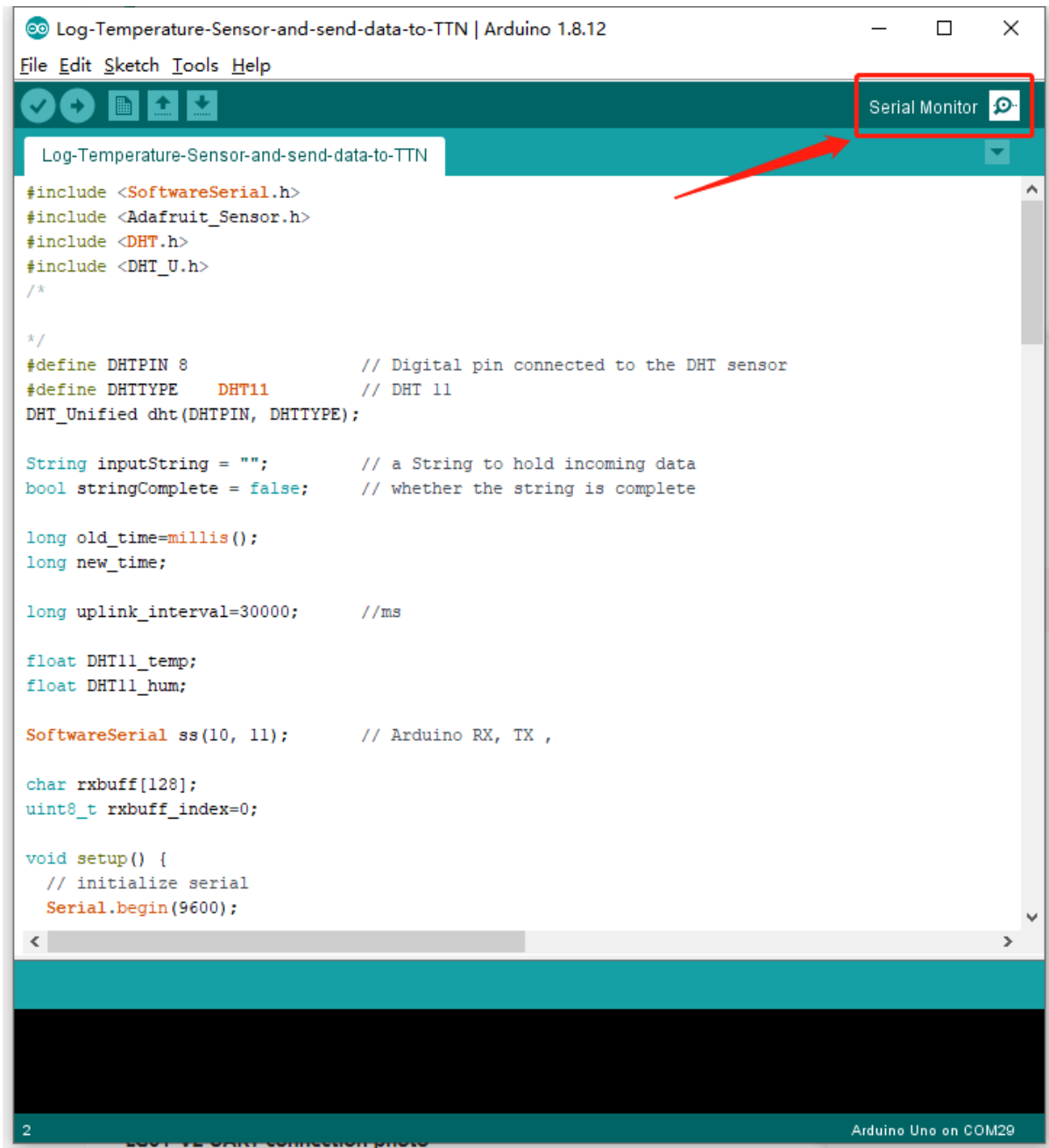
char rxbuff[128];
uint8_t rxbuff_index=0;

void setup() {
  // initialize serial
  Serial.begin(9600);

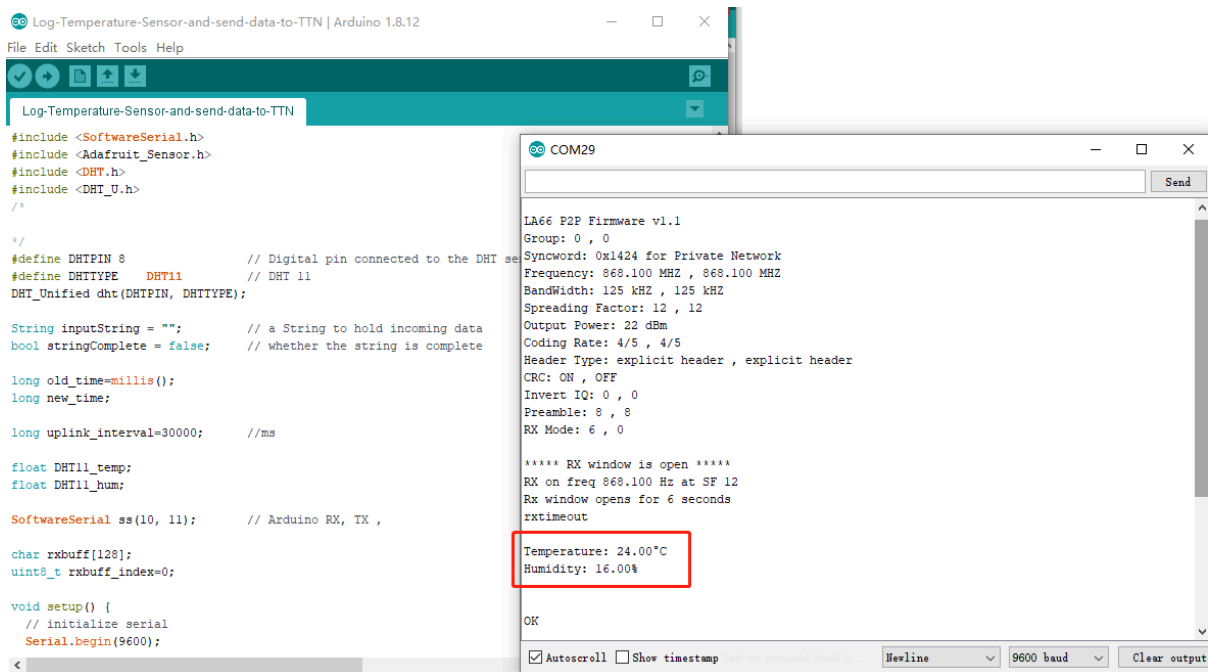
  ss.begin(9600);
```

3. Open the Serial Monitor to check the LA66 Shield data

The UNO will now reads the temperature and humidity data from the sensor and broadcast it via LoRa wireless,



Sending out data as below.



5.2.3 Set Up LG01v2

Configure LG01v2 LoRa channel parameters so it can get data from LA66 Shield

LG01v2 as Receiver: (configured as AT+RXMOD=65535,2)

LG01-V2 configuration:

AT+FRE=868.100,868.100	---> TX and RX frequency set: 868100000
AT+BW=0,0	---> TX and RX Bandwidth set: 125kHz
AT+SF=12,12	---> TX and RX Spreading Factor set: SF12
AT+POWER=14	---> TX Power Range set: 14dBm
AT+CRC=1,1	---> TX and RX CRC Type
AT+HEADER=0,0	---> TX and RX Header Type
AT+CR=1,1	---> TX and RX Coding Rate
AT+IQ=0,0	---> TX and RX InvertIQ
AT+PREAMBLE=8,8	---> TX and RX Preamble Length set: 8
AT+SYNCWORD=0	---> Syncword: 0: private, 1: public
AT+RXMOD=65535,2	---> Rx Timeout and Reply mode, RX window always open

0:No ACK, 1:Reply mode, 2:Send an ACK once got a message from another device. ACK Content is 0x00 FF)

5.2.4 Test result

After the above configuration is complete, users can send test simulation data to check whether the configuration is correct, In LA66 sheild serial console send:(**AT+SEND=1,hello world,2,3**).

When LG01v2 replies with ACK when it receives a packet sent by LA66 sheild.

```
COM29
AT+SEND=1,hello world,2,3
***** UpLinkCounter= 44 *****
TX on freq 868.100 Hz at SF 12
txDone
RX on freq 868.100 Hz at SF 12
Rx window opens for 6 seconds
rxDone
Data: (HEX:) 00 ff
Receive ACK
Rssi= -51
OK
***** UpLinkCounter= 45 *****
TX on freq 868.100 Hz at SF 12
txDone
RX on freq 868.100 Hz at SF 12
Rx window opens for 6 seconds
rxDone
Data: (HEX:) 00 ff
Receive ACK
```

In the real-time log of LG01v2:

✓ 10.130.2.138 x

```
welcome to minicom 2.8

OPTIONS: I18n
Port /dev/ttyUSB0, 08:40:09

Press CTRL-A Z for help on special keys

ssi= -45
Send ACK

***** UpLinkCounter= 46 *****
TX on freq 868.100 Hz at SF 12
txDone
RX on freq 868.100 Hz at SF 12
Rx window is receiving

rxDone
Data: (HEX:) 68 65 6c 6c 6f 20 77 6f 72 6c 64

Rssi= -45
Send ACK

***** UpLinkCounter= 47 *****
TX on freq 868.100 Hz at SF 12
txDone
RX on freq 868.100 Hz at SF 12
Rx window is receiving

rxDone
Data: (HEX:) 68 65 6c 6c 6f 20 77 6f 72 6c 64

Rssi= -44 ASCII : hello world
Send ACK

***** UpLinkCounter= 48 *****
TX on freq 868.100 Hz at SF 12
txDone
RX on freq 868.100 Hz at SF 12
Rx window is receiving
```

5.2.5 Plot data chart in LG01v2

User can plot the temperature and humidity chat via LG01v2 built-in IoT server.

User can import this example in Node-Red: [Log-Temperature-Sensor-and-send-data-to-Node-red.json](#)

The screenshot shows a Node-RED workspace titled "serial USB". The main flow consists of the following nodes and connections:

- A `/dev/ttyUSB0` node (connected) feeds into a `function 1` node.
- The `function 1` node outputs to three nodes: `Temperature`, `Humidity`, and `RSSI`.
- A `debug 1` node is connected to the output of the `function 1` node.
- A separate flow starts with an `AT+SEND=1,hello world,0,3` node, followed by `ATZ`, `AT+FRE`, `AT+BW`, `AT+SF`, `AT+RXMOD`, and `AT+SYNCWORD` nodes.
- All these AT command nodes feed into a `/dev/ttyUSB0` node (connected).

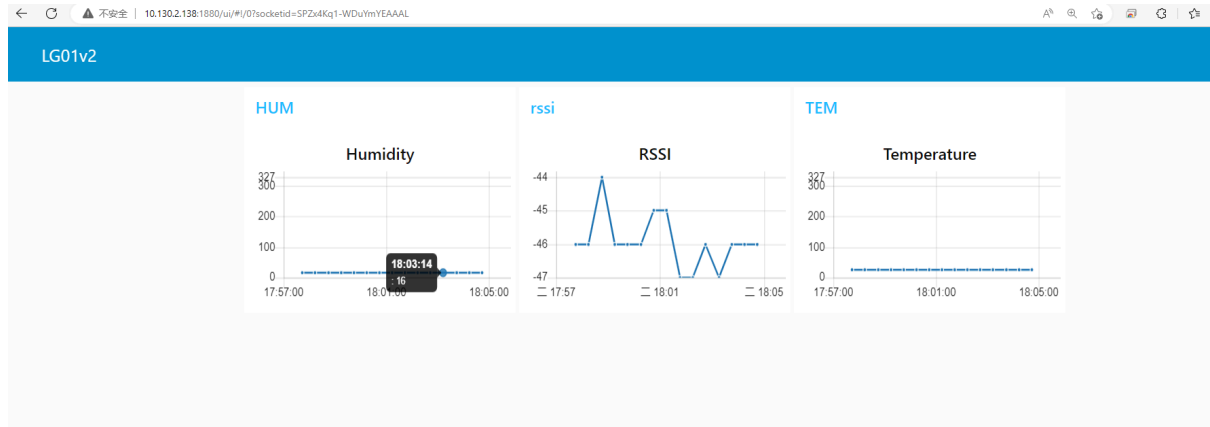
A context menu is open over the `Import` option, showing various actions like `Edit`, `View`, `Arrange`, `Import`, `Export`, `Search flows`, `Configuration nodes`, `Flows`, `Subflows`, `Groups`, `Manage palette`, `Settings`, `Keyboard shortcuts`, and `Node-RED website`.

The console on the right shows the following log entries:

```
2022/11/8 18:02:50 node: debug 1
msg.payload: string[33]
"
TX on freq 868.100 Hz at SF 12"
2022/11/8 18:02:50 node: debug 1
msg.payload: string[8]
"txDone"
2022/11/8 18:02:50 node: debug 1
```

The temperature and humidity chart is displayed in the built-in node-red UI

Browser input: <http://<local-IPV4-address>>



6. How users can access LG01v2 using serial USB

USB TTL to LG01v2 Connection:

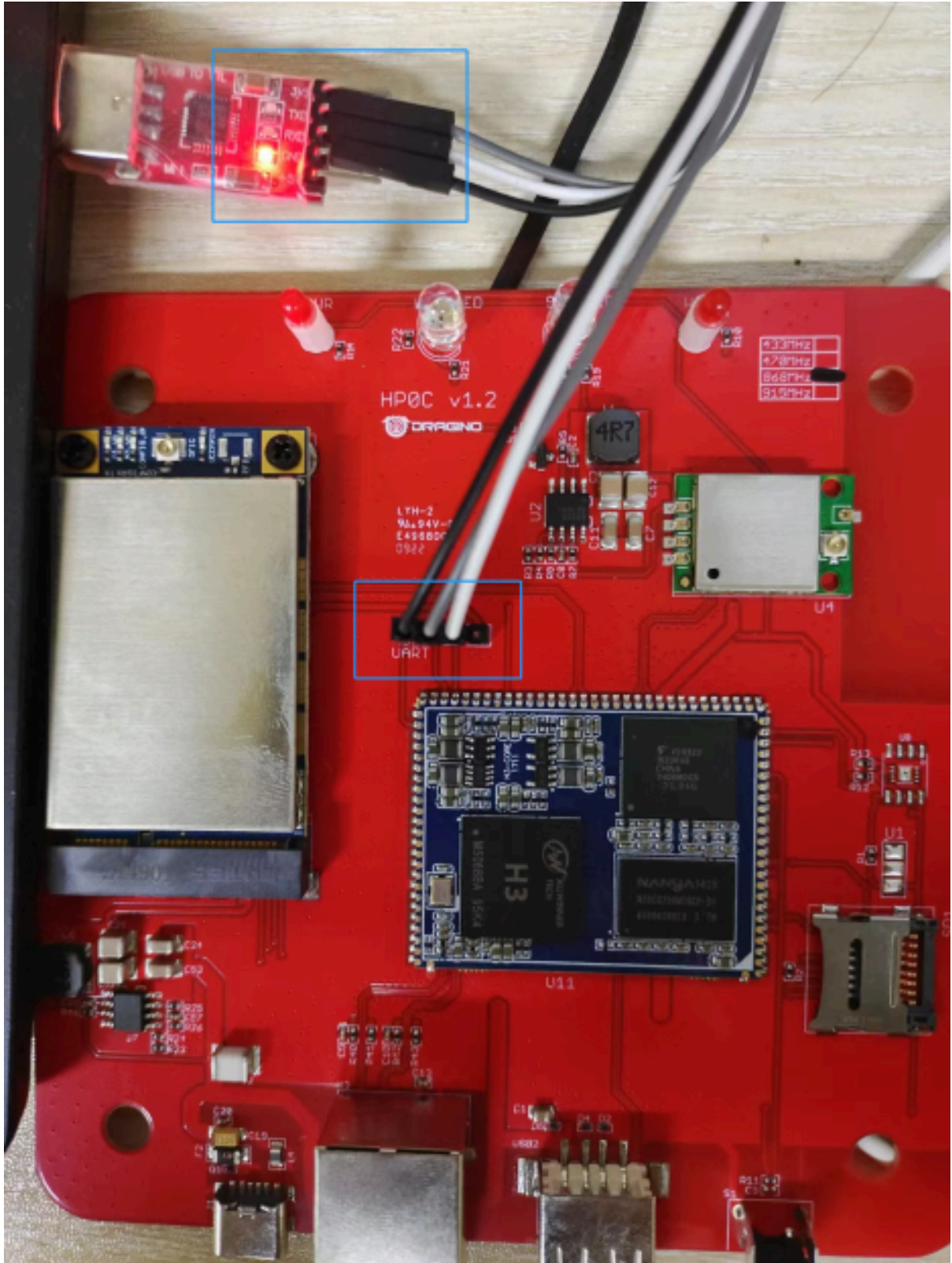
Port 1 of the UART on the LG01v2 is GND

TXD <---> UART RXD (Gray line)

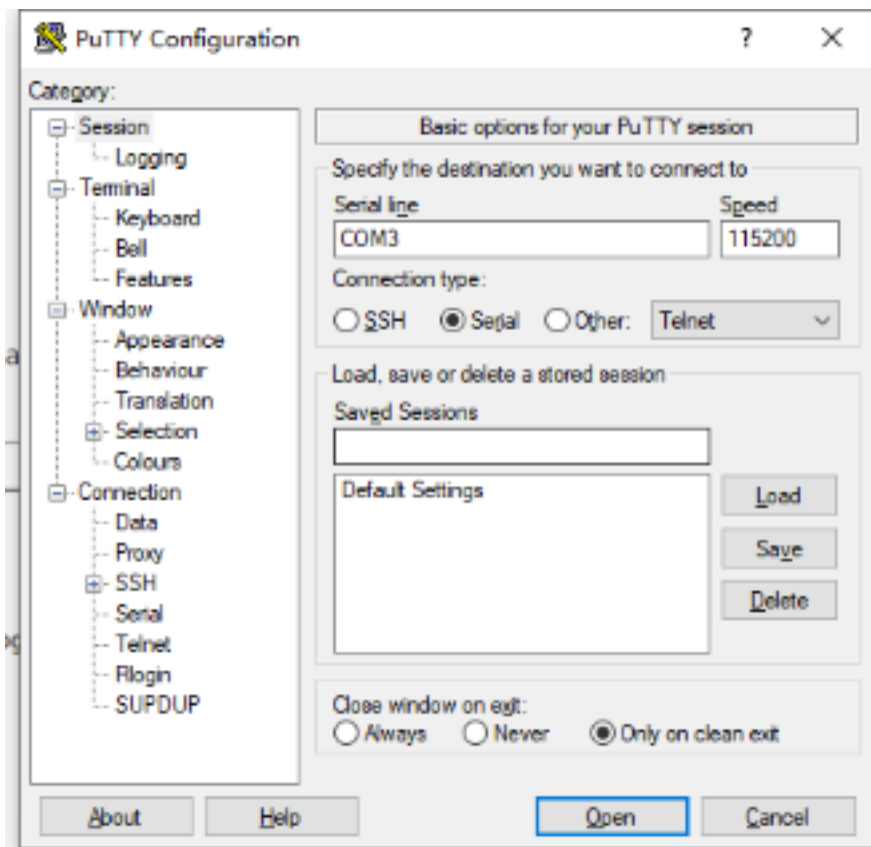
RXD <---> UART TXD (White line)

GND <---> GND (Black line)

LG01v2 UART connection photo



In the PC, you can use the serial port tool (such as [putty](#) in Windows), you need to set the serial baud rate to **115200** to access the serial console for LG01v2. LG01v2 will output system info once power on as below:




```
root@dragino-240059:~#
U-Boot SPL 2021.10-armbian (Jul 07 2022 - 04:27:17 +0000)
DRAM: 512 MiB
Trying to boot from MMC2

U-Boot 2021.10-armbian (Jul 07 2022 - 04:27:17 +0000) Allwinner Technology
CPU: Allwinner H3 (SUN8I 1680)
Model: Dragino HotsPot Zero
DRAM: 512 MiB
MMC: mmc@1c0f000: 0, mmc@1c10000: 2, mmc@1c11000: 1
Loading Environment from FAT... Unable to use mmc 1:1... In: serial
Out: serial
Err: serial
Net: phy interface0
eth0: ethernet@1c30000
Card did not respond to voltage select! : -110
Couldn't find partition mmc 0
Card did not respond to voltage select! : -110
Couldn't find partition mmc 0
starting USB...
Bus usb@1c1a000: USB EHCI 1.00
Bus usb@1c1a400: USB OHCI 1.0
Bus usb@1c1b000: USB EHCI 1.00
Bus usb@1c1b400: USB OHCI 1.0
Bus usb@1c1c000: USB EHCI 1.00
Bus usb@1c1c400: USB OHCI 1.0
Bus usb@1c1d000: USB EHCI 1.00
Bus usb@1c1d400: USB OHCI 1.0
scanning bus usb@1c1a000 for devices... 1 USB Device(s) found
scanning bus usb@1c1a400 for devices... 1 USB Device(s) found
scanning bus usb@1c1b000 for devices... 1 USB Device(s) found
scanning bus usb@1c1b400 for devices... 1 USB Device(s) found
scanning bus usb@1c1c000 for devices... 1 USB Device(s) found
scanning bus usb@1c1c400 for devices... 1 USB Device(s) found
scanning bus usb@1c1d000 for devices... 2 USB Device(s) found
scanning bus usb@1c1d400 for devices... 1 USB Device(s) found
scanning usb for storage devices... 0 Storage Device(s) found
Autoboot in 1 seconds, press <Space> to stop
switch to partitions #0, OK
mmc1(part 0) is current device
Scanning mmc 1:1...
Found U-Boot script /boot/boot.scr
3772 bytes read in 1 ms (3.6 MiB/s)
## Executing script at 43100000
U-boot loaded from eMMC or secondary SD
Card did not respond to voltage select! : -110
Boot script loaded from mmc
202 bytes read in 1 ms (197.3 KiB/s)
11639090 bytes read in 249 ms (44.6 MiB/s)
7829384 bytes read in 167 ms (44.7 MiB/s)
found valid kernel configuration
```

7. OTA System Update

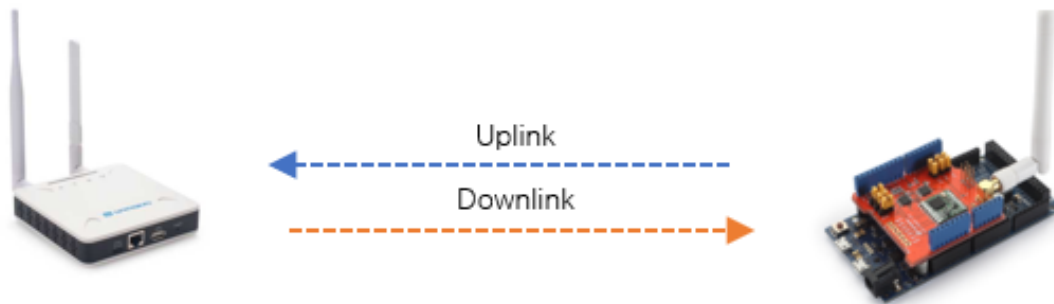
LG01v2 supports system auto update via OTA, please see [this URL](#) for the detail of this feature.

8. FAQ

8.1 How does LG01v2 communicate with Lora shield (LoRa.h)

This example describes how to use LG01v2, LoRa Shield to set up a LoRa network,

LG01-V2 communicate with Lora shield (LoRa.h):



Prerequisites: The configurations of LG01v2 and Lora shield must match

LG01v2 configuration:

AT+FRE=868.100,868.100	---> TX and RX frequency set: 868100000
AT+BW=0,0	---> TX and RX Bandwidth set: 125kHz
AT+SF=12,12	---> TX and RX Spreading Factor set: SF12
AT+POWER=14	---> TX Power Range
AT+CRC=1,1	---> TX and RX CRC Type
AT+HEADER=0,0	---> TX and RX Header Type
AT+CR=1,1	---> TX and RX Coding Rate
AT+IQ=0,0	---> TX and RX InvertIQ
AT+PREAMBLE=8,8	---> TX and RX Preamble Length set: 8
AT+SYNCWORD=0	---> Syncword(0: private, 1: public), the corresponding Lora shield
syncword is 0x12	
AT+RXMOD=65535,0	---> Rx Timeout and Reply mode,RX window always open
AT+RXDAFORM=1	

Lora shield configuration:

Lora Shield example: [LoRa_Shield_Sketch_For_MQTT.ino](#) , [arduino-LoRa-master.zip](#)

LoRa_Shield_Sketch_For_MQTT

```
unsigned int count = 1;
unsigned long new_time,old_time=0;

void setup()
{
  Serial.begin(9600);
  while (!Serial);
  Serial.println(F("Start MQTT Example"));
  if (!LoRa.begin(868100000)) //868000000 is frequency
  {
    Serial.println("Starting LoRa failed!");
    while (1);
  }
  // Setup Spreading Factor (6 ~ 12)
  LoRa.setSpreadingFactor(12);

  // Setup BandWidth, option: 7800,10400,15600,20800,31250,41700,62500,125000,250000,500000
  //Lower BandWidth for longer distance.
  LoRa.setSignalBandwidth(125000);

  // Setup Coding Rate:5(4/5),6(4/6),7(4/7),8(4/8)
  LoRa.setCodingRate4(5);
  LoRa.setSyncWord(0x12);
  void disableCrc();
  LoRa.disableInvertIQ();
  LoRa.explicitHeaderMode();
  Serial.println("LoRa init succeeded.");
  LoRa.onReceive(onReceive);
  LoRa.receive();
}

void dhtTem()
{
  tem = random(15,40);
}
```

Test LG01v2 to receive Lora Shield data:

```

rxDone
Data: (String: ) tem=22.0&hum=49.0

Rssi= -22

rxDone
Data: (String: ) tem=38.0&hum=58.0

Rssi= -23

rxDone
Data: (String: ) tem=20.0&hum=72.0

Rssi= -22

```

LG01v2 received date

```

COM33

Start MQTT Example
LoRa init succeeded.
***** COUNT=1 *****
The temperature and humidity:
[22.00°C,49.00%]
Packet Sent
***** COUNT=2 *****
The temperature and humidity:
[38.00°C,58.00%]
Packet Sent
***** COUNT=3 *****
The temperature and humidity:
[20.00°C,72.00%]
Packet Sent

```

Lora Shield send data

Test the LG01v2 to send data:

```

OK

**** UpLinkCounter= 0 ****
TX on freq 868.100 Hz at SF 12
txDone
RX on freq 868.100 Hz at SF 12
Rx window is receiving

OK

**** UpLinkCounter= 1 ****
TX on freq 868.100 Hz at SF 12
txDone
RX on freq 868.100 Hz at SF 12
Rx window is receiving

```

LG01v2 send date

```
AT+SEND=1,hello world,0,3
```

```

COM33

***** COUNT=7 *****
The temperature and humidity:
[32.00°C,42.00%]
Packet Sent
***** COUNT=8 *****
The temperature and humidity:
[27.00°C,63.00%]
Packet Sent
***** COUNT=9 *****
The temperature and humidity:
[17.00°C,49.00%]
Packet Sent
***** COUNT=10 *****
The temperature and humidity:
[30.00°C,52.00%]
Packet Sent
***** COUNT=11 *****
The temperature and humidity:
[18.00°C,49.00%]
Packet Sent
***** COUNT=12 *****
The temperature and humidity:
[24.00°C,77.00%]
Packet Sent
***** COUNT=13 *****
The temperature and humidity:
[25.00°C,53.00%]
Packet Sent
***** COUNT=14 *****
The temperature and humidity:
[39.00°C,78.00%]
Packet Sent
Received packet : hello world
Received packet : 123456

```

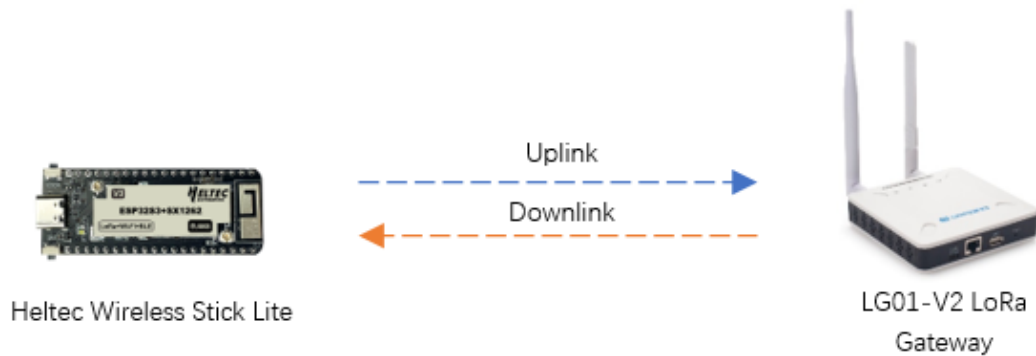
Lora Shield received date

发送

8.2 How does LG01v2 communicate with Heltec LoRa Node

This example describes how to use LG01v2 and Heltec LoRa Node to set up a LoRa network,

LG01-V2 communicate with Heltec LoRa Node:



Prerequisites: The configurations of LG01v2 and Lora shield must match

LG01v2 configuration:

AT+FRE=868.100,868.100	---> TX and RX frequency set: 868100000
AT+BW=0,0	---> TX and RX Bandwidth set: 125kHz
AT+SF=12,12	---> TX and RX Spreading Factor set: SF12
AT+POWER=14	---> TX Power Range
AT+CRC=1,1	---> TX and RX CRC Type
AT+HEADER=0,0	---> TX and RX Header Type
AT+CR=1,1	---> TX and RX Coding Rate
AT+IQ=0,0	---> TX and RX InvertIQ
AT+PREAMBLE=8,8	---> TX and RX Preamble Length set: 8
AT+SYNCWORD=0	---> Syncwo(0: private, 1: public), the corresponding Lora shield
syncword is 0x12	
AT+RXMOD=65535,0	---> Rx Timeout and Reply mode,RX window always open
AT+RXDAFORM=1	---> RX data format(0: Hex ,1: String)

After we upload the sketch to Heltec LoRa Node, we can see below output from Arduino.

Lora Shield example: [LoRa_send_trial.ino](#)

```
LoRa_send_trial | Arduino 1.8.12
文件 编辑 项目 工具 帮助

LoRa_send_trial
#include "LoRaWAN_APP.h"
#include "Arduino.h"

#define RF_FREQUENCY          868100000 // Hz
#define TX_OUTPUT_POWER      5          // dBm
#define LORA_BANDWIDTH       0          // [0: 125 kHz,
// 1: 250 kHz,
// 2: 500 kHz,
// 3: Reserved]
#define LORA_SPREADING_FACTOR 12        // [SF7..SF12]
#define LORA_CODINGRATE      1          // [1: 4/5,
// 2: 4/6,
// 3: 4/7,
// 4: 4/8]
#define LORA_PREAMBLE_LENGTH 8          // Same for Tx and Rx
#define LORA_SYMBOL_TIMEOUT  0          // Symbols
#define LORA_FIX_LENGTH_PAYLOAD_ON false
#define LORA_IQ_INVERSION_ON  false

#define RX_TIMEOUT_VALUE     1000

找到无效库在 D:\uno\Arduino\libraries\usb-ttl: no headers files (.h) found in D:\uno\Arduino\lib
找到无效库在 D:\uno\Arduino\libraries\WiFi_Kit_series-master: no headers files (.h) found in D:

<
50

COM3
<GW01>tem_a=23.0shum_a=66.0
TX done.....
9.51
The temperature and humidity:
[36.00°C,72.00%]
<GW01>tem_a=36.0shum_a=72.0
TX done.....
9.52
The temperature and humidity:
[31.00°C,43.00%]
<GW01>tem_a=31.0shum_a=43.0
TX done.....
9.53
The temperature and humidity:
[24.00°C,45.00%]
<GW01>tem_a=24.0shum_a=45.0
TX done.....
9.54
The temperature and humidity:
[23.00°C,68.00%]
<GW01>tem_a=23.0shum_a=68.0
TX done.....
9.55
The temperature and humidity:
[22.00°C,63.00%]
<GW01>tem_a=22.0shum_a=63.0
TX done.....
9.56
The temperature and humidity:
[39.00°C,55.00%]
<GW01>tem_a=39.0shum_a=55.0
TX done.....

 自动滚屏  Show timestamp
```

And we can see the logread of gateway as below, means the packet arrive gateway:

✓ 10.130.2.139 x

Welcome to minicom 2.8

OPTIONS: I18n

Port /dev/ttyUSB0, 07:06:16

Press CTRL-A Z for help on special keys

rxDone

Data: (String:) <Gw01>tem_a=17.0&hum_a=65.0

Rssi= -90

rxDone

Data: (String:) <Gw01>tem_a=35.0&hum_a=56.0

Rssi= -90

rxDone

Data: (String:) <Gw01>tem_a=25.0&hum_a=43.0

Rssi= -88

rxDone

Data: (String:) <Gw01>tem_a=31.0&hum_a=47.0

Rssi= -93

rxDone

Data: (String:) <Gw01>tem_a=16.0&hum_a=43.0

Rssi= -91

■

CTRL-A Z for help | 9600 8N1 | NOR | Minicom 2.8 | vt102 | offline | ttyUSB0

8.3 How does LG01v2 communicate with LoRaWAN node

This example describes how to use LG01v2 and LSN50 to set up a network,

In this case, users need to set LSN50 to work in ABP mode and transmit in only one frequency.

Assume we have a LG01v2 working in the frequency 868100000 now, below is the steps.

Step1: Configure the LG01v2

AT+FRE=868.100,868.100	---> TX and RX frequency set: 868100000
AT+BW=0,0	---> TX and RX Bandwidth set: 125kHz
AT+SF=12,12	---> TX and RX Spreading Factor set: SF12
AT+SYNCWORD=1	---> Syncword(0: private, 1: public), the corresponding Lora shield
syncword is 0x12	

Step2: Run AT commands to make the LSN50 work in Single frequency and ABP mode. Below are the AT commands:

AT+FDR	---> Reset Parameters to Factory Default, Keys Reserve
AT+NJM=0	---> Set to ABP mode
AT+ADR=0	---> Set the Adaptive Data Rate Off
AT+DR=0	---> Set Data Rate (Set AT+DR=3 for 915 band)
AT+TDC=300000	---> Set transmit interval to 5 minutes
AT+CHS=868100000	---> Set transmit frequency to 868.1Mhz
AT+DADDR=FFFFFF111	---> Set Device Address to 26 01 1A F1
ATZ	---> Reset MCU

Step3: Check result

User can plot the temperature and humidity chat via LG01v2 built-in IoT server.

User can import this example in Node-Red: [LG01v2_LSN50v2_S31.json](#)

First the user needs to fill in the NwkSkey and AppSkey in the LoraWan Packet Decrypter node.

The screenshot displays the Node-RED web interface. The workspace contains a flow for 'LoraWAN Decrypt' with the following nodes: `/dev/ttyUSB0`, `修改 2 张规则`, `debug 2`, `hex to base64`, `FFFFF111`, `debug 3`, and `function 4`. The `FFFFF111` node is highlighted with a red box.

The configuration panel for the `编辑 LoraWan Packet Decrypter 节点` (Edit LoraWAN Packet Decrypter Node) is visible on the right. It contains the following fields:

- Name: FFFFF111
- Network Secret Key: CCFEEEEEEEEEEEEEEEEEEEEEEAA
- Application Secret Key: FFFFFFFEEEEEEEEEEEEEEEEEECC

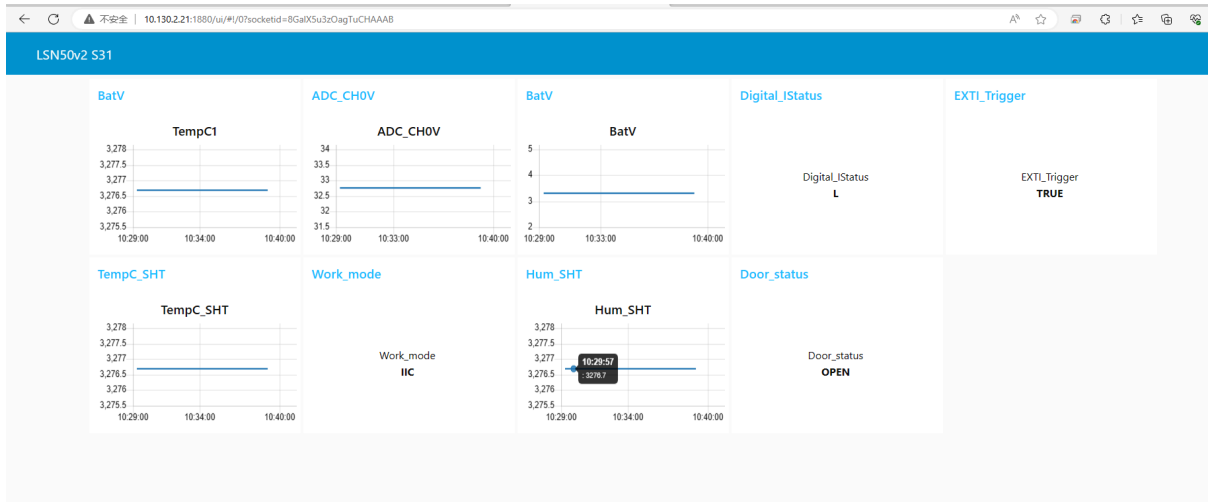
The rightmost panel shows the terminal output with the following log entries:

```
msg.payload: string[0]
--
2023/6/20 10:35:07 node: debug 2
msg.payload: string[2]
> "u"
2023/6/20 10:35:07 node: debug 3
msg.payload: string[0]
--
2023/6/20 10:35:07 node: debug 2
msg.payload: string[0]
> "rxDone"
2023/6/20 10:35:07 node: debug 3
msg.payload: string[0]
--
2023/6/20 10:35:07 node: debug 2
msg.payload: string[52]
>
"4011ffff0123000db2a493c3c4e1e47932
d4e9e63957ecfa"
2023/6/20 10:35:07 node: debug 3
msg.payload: string[36]
"<Q@h/<881uM4q5Tu6tH5rky10mgVW+zw"
--
2023/6/20 10:35:07 node: debug 2
msg.payload: string[2]
> "u"
2023/6/20 10:35:07 node: debug 3
msg.payload: string[0]
--
2023/6/20 10:35:07 node: debug 2
msg.payload: string[10]
> "Rssi=-13dBm"
2023/6/20 10:35:07 node: debug 3
msg.payload: string[0]
--
```

The screenshot displays a Node-RED workspace titled "LoraWAN Decrypt". The flow starts with a "serial USB" node (AdevityUSB0) connected to a "修改 2 条规则" (Modify 2 rules) node, which then connects to a "debug 2" node. The flow continues to a "hex to base64" node, followed by a "FFFF111" node and a "debug 3" node. The main processing block is a "function 4" node, which outputs to seven sensor nodes: BatV, TempC1, ADC_CHOV, Digital_IStatus, EXTI_Ttrigger, Door_status, TempC_SHT, Work_mode, and Hum_SHT. The right-hand console shows a log of messages, including a Base64-encoded payload: "4011f3ffff010b00000277b6d18b87b613032ca28a409df8e8a".

The data will be displayed in the built-in node-red UI

Browser input: <http://<local-IPV4-address>>



9. Trouble Shooting

9.1 Fallback IP does not work, how can users check

When the computer has completed the above fallback IP configuration, the LG01v2 Web UI is still not accessible via fallback IP.

1. Check whether the configuration is correct

Run the CMD command to ipconfig and ping 172.31.255.254.

If this fails, the user needs to reconfigure.

```
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :

Wireless LAN adapter 本地连接* 2:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :

Ethernet adapter Ethernet:

Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::7ce6:f39d:bfcc:5b71%5
IPv4 Address. . . . . : 172.31.255.253
Subnet Mask . . . . . : 255.255.255.252
Default Gateway . . . . . :

Wireless LAN adapter WLAN:

Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::d477:393b:a910:d30b%14
IPv4 Address. . . . . : 10.130.2.141
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 10.130.2.1

Ethernet adapter Bluetooth Network Connection:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :

C:\Users\Administrator>ipconfig
```

```
C:\Users\Administrator>ping 172.31.255.254

Pinging 172.31.255.254 with 32 bytes of data:
Reply from 172.31.255.254: bytes=32 time=1ms TTL=64
Reply from 172.31.255.254: bytes=32 time<1ms TTL=64
Reply from 172.31.255.254: bytes=32 time<1ms TTL=64
Reply from 172.31.255.254: bytes=32 time<1ms TTL=64

Ping statistics for 172.31.255.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\Administrator>.
```

2. Check whether the firewall is disabled

If the firewall is not down, this will affect access to the gateway.

10. Supports

If you are experiencing issues and can't solve them, you can send mail to support@dragino.com.

With your question as detailed as possible. We will reply and help you in the shortest.

11. Reference

- Install Tago Core: Refer **Install Tago Core in LG01v2** in [Instruction](#).
- [Advance OS Reference Guide for LG01v2](#).

12. Order Info

LG01v2-XXX-YYY

XXX: Frequency Band

- **868:** For frequency : 863 ~ 870Mhz
- **915:** For frequency : 902 ~ 928Mhz

YYY: 4G Cellular Option

- **EC25-E:** EMEA, Korea, Thailand, India
- **EC25-AFX:** America: Verizon, AT&T(FirstNet), U.S.Cellular; Canada: Telus
- **EC25-AUX:** Latin America, New Zeland, Taiwan
- **EC25-J:** Japan, DOCOMO, SoftBank, KDDI

More info about valid bands, please see [EC25-E product page](#).

13. Manufacturer Info

Shenzhen Dragino Technology Development co. LTD

Room 202, Block B, BCT Incubation Bases (BaoChengTai), No.8 CaiYunRoad

LongCheng Street, LongGang District ; Shenzhen 518116,China

14. FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

