G-NiceRF®

LG1301-SE

LoRaWAN Gateway

Product Specification

Catalog

Note: Revision History

Revision	Date	Comment
V1.0	2018-7	First release
V1.1	2021-1	Update format

1. Overview

LG1301-SE is the LoRaWAN gateway. It works with LoRaWAN node LN610 only.It integrates Standard LoRaWAN protocol V1.0 Class C.

When LG1301-SE received data from LN610, LG 1301-SE will output the RF data and Device Addr of LN610 to serial interface. When serial data with Device Addr of target LN610 inputted to LG1301-SE, it will send the serial data to target LN610.

All the wireless communication comply the LoRaWAN protocol. It is easy to build a LoRaWAN network without knowing how LoRaWAN works.

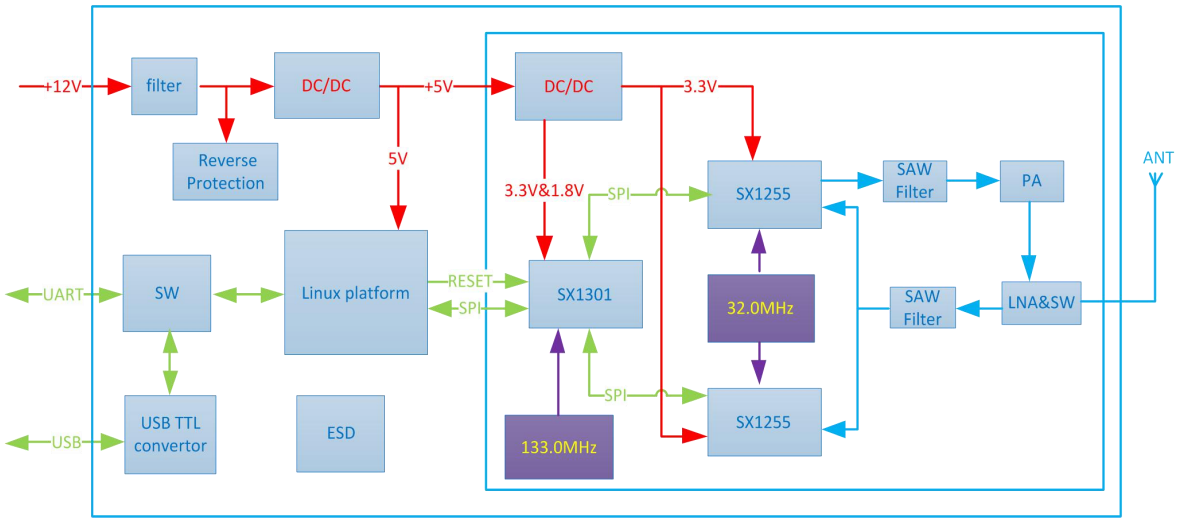
2. Feature

- LoRaWAN protocol supported
- Uart interface
- AES128 encryption
- 8 channel communication simultaneously
- Configurable parameters
- OTAA & ABP
- Long range
- ADR
- EU433M / EU868M / KR920M / AS923M / CN780M/ CN470M / US915M / AS915M

3. Application

- Smart city
- Smart Metering (Water, Electric, Gas meter)
- Agricultural Monitoring
- Irrigation control
- Internet of Things (IoT)
- M2M
- Wireless Sensors
- Wireless Alarm and Security Systems

4. Block Diagram



5. Electrical Characteristics

Parameter	Min	Typ.	Max	Unite	Condition
Working Condition					
Working voltage range	5	12	30	V	
Temperature voltage	-40		85	℃	
Current Consumption					
Receiving current		<280		mA	@12v,9 channels all open
Transmitting current		<450		mA	@12v,TX=24dBm
Parameter					
Frequency range	429	433	440	MHz	@433MHz
	470	480	490	MHz	@470MHz
	860.75	868.3	874.5	MHz	@868MHz
	902	915	928	MHz	@915MHz
Output power range	0		24	dBm	
Receiving sensitivity		-133		dBm	@SF=10,,BW=125kHz

★ Note: the following parameters is VCC = 3.3, with 50 ohm copper axis test instrumentation.

6. Function Description

1) Power on

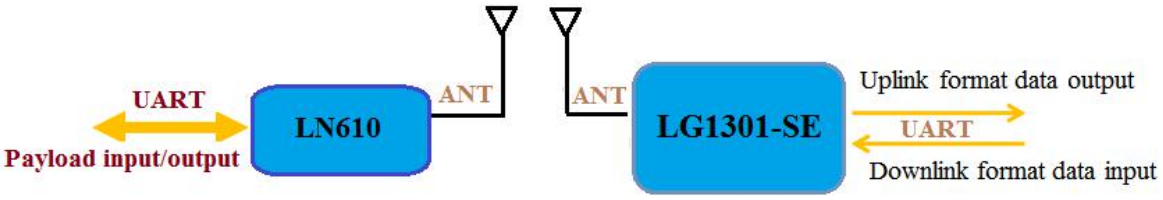
After powered on, the power led will light on to indicate, the gateway start the initialization. After 15s, the Tx LED will blink once to indicate the Linux system is ready, and then 5s later , the status LED will blink once per second which indicate the whole system is ready. Then it enters the normal working mode.

2) Normal Working Mode

In normal working mode, when payload is inputted to LN610, LN610 will transmit the packet to LG1301-SE automatically. After LG1301-SE received the data, it will output the payload in uplink format by serial interface.

when payloads with downlink format are inputted to LG1301-SE. LG1301-SE will transmit the packet automatically. LN610 will compare its Device Addr with the received packet. If the Device

Addr is match, it will output the payload by serial interface.



Uplink/downlink format (All the data are in HEX format)

Uplink format: (Data from the node to the gateway)

Header (5 bytes) + Length (1 byte) + Device Addr (4 bytes) + Payload + Frame end (2 bytes)

Header: fixed to “$lora”;

Length: payload length + 4

Device Addr: MSB, Target Device Addr, only the product with this Device Addr will receive the message when send downlink packet.

Frame end : fixed to 0x0d 0x0a

Example:

LN610 input hex data:
AA BB CC DD EE FF
LG1301-SE output hex data:
24 6C 6F 72 61 0A 01 B9 EC DC AA BB CC DD EE FF 0D 0A
Parse:
24 6C 6F 72 61 ---------- Header
0A ---------- Length
01 B9 EC DC ---------- Device Addr
AA BB CC DD EE FF ---------- Payload
0D 0A ---------- Frame end

Downlink format : (Data from the gateway to the node)
Format: Device Addr (4 bytes) + payload

Example:

LG1301-SE input hex data:
01 B9 EC DC 11 22 33 44 55 66
LN610 output hex data:
11 22 33 44 55 66
Parse:
01 B9 EC DC ---------- Device Addr
11 22 33 44 55 66 ---------- Payload

Note:

The LN610 must join the network before communicate with LG1301-SE.

3) Setting mode

In normal working mode, press SET key to enter setting mode. The status LED will be turned on to indicate. Press SET key again to exit setting mode and back to normal working mode, the status LED will blink once per second to indicate.

User can use our specified PC software to configure LG1301-SE.

Below is the PC software interface.

In setting mode , the gateway supports three operation on node.

- Add node into the network

User input the Device Addr、NwkSKey and AppSKey of node. Click [Add Node] button , then the node will be added into the network.

Note: The Device Addr、NwkSKey and AppSKey of node can be read out in PC software of node.

- Delete node from the network

Input Device Addr in block ”Delete node”，and click [delete] button，then the node with this Device Addr will be deleted from the network.

Once the node is deleted from the network, the gateway will ignore all the information from the node and won’t send message to the deleted node.

- Read out the node list of the network

Click [Read] button can read out the node list.

When PC software opened, the node list will be read out automatically.

4) Parameters for Gateway

UART : 115200, 8, N, 1

Tx power : 23dBm

Tx frequency and Data Rate:

Region	Frequency(MHz)	Data rate
EU433M	434.665	DR0 (SF12,125 kHz)
EU868M	869.525	DR0 (SF12,125 kHz)
KR920M	921.90	DR0 (SF12,125 kHz)
AS923M	923.20	DR2 (SF10/125KHz)
CN780M	786.00	DR0 (SF12,125 kHz)
CN470M	505.30	DR0 (SF12,125 kHz)
US915M	923.30	DR8(SF12,500 kHz)
AS915M	923.30	DR8(SF12,500 kHz)

Receive Frequency channel :

Channels	Frequency(MHz)							
	EU433M	EU868M	KR920M	AS923M	CN780M	CN470M	US915M	AS915M
0	433.175	868.10	921.90	923.20	779.50	470.30	902.3	915.2
1	433.375	868.30	922.10	923.40	779.70	470.50	902.5	915.4
2	433.575	868.50	922.30	923.60	779.90	470.70	902.7	915.6
3	433.775	868.70	922.50	923.80	780.50	470.90	902.9	915.8
4	433.975	868.90	922.70	924.00	780.70	471.10	903.1	916.0
5	434.175	869.10	922.90	924.20	780.90	471.30	903.3	916.2
6	434.375	869.30	923.10	924.40	781.10	471.50	903.5	916.4
7	434.575	869.50	923.30	924.60	781.30	471.70	903.7	916.6

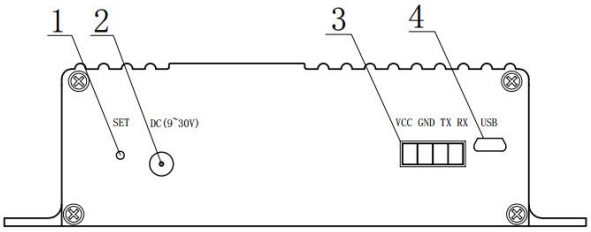
Note:

The Tx rate of LG1301-SE is fixed as the Rx rate of LN610, the Rx data rate of LG1301-SE is not fixed which match to the LN610's Tx rate automatically.

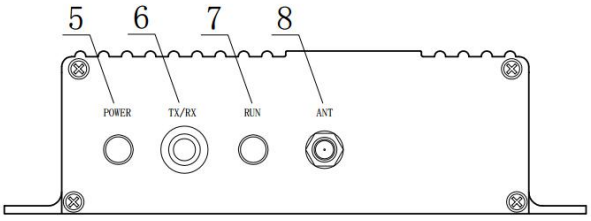
The Tx frequency of LG1301-SE is fixed, but it can receive the data from all the 8 channel simultaneously.

The maximum MACPayload size length (M) of LG1301-SE is 51bytes, the minimal Tx time interval is 2s.

7. Pin definition



Front



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No.	Definition	Description
1	SET	Press to enter/exit setting mode
2	Power In	Voltage input DC 5~30V
3	Data interface	TTL or RS232 ,RS485 Interface Three choices
4	Micro USB	System parameter configuration
5	Power LED	Green LED , indication of powered on
6	LED for Tx/Rx	Red LED blinks once when Tx one packet and Blue led blinks once when one packet is received and verified OK.
7	LED for Status	Light on in setting mode, and blinks once per second in normal mode
8	Antenna	Connected with 50 Antenna

Definition of Data interface			
No.	**Definition**	**Type**	**Description**
1	+3.3V	Power (VCC)	DC 5~30V Input
2	GND	Power (GND)	Ground
3	TXD	Output	Connected with the RXD of external device
4	RXD	Input	Connected with the TXD of external device

Note: The TXD/RXD must be connected with 3.3V TTL, higher voltage may damage the module.

8. Mechanical dimension(Unit:mm)