



**SGW2828 LoRa Module AT Command
User Manual**

November 2021 V1.2

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1. Introduction

The SGW2828 LoRa Module is a pre-certified SoM enabling LoRa connectivity for portable and extremely low-power embedded systems. The compact, highly sensitive SGW2828 Module easily achieves +30dBm Tx power without the need to integrate an external power amplifier, and is tailored for the US market with an operating frequency of 915MHz and fast frequency hopping abilities. Supporting a wide range of sensors and ultra-long range spread spectrum communication between devices, the SGW2828 Module can be integrated into a variety of popular development platforms to facilitate the building of smart devices fast at optimized cost.



Figure 1: SGW2828 LoRa Module

This user manual details the AT command set supported by the SGW2828 LoRa Module.

2. UART Interface

The SGW2828 Module can be connected via its UART port:

Baud Rate	4,800
Data Bits	8
Stop Bit	1
Parity Bit	None
Flow Control Settings	Diabled

3. AT Commands

Listed in this document are the AT commands supported by the SGW2828 LoRa Module in version V0.0.20

a. Command Set

Command List	AT Command	Outcome
Get Command List	AT?	Get a list of all available AT commands
Help Command	AT+<x>?	Get command help information
Read Command	AT+<x>=?	Read command
Write Command	AT+<x>=<...>	Write command
Execution Command	AT+<x>	Execution command

Notes:

- All commands are case insensitive. All commands end with \r. All returns end with \r\n.
- No spaces should be added when sending commands. If there is a parameter error, it will result in **AT_PARAM_ERROR**. If it is an unrecognized command, it will result in **AT_ERROR**. These two error prompts apply to all commands and will not be indicated in the command list going forwards.

b. System Command

	System Command	Command	Response
1	Get firmware version AT+VERSION	Help Command AT+VERSION?	AT+VERSION: Get the firmware version OK
		Execution Command AT+VERSION=?	SGW2828_EVK_vx.y.z OK
2	Set sleep mode AT+SLEEP Enables ultra-low power consumption sleep mode. After entering sleep mode, the host can send any character through the serial port to wake up the module. Once awakened, it will prompt the "wake up" character. If there is a 32.768KHz crystal oscillator and the function of burning with RTC, the module will wake up by itself after setting the sleep time <t> in the command.	Help Command AT+SLEEP?	AT+SLEEP: Let the MCU into sleep mode OK
		Execution Command AT+ SLEEP=<t> Where <t> = sleep time with unit in seconds. Min 1 to max 65,535 seconds.	Entry sleep
3	Reset MCU AT+RESET	Help Command AT+RESET?	AT+RESET: Trig a reset of MCU OK
		Execution Command AT+ RESET	<i>Nil</i>
4	Restore factory settings AT+RELOAD Resets and reloads RF setting information in EEPROM. Default RF Setting: <ul style="list-style-type: none"> • Preamble: 16 • BW: 250kHz • CR: 1 • SF: 7 • Hop: 0 • Chan: 0 • SX1276 Tx Power: 4dB 	Help Command AT+RELOAD?	AT+RELOAD: Restore factory settings OK
		Execution Command AT+ RELOAD	Preamble:16,BW:250kHz,CR:1,SF:7,Hop:0,chan:0,Pow:4dB OK
5	Get MAC address of module AT+MAC Gets MAC address of module (6 bytes in total).	Help Command AT+MAC?	AT+MAC: Get the MAC Value OK
		Write Command AT+MAC=<Mac Addr> Where <mac addr> is in ASCII format. Example:	OK

		Send: <code>at+mac=112233aabbcc\r</code> Return: <code>OK\r\n</code>	
		Read Command AT+MAC=?	xx xx xx xx xx xx OK
6	Get ID of STM32 AT+MCUMAC Obtains STM32 96bit UID.	Help Command AT+MCUMAC? Read Command AT+MCUMAC=? Where <mac addr> is in ASCII format. Example: Send: <code>at+mcumac=?\r</code> Return: <code>31 39 47 16 33 36 37 30 32 00 19 00</code> OK	AT+MAC: Get the STM32 UID OK xx xx xx xx xx xx xx xx xx xx xx xx

c. LoRaP2P

	System Command	Command	Response
1	RF Information AT+RF_CONFIG Reads or sets RF Parameters which will be saved to EEPROM.	Help Command AT+RF_CONFIG?	AT+RF_CONFIG: Set or read the RF setting OK
		Write Command AT+RF_CONFIG = <Preamble>,<BW>,<CodeRate>,<SF>,<HopPeriod>,<Channel>,<Power> Where: <ul style="list-style-type: none"> • <Preamble> = Preamble length • <BW> = Frequency bandwidth - 0: 126 Khz, 1: 250 kHz; 2:500 kHz • <CodeRate> = Error correction rate 1 - 4 • <SF> = Spread spectrum factor 7 - 12 • <HopPeriod> = Frequency hopping period 0 - 255 • <Channel> = RF start channel - 0-127 (bw 125 KHz), 0 - 76 (bw 250 KHz), 0 - 32 (bw 500 KHz) • <Power> = SX1276 RF transmission power -4 ~ 5 dB 	OK
		Read Command AT+RF_CONFIG=?	Preamble:xx,BW: <xx>kHz, SF: <x>, Hop: <x>, Chan: <x>, Pow: <x>dB OK
2	Send RF data AT+RF_SEND Sends data via LoRa RF transmission.	Help Command AT+ RF_SEND?	AT+RF_CONFIG: send RF data OK
		Write Command AT+RF_SEND=<Cnts>,<Interval>, <Len> Followed by <Data> Where: <ul style="list-style-type: none"> • <Cnts> = Number of times data is repeatedly sent, 0 - 65,535. • <Interval> = Send interval (ms). When the set interval time is less than the sending time, the next data packet will be sent after the last data packet is sent. 0 - 65,535. • <Len> = Data length in byte, 1 - 64. • <Data> = Data to be sent After sending write command to the module, the serial port will return the symbol '>', and then send data to the module through	OK Time out if hex data is not sent within 3 seconds of sending send command.

		<p>the serial port. Module will return each byte of the data to host in readable HEX format.</p> <p>Example: Send: <code>AT+rf_send=1,0,5\r</code> <code>>Hello</code></p> <p>Return during transmission to module: <code>48 65 6C 6C 6F</code> (hex code of 'Hello')</p> <p>Return after send complete: <code>OK\r\n</code></p>	
3	<p>Read data received by RF AT+RF_RECE</p>	<p>Help Command AT+RF_RECE?</p>	<p>AT+RF_RECE: read data received by RF OK</p>
	<p>Reads data received by LoRa RF transmission.</p>	<p>Read Command AT+RF_RECE=?</p>	<p><Data> OK</p>
4	<p>Read RF signal strength AT+RF_RSSI</p>	<p>Help Command AT+RF_RSSI?</p>	<p>AT+RF_RSSI: Get last received data Len and RSSI OK</p>
	<p>Reads last received data length and RF signal strength from transmitted device.</p>	<p>Read Command AT+RF_RSSI=?</p>	<p>Len: xx, RSSI xx dB OK</p>
5	<p>Stop sending RF data AT+RF_STOP</p>	<p>Help Command AT+RF_STOP?</p>	<p>AT+RF_STOP: Stop sending RF data OK</p>
	<p>Stops RF continuous transmission. RF modules enters reception mode.</p>	<p>Execution Command AT+RF_STOP</p>	<p>OK</p>
6	<p>Put LoRa Module into Transparent Mode AT+ENTM</p>	<p>Help Command AT+ENTM?</p>	<p>AT+ENTM: Transparent transmission mode OK</p>
	<p>After entering transparent transmission mode, data sent by PC to LoRa module will be transmitted directly through RF. To exit this mode, send +++.</p>	<p>Execution Command AT+ENTM</p>	<p>OK</p>
7	<p>Single frequency test AT_TXTONE</p>	<p>Help Command AT+TXTONE?</p>	<p>AT+TXTONE: RF Test Tone OK</p>
	<p>Tests actual frequency and measures frequency offset.</p>	<p>Execution Command AT+TXTONE</p>	<p>OK</p>

d. Module Peripheral Control

	System Command	Command	Response
1	Read or set GPIO high and low level AT+GPIO Reads or sets high or low levels on corresponding pin of module.	Help Command AT+GPIO?	AT+GPIO: Read or set GPIO high and low level OK
		Write Command AT+GPIO=<Pin>, <Level> Where: <ul style="list-style-type: none"> • <Pin> = Module pin number 8, 16, 17, 23 • <Level> = High and low level of IO port – 0: low level, 1: high level 	GPIO: H/L OK
		Read Command AT+GPIO=?<Pin>	OK
2	Set I2C communication rate AT+I2C_CONFIG Sends data via LoRa RF transmission.	Help Command AT+I2C_CONFIG?	AT+I2C_CONFIG: Set I2C rate OK
		Write Command AT+I2C_CONFIG=<Rate> Where <Rate> = I2C rate – 1: 5k, 2: 10k, 3: 50K, 4: 100K, 5: 400K Example: Set I2C 10kHz communication rate Send: AT+I2C_config=2 Return: OK	OK
		Read Command AT+I2C_CONFIG=?	I2C Frequency:xx OK
3	I2C read and write operations AT+I2C Communicates with external I2C devices.	Help Command AT+I2C?	AT+I2C:set the addr and len,and then to read or writeOK
		Write Command AT+I2C=<DeviceAddr>,<MemoryAddr>,<Len> Followed by <Data> Where : <ul style="list-style-type: none"> • <DeviceAddr> = 7bit I2C hardware address • <MemoryAddr> = External memory address – Null: Null memory address, xx: 1Byte memory address, xxxx: 2Byte memory address • <Len> = Length of data in byte to read or write • <Data> = Data to be sent in hex format 	OK <ul style="list-style-type: none"> • AT_PARAM_ERROR if there is a parameter error. • Device ERR if I2C peripheral has no ACK. • Time out if no data is sent within 3 seconds of sending write command.

		<p>After sending write command to the module, the serial port will return the symbol '>', and then send data to the module through the serial port. Module will return each byte of the data to host in readable HEX format.</p> <p>Example showing bytes sent to I2C devices:</p> <ol style="list-style-type: none"> 1. Read data from I2C device <code>AT+I2C=?18,,2</code> = No memory address, read 2 bytes from 7bit I2C hardware address 0x18 2. Write data to I2C device <code>AT+I2C=18,12,5</code> = Write 5 bytes to I2C peripheral with 7bit I2C hardware address, 0x18 and memory address 0x12 > 1234567890 (data written in hex format) 3. Write data to I2C device <code>AT+I2C=18,1234,5</code> = Write 5 bytes to I2C peripheral with 7bit I2C hardware address, 0x18 and memory address 0x1234 > 1234567890 (data written in hex format) 	
		<p>Read Command <code>AT+I2C=?<DeviceAddr>,<MemoryAddr>,<Len></code></p>	<p><Data> OK</p>
4	<p>Read ad value <code>AT+ADCx</code></p> <p>Reads ad value of corresponding pin of module. For adc1, change 0 to 1.</p>	<p>Help Command <code>AT+ADC0?</code></p> <p>Read Command <code>AT+ADC0=?</code></p>	<p>AT+ADC0: Get AD0 Value OK</p> <p>AD0: <Value> OK</p> <p>Where <Value> = AD value, 0 - 4,095</p>
5	<p>Set PWM <code>AT+PWM</code></p> <p>Sets PWM signal output on 8-pin of module.</p>	<p>Help Command <code>AT+ PWM?</code></p> <p>Write Command <code>AT+PWM=< Period>,<Pulse></code></p> <p>Where:</p> <ul style="list-style-type: none"> • <Period> = PWM frequency, 1 - 10 KHz • <Pulse> = PWM duty cycle, 0 - 100% <p>Read Command <code>AT+PWM=?</code></p>	<p>AT+PWM Set the PWM 1K-10K OK</p> <p>PWM Period: xxxx, Pulse: xx OK</p> <p>Nil</p>

Revision History

Revised	Version	Description
13-Oct-2020	1.0	Initial document release
17-Dec-2020	1.1	AT Command Module Peripheral Control section update
23-Nov-2021	1.2	Minor format change and AT Command response update

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