Lora AT COMMAND GUIDE

APPLY FOR :

1. RYLR405
2. RYLR406
3. RYLR895
4. RYLR896

THE SEQUENCE OF USING AT COMMAND

1. Use "**AT+ADDRESS**" to set ADDRESS. The ADDRESS is regard as the identification of transmitter or specified receiver.
2. Use "**AT+NETWORKID**" to set the ID of Lora network. This is a Group function. Only by setting the same NETWORKID can the modules communicate with each other. If the ADDRESS of specified receiver is belong to different group, it is not able to communicate with each other.
   The recommend value: 1~15
3. Use" **AT+BAND**" to set the center frequency of wireless band. The transmitter and the receiver are required to use the same frequency to communicate with each other.
4. Use" **AT+PARAMETER**" to set the RF wireless parameters. The transmitter and the receiver are required to set the same parameters to communicate with each other. The parameters of which as follows:

   [1] <Spreading Factor>: The larger the SF is, the better the sensitivity is. But the transmission time will take longer.

   [2] <Bandwidth>: The smaller the bandwidth is, the better the sensitivity is. But the transmission time will take longer.

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[3] <Coding Rate>: The coding rate will be the fastest if setting it as 1.

[4] <Programmed Preamble>: Preamble code. If the preamble code is bigger, it will result in the less opportunity of losing data. Generally preamble code can be set above 10 if under the permission of the transmission time.
Communication within 3 km: Recommend to set "**AT + PARAMETER = 10,7,1,7**"
More than 3 km: Recommend to set " **AT + PARAMETER = 12,4,1,7**"

5. Use "**AT+SEND**" to send data to the specified ADDRESS. Please use "Lora Modem Calculator Tool" to calculate the transmission time. Due to the program used by the module, the payload part will increase more 8 bytes than the actual data length.

AT Command Set

It is required to key in "enter" or "\r\n" in the end of all AT Commands.
Add" ? "in the end of the commands to ask the current setting value.
It is required to wait until the module replies +OK so that you can execute the next AT command.

1. **AT** Test if the module can respond to Commands.

Syntax	Response
AT	+OK

2. **Software RESET**

Syntax	Response
AT+RESET	+RESET +READY

3. **AT+MODE** Set the work mode

Syntax	Response
AT+MODE=<parameter> <parameter>range from 0 to 1 0 : Transmit and Receive mode (default). 1 : Sleep mode. Example : Set the sleep mode, AT+MODE=1	+OK
AT+MODE? Any text	+MODE=0 'Transmit and Receive mode +READY 'Sleep mode.

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4. **AT+IPR** Set the UART baud rate

Syntax	Response
AT+IPR=<rate> <rate> is the UART baud rate： 300 1200 4800 9600 19200 28800 38400 57600 115200(default). Example: Set the baud rate as 9600, **The settings will be memorized in EEPROM.* AT+IPR=9600	+OK
AT+IPR?	+IPR=9600

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5. **AT+PARAMETER** Set the RF parameters

Syntax	Response
AT+PARAMETER=<Spreading Factor>, <Bandwidth>,<Coding Rate>, <Programmed Preamble> <Spreading Factor>7~12, (default 12) <Bandwidth>0~9 list as below 0 : 7.8KHz (not recommended, over spec.) 1 : 10.4KHz (not recommended, over spec.) 2 : 15.6KHz 3 : 20.8 KHz 4 : 31.25 KHz 5 : 41.7 KHz 6 : 62.5 KHz 7 : 125 KHz (default). 8 : 250 KHz 9 : 500 KHz <Coding Rat>1~4, (default 1) <Programmed Preamble> 4~7(default 4) Example : Set the parameters as below: <Spreading Factor> 7,<Bandwidth> 20.8KHz, <Coding Rate> 4,<Programmed Preamble>5, AT+PARAMETER=7,3,4,5	+OK
AT+PARAMETER?	+PARAMETER=7,3,4,5

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6. **AT+BAND** Set RF Frequency

Syntax	Response
AT+BAND=<parameter> <parameter>is the RF Frequency, Unit is Hz 470000000: 470000000Hz(default: RYLR40x) 915000000: 915000000Hz(default: RYLY89x) Example : Set the frequency as 868500000Hz, AT+BAND=868500000	+OK
AT+BAND?	+BAND=868500000

7. **AT+ADDRESS** Set the ADDRESS of module

Syntax	Response
AT+ADDRESS=<Address> <Address>=0~65535(default 0) Example : Set the address of module as 120, **The settings will be memorized in EEPROM.* AT+ADDRESS=120	+OK
AT+ADDRESS?	+ADDRESS=120

8. **AT+NETWORKID** Set the network ID

Syntax	Response
AT+NETWORKID=<Network ID> <Network ID>0~16(default 0) Example : Set the network ID as 6, **The settings will be memorized in EEPROM.* **The" 0" is the public ID of Lora. It is not recommend to set 0 to make the distinction of NETWORK.* AT+NETWORKID=6	+OK
AT+NETWORKID?	+NETWORK=6

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9. **AT+CPIN** Set the AES128 password of the network.

Syntax	Response
AT+CPIN=<Password> <Password>: An 32 character long AES password From 00000000000000000000000000000001 to FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF Only by using same password can the data be recognized. After resetting, the previously password will disappear. Example : Set the password as below: FABC0002EEDCAA90FABC0002EEDCAA90 AT+CPIN=FABC0002EEDCAA90FABC0002EEDCAA90	+OK
AT+CPIN?	+CPIN=FABC0002EEDCAA90FABC0002EEDCAA90 +CPIN=No Password! 'Default value

10. **AT+CRFOP** Set the RF output power

Syntax	Response
AT+CRFOP=<power> <power>0~15 15：15dBm(default) 14：14dBm …… 01：1dBm 00：0dBm Example: Set the output power as 10dBm, AT+CRFOP=10	+OK
AT+CRFOP?	+CRFOP=10

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11. **AT+SEND** Send data to the appointment Address

Syntax	Response
AT+SEND=<Address>,<Payload Length>,<Data> <Address>0~65535, When the <Address> is 0, it will send data to all address (From 0 to 65535.) <Payload Length>Maximum 240bytes <Data>ASCII Format Example : Send HELLO string to the Address 50, AT+SEND=50,5,HELLO	+OK
AT+SEND?	+SEND=50,5,HELLO

12. **+RCV** Show the received data

Syntax	Response
+RCV=<Address>,<Length>,<Data>,<RSSI>,<SNR>, <Address>Transmitter Address ID <Length>Data Length <Data>Data <RSSI> Received Signal Strength Indicator <SNR> Signal-to-noise ratio	
Example: Module received the ID Address 50 send 5 bytes data, Content is HELLO string ,RSSI is -99dBm, SNR is 40, It will show as below: +RCV=50,5,HELLO,-99,40	

13. **AT+VER?** to inquire the firmware version

Syntax	Response
AT+VER?	+VER=RYLR406_Vx.x.x(RYLR40x) +VER=RYLR89C_Vx.x.x(RYLR89x)

14. **AT+UID?** to inquire the unique ID number of the module

Syntax	Response
AT+UID? 12 Bytes Unique ID	+UID=164738323135383200100025

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15. **AT+FACTORY** Set all current parameters to manufacturer defaults

Syntax	Response
AT+FACTORY Manufacturer defaults： BAND：915MHz UART：115200 Spreading Factor：12 Bandwidth：125kHz Coding Rate：1 Preamble Length：4 Address：0 Network ID：0 CRFOP：15	+FACTORY

16. **Other messages**

Syntax	Response
After RESET	+READY

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17. Error result codes

Syntax	Response
There is not "enter" or 0x0D 0x0A in the end of the AT Command.	+ERR=1
The head of AT command is not "AT" string.	+ERR=2
There is not "=" symbol in the AT command.	+ERR=3
Unknow command.	+ERR=4
TX is over times.	+ERR=10
RX is over times.	+ERR=11
CRC error.	+ERR=12
TX data more than 240bytes.	+ERR=13
Unknow error.	+ERR=15

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