
Point to Point Communication for RS485-LN

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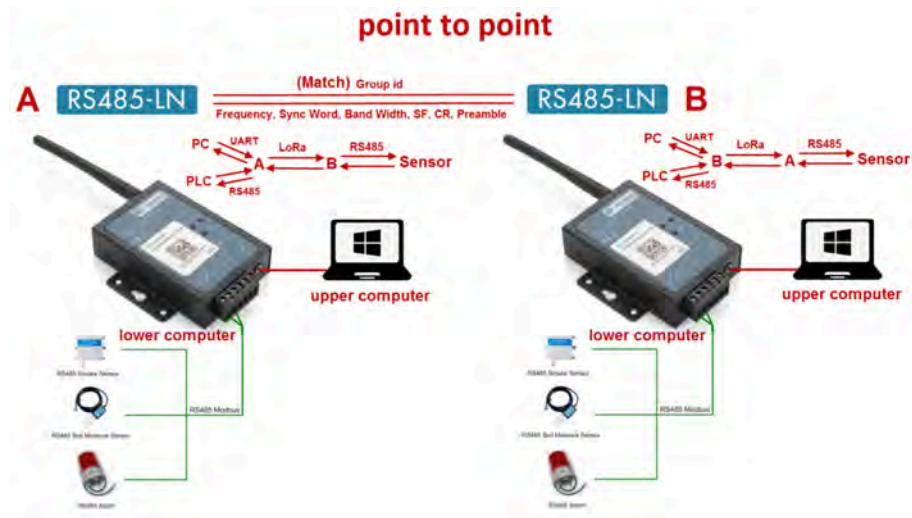
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1. point to point

1.1 Overview



1.2 Configure

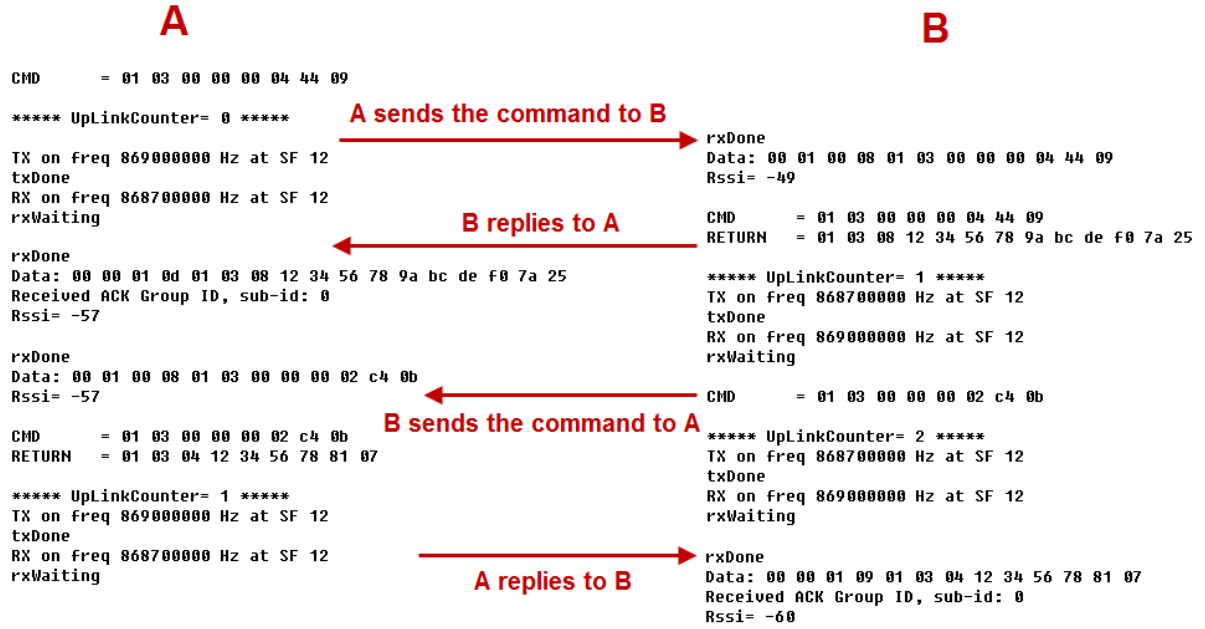
A's configuration:

```
AT+GROUPMOD=0
AT+GROUPID=12345678
AT+TXCHS=868700000
AT+RXCHS=869000000
AT+CFGDEV=01 03 00 00 00 04,1
or
AT+COMMAND=01 03 00 00 00 04,1
```

B's configuration:

```
AT+GROUPMOD=0
AT+GROUPID=12345678
AT+TXCHS=869000000
AT+RXCHS=868700000
AT+CFGDEV=01 03 00 00 00 02,1
or
AT+COMMAND=01 03 00 00 00 02,1
```

1.3 Serial port display



A sends a command to B to query B's RS485 sensor data and display it on A's upper computer.

Similarly, B sends a command to A to query A's RS485 sensor data and display it on B's upper computer.

```

CMD      = 01 03 00 00 00 04 44 09
***** UplinkCounter= 1 *****
TX on freq 869000000 Hz at SF 12
txDone
RX on freq 868700000 Hz at SF 12
rxWaiting

CMD      = 01 03 00 00 00 04 44 09
***** UplinkCounter= 1 *****
TX on freq 869000000 Hz at SF 12
txDone
RX on freq 868700000 Hz at SF 12
rxWaiting

CMD      = 01 03 00 00 00 04 44 09
***** UplinkCounter= 1 *****
TX on freq 869000000 Hz at SF 12
txDone
RX on freq 868700000 Hz at SF 12
rxWaiting

CMD      = 01 03 00 00 00 04 44 09
***** UplinkCounter= 1 *****
TX on freq 869000000 Hz at SF 12
txDone
RX on freq 868700000 Hz at SF 12
rxWaiting

CMD      = 01 03 00 00 00 04 44 09
***** UplinkCounter= 1 *****
TX on freq 869000000 Hz at SF 12
txDone
RX on freq 868700000 Hz at SF 12
rxWaiting

```

← External interrupt
or
use AT+CFGDEV

← Retransmission

← Retransmission

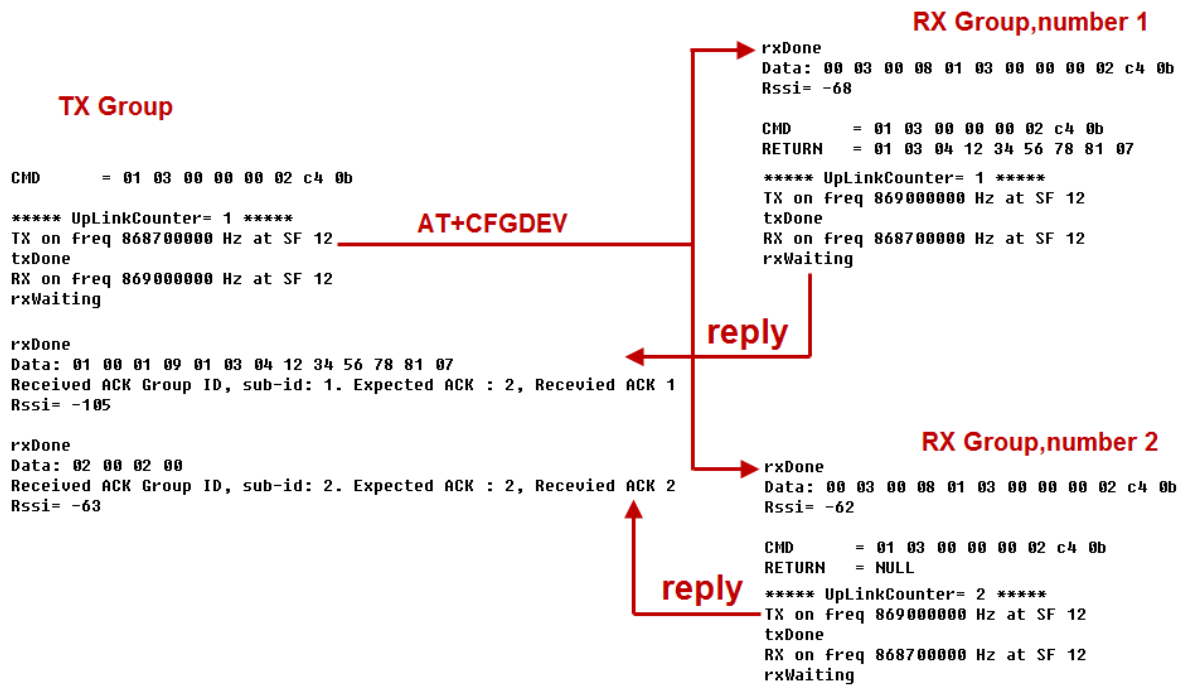
← Retransmission

← Retransmission

If the sender does not get the ACK reply from the receiver, it will retransmit up to 4 times, each interval is 10 seconds, and the UplinkCounter of the retransmission will not increase. (Retransmission only occurs when using the AT+CFGDEV command or triggering an external interrupt)

2. Point To Multi-Point

2.1 Overview



The TX group sends broadcast data to the RX group. After the RX group receives the data, it will reply to the TX group in order from small to large.

```

CMD      = 01 03 00 00 00 04 44 09
***** UplinkCounter= 1 *****
TX on freq 869000000 Hz at SF 12
txDone
RX on freq 868700000 Hz at SF 12
rxWaiting

CMD      = 01 03 00 00 00 04 44 09
***** UplinkCounter= 1 *****
TX on freq 869000000 Hz at SF 12
txDone
RX on freq 868700000 Hz at SF 12
rxWaiting

CMD      = 01 03 00 00 00 04 44 09
***** UplinkCounter= 1 *****
TX on freq 869000000 Hz at SF 12
txDone
RX on freq 868700000 Hz at SF 12
rxWaiting

CMD      = 01 03 00 00 00 04 44 09
***** UplinkCounter= 1 *****
TX on freq 869000000 Hz at SF 12
txDone
RX on freq 868700000 Hz at SF 12
rxWaiting

CMD      = 01 03 00 00 00 04 44 09
***** UplinkCounter= 1 *****
TX on freq 869000000 Hz at SF 12
txDone
RX on freq 868700000 Hz at SF 12
rxWaiting

```

← External interrupt
or
use AT+CFGDEV

← Retransmission

← Retransmission

← Retransmission

← Retransmission

If the sender does not get the ACK reply from the receiver, it will retransmit up to 4 times, each interval is 30 seconds, and the UplinkCounter of the retransmission will not increase. (Retransmission only occurs when using the AT+CFGDEV command or triggering an external interrupt)

3. AT command

- ATZ:** Trig a reset of the MCU
- AT+FDR:** Reset Parameters to Factory Default, Keys Reserve
- AT+FCU:** Get or Set the Frame Counter Uplink
- AT+FCD:** Get or Set the Frame Counter Downlink
- AT+TXP:** Get or Set the transmit power, the maximum is 20dBm (default is 14dBm)
- AT+SYNC:** Get or Set the Sync word [1:0x34,0:0x12] (default is 1)
- AT+PMB:** Get or Set the preamble (default:8)
- AT+TXCHS:** Get or Set the transmit frequency of TX (default:868700000)

- AT+TXSF** : Get or Set the spreading factor of TX (7 to 12) (default:12)
- AT+RXCHS** : Get or Set the transmit frequency of RX (default:869000000)
- AT+RXSF** : Get or Set the spreading factor of RX (7 to 12) (default:12)
- AT+BW** : Get or Set the bandwidth [0:125khz,1:250khz,2:500khz] (default:0)
- AT+CR** : Get or Set the coding rate [1: 4/5, 2: 4/6, 3: 4/7, 4: 4/8] (default:1)
- AT+TDC** : Get or set the application data transmission interval in ms(default 10 minutes)
- AT+VER** : Get firmware version number
- AT+SEND** : Set Custom sent hex data
- AT+GROUPMOD** : Set or Get the grouping mode of the device (default: 0)
- AT+GROUPID** : Set or Get the password for matching between TX group and RX group, which can be composed of numbers or characters (default: 12345678)
- AT+INTMOD** : Get or Set the trigger interrupt mode
- AT+BAUDR** : Get or set the baud rate of rs485. (default: 9600)
- AT+DATABIT** : Get or Set databit(7:7 bits,8:8 bits) of rs485 (default: 8)
- AT+PARITY** : Get or Set parity(0:none,1:odd,2:even) of rs485(default: 0)
- AT+STOPBIT** : Get or Set stopbit(0:1 bit,1:1.5 bit,2:2 bit) of rs485(default: 0)
- AT+CMDDL** : Get or Set the delay waiting time after receiving RS485 command (default: 400)
- AT+CRCCHECK** : Get or set to receive and verify RS485 sensor data (0: Disable,1:CRC16_MODBUS) (default: 1)
- AT+SCHEDULE** : Each TDC sends command data to the receiver.
- AT+CFGDEV** : Instantly send RS485 commands to the receiver.
- AT+RS485** : Send commands to the local RS485 device.
- AT+MOD** : Get or set the host send mode.(default: 0)

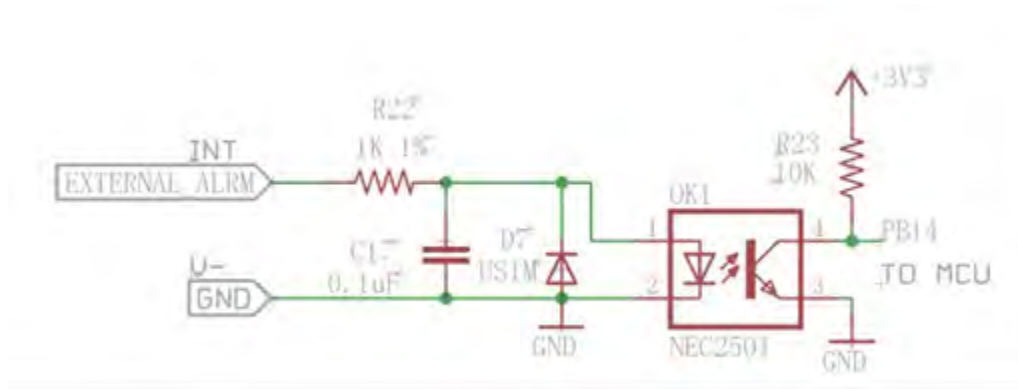
Example 1:

AT+SEND=01020304 will send a payload of 01020304

Example 2:

AT+INTMOD=aa (0:Disable,1:falling or rising,2:falling,3:rising) (default: 2)

RS485-LN support external Interrupt uplink since hardware v1.2 release.



Connect the Interrupt pin to RS485-LN INT port and connect the GND pin to V- port. When there is a high voltage (Max 24v) on INT pin. Device will send an lora packet.

Example 3:

AT+SCHEDULE: This command will be sent to Group RX during each transmission, Max command length is 14 bytes. The grammar is:

AT+SCHEDULE =xx xx xx xx xx xx xx xx xx xx xx,m

xx xx xx xx xx xx xx xx xx xx xx: The RS485 command to be sent

m: 0: no CRC, 1: add CRC-16/MODBUS in the end of this command

For example, if we have a RS485 sensor. The command to get sensor value is: 01 03 0B B8 00 02 46 0A. Where 01 03 0B B8 00 02 is the Modbus command to read the register 0B B8 where stored the sensor value. The 46 0A is the CRC-16/MODBUS which calculate manually.

Example 4:

AT+CFGDEV : This command will be sent to Group RX.

The grammar is:

AT+CFGDEV =xx xx xx xx xx xx xx xx xx xx xx,m

xx xx xx xx xx xx xx xx xx xx xx: The RS485 command to be sent

m: 0: no CRC, 1: add CRC-16/MODBUS in the end of this command.

Example 5:

AT+RS485: This command will be sent to local RS485 device.

The grammar is:

AT+RS485 =xx xx xx xx xx xx xx xx xx xx xx,m

xx xx xx xx xx xx xx xx xx xx xx: The RS485 command to be sent

m: 0: no CRC, 1: add CRC-16/MODBUS in the end of this command.

Example 6:

AT+MOD=0 Commands are transparently transmitted through UART.

AT+MOD=1,500 Commands are transparently transmitted through RS485. 500 ms after the first character is received from RS485, all characters are commands.

Example 7:

AT+GROUPMOD=0 Set to point to point mode

AT+GROUPMOD=0,aa Set the TX group that controls the number of aa (The maximum value of aa is 8)

AT+GROUPMOD=1,bb Set to the RX group controlled by the TX group, numbered bb(The maximum value of bb is 8)

AT+GROUPMOD=0,2 Set to control the TX group of the two RX groups

AT+GROUPMOD=1,1 Set the RX group numbered 1

AT+GROUPMOD=1,2 Set the RX group numbered 2

4. Data Format

8 bytes of GROUPLD +n payload + 4 bytes of checksum

Payload(S12, SF11, SF10 maximum length is 59, SF9 maximum length is 123, SF8, SF7 maximum length is 230):

Size (bytes)	1	1	1	1	payloadsize
Value	address	request	ACK	payloadsize	command data or return data

The first byte: 00 is the broadcast address, 01-08 is the RX group number

The second byte: send request when not 0, not request when it is 0

The third byte: ACK returned to the sender.

The fourth byte: The command length of the sender or the data length of the RS485 sensor returned by the receiver.

The Fifth byte: RS485 command or RS485 return data.