1. General

HM-TRLR-D series is a low cost, high performance transparent transceiver with operating at 433/470/868/915 MHz. It is LoRa/FSK/ GFSK/OOK modulation variety, multi-interface mode(TTL/RS232/RS485), high output power, high sensitivity, long transmission distance and most of the parameters can be set via the command. Receive and send data to automatically switch. It has a wide operating voltage and low sleep current. It is flexible for the users to set the UART baud rate, output power, data rate, frequency select, modulation mode select etc parameters. It is your ideal choice for designing wireless data transmission products which can be widely used on wireless data transmission field.

HM-TRLR-D-YYY-XXX

2. Features

- Low cost, high performance , high reliability
- LoRa/FSK/GFSK/OOK modulation, 2-way half –duplex communication, strong anti-interfere
- 433/470/868/915MHz ISM band，globally license free.
- Maximal output power100mW(20dBm)，output power adjustable between 2-20dBm
- LORA Sensitivity -139dBm
- Supply current for Tx 130mA@20dBm, 35mA@13dBm
- Supply current for Rx 20mA
- Low current sleep mode 2uA
- Wide operating voltage:3.3V-5.5V
- Standard TTL UART/RS232/RS485 interface
- Operation frequency can be configured, acceptable for several modules working in different frequency with no disturbance on each other.
- RF parameters as needed, users can be modulated by software.
- Easily use, auto exchange on communication & transceiver
- Communication speed 1.2kbps -115.2kbps，can be modulated through software
- Afford Sleep control signal，user self control work duty cycle
- With LED indication
- Longer transmission distance，over 5Km in open air
- Small size 26*47*2mm，easy for assembly .
- Tuning free
- Accord FCC,ETSI standard

3. Application

- Remote control, remote measurement
- Access control
- Data collection
- Intelligence household appliance
- Wireless meter
- Identification system
- IT household appliance
- Baby monitoring system

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4. Pin Description

TOP VIEW

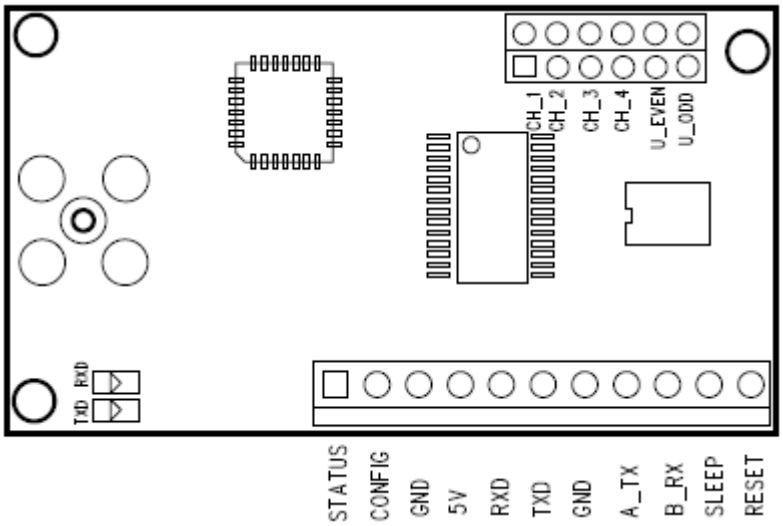

Figure 2. HM-TRLR-D Series Pin Description

Name	Note
STATUS	Dis-connected(when logic 1, output 3.3V voltage)
CONFIG	Set low for configuration mode, while set high for communication
GND	Ground
5V	Power supply,3.3V-5.5V DC power
RXD	TTL Data receiving
TXD	TTL Data transmission
GND	Ground
A_TX	RS485 A (RS232 TX)
B_RX	RS485 B (RS232 RX)
SLEEP	Set low for normal mode for data transceiver , while back to sleep if set high
RESET	Reset trigger input, Active low

5. Maximum specifiction

Parameter	Min	Max	Unit
Power supply(VCC)	-0.3	+5.5	V
Storage temperature	-40	+150	℃
Operate temperature	-20	+85	℃
Reflow temperature		+260	℃

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6. Parameter

Parameter	Condition	Min	Typical	Max	Unit
Power supply(VCC)		3.3		5.5	V
Operate temperature		-20		85	℃
Operate frequency	HM-TRLR-D-YYY-433	414	434	454	MHz
	HM-TRLR-D-YYY-470	450	470	490	
	HM-TRLR-D-YYY-868	849	869	889	
	HM-TRLR-D-YYY-915	895	915	935	
Max output power		18	20		dBm
Output range		2		20	dBm
Receive Sensitivity （FSK/LoRa）	FSK,Fdev=35KHz, DR=1.2Kbps,		-117		dBm
	FSK,Fdev=35KHz, DR=9.6Kbps,		-114		
	LoRa SBW= 62.5KHz SF=12		-139		
	LoRa SBW= 500KHz SF=12		-130		
Tx Current	20dBm output power		120		mA
	13dBm output power		35		
Rx Current		18	20	22	mA
Sleep Current		TBD	8	12	uA
Modulate deviation	FSK mode	10		50	KHz
Receive bandwidth	FSK mode	42		166	KHz
UART Data Rate		1.2		115.2	Kbps
UART data bit			8		bit
UART stop bit			1		bit

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7. HM-TRLR-D Series Application Circuit

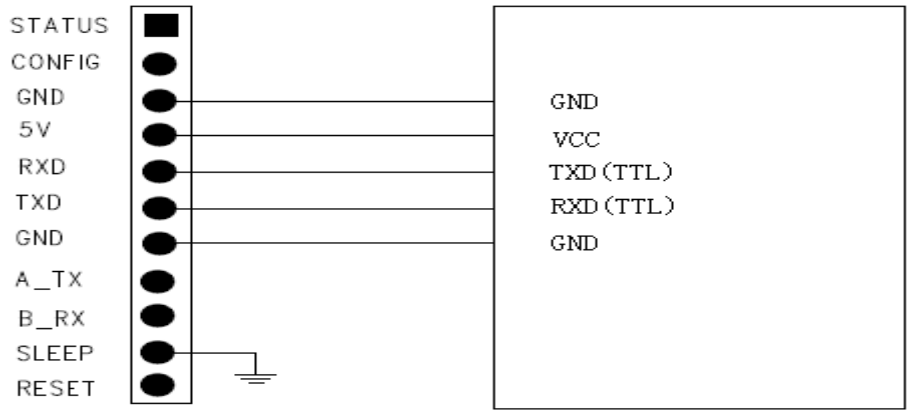

Figure 3.HM-TRLR-D TTL UART Simple Application

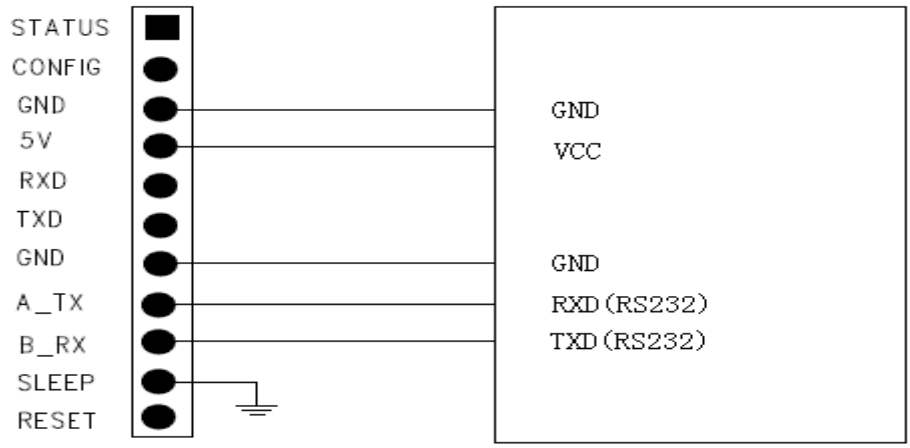

Figure 4. HM-TRLR-D RS232 Simple application

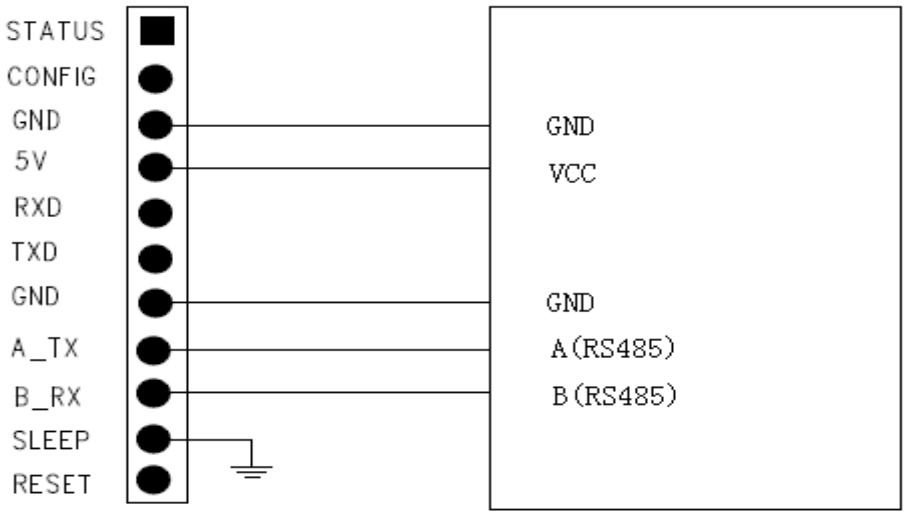

Figure 5. HM-TRLR-D RS485 Simple application

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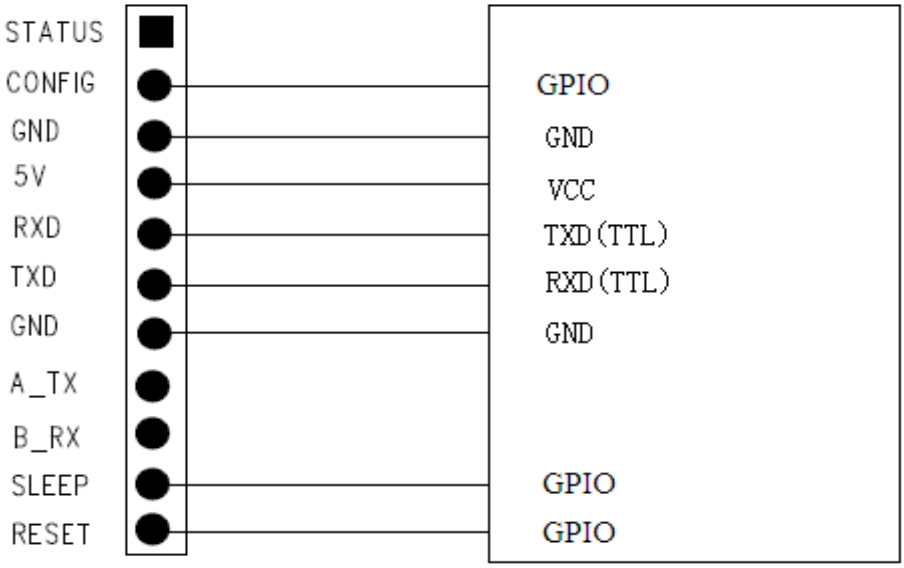
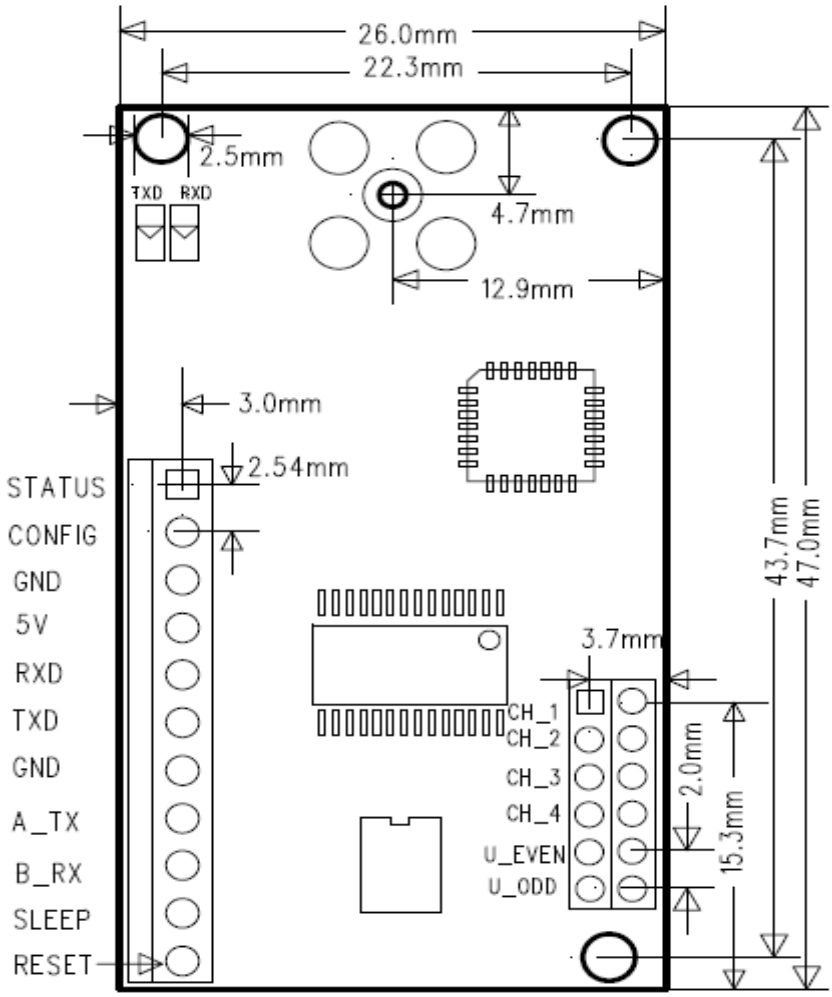


Figure 6.HM-TRLR-D TTL UART Complete Application

8. Mechanical Dimension（size unit：mm）



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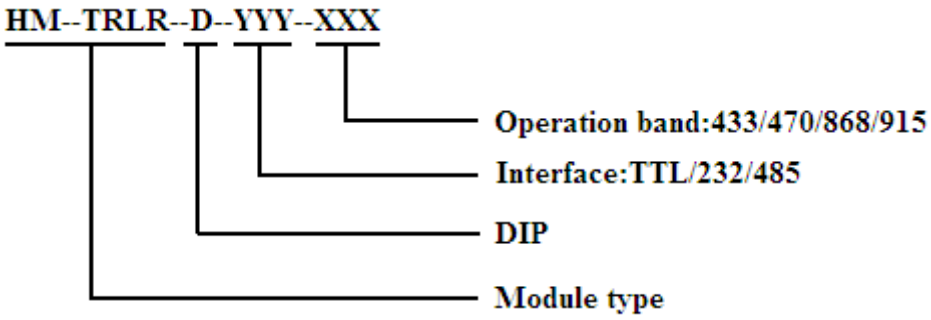
9. Ordering Information

Part Number=Module type – Package type – Interface type – Operation band



Part Number	Interface	Operation Band
HM-TRLR-D-TTL-433	TTL	433MHZ
HM-TRLR-D-TTL-470	TTL	470MHZ
HM-TRLR-D-TTL-868	TTL	868MHZ
HM-TRLR-D-TTL-915	TTL	915MHZ
HM-TRLR-D-232-433	232	433MHZ
HM-TRLR-D-232-470	232	470MHZ
HM-TRLR-D-232-868	232	868MHZ
HM-TRLR-D-232-915	232	915MHZ
HM-TRLR-D-485-433	485	433MHZ
HM-TRLR-D-485-470	485	470MHZ
HM-TRLR-D-485-868	485	868MHZ
HM-TRLR-D-485-915	485	915MHZ

Table 4: Part Number list

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（二）Operation and Applications

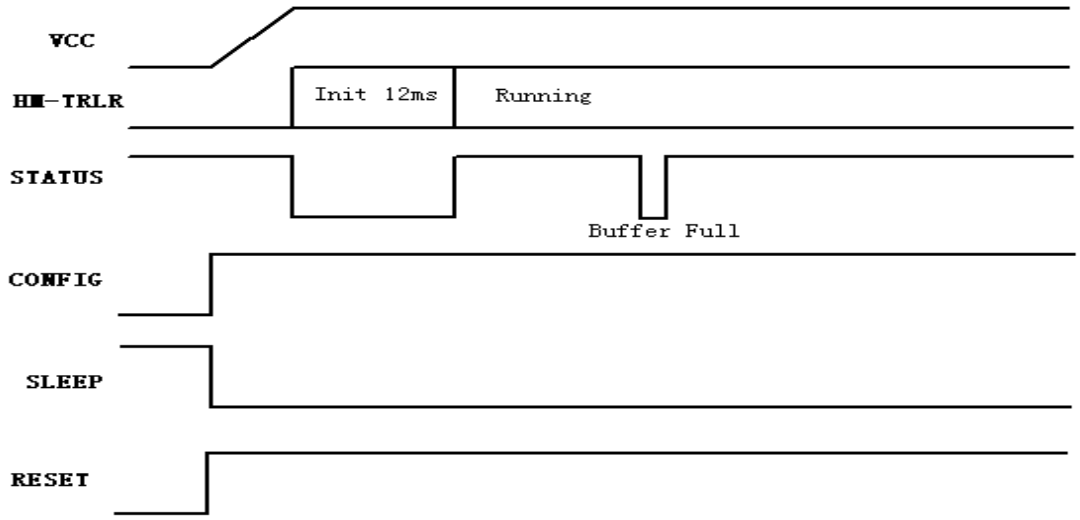
1. Modulation mode

HM-TRLR series transceiver module can work with the traditional FSK/GFSK modulation mode, also can work in LoRa modulation mode. The user according to the application requirements, can easily switch in modulation mode. Use principle need large quantities of data use FSK/GFSK modulation; The occasion of long distance transmission is required, use LoRa modulation.

2.Work mode

HM-TRLR series transceiver module has three work modes: running mode, configuration mode and sleep mode. When the module work in the running mode, the user can send and receive data. When the module work in configuration mode, the user can according to his requirement, through the AT command to change configuration parameters. Sleep mode module into low power consumption mode.

- **Running mode timing scheme**



Attention: During the modulation mode in LoRa receive buffer is full,the STATUS will lower the output to prompt the user.

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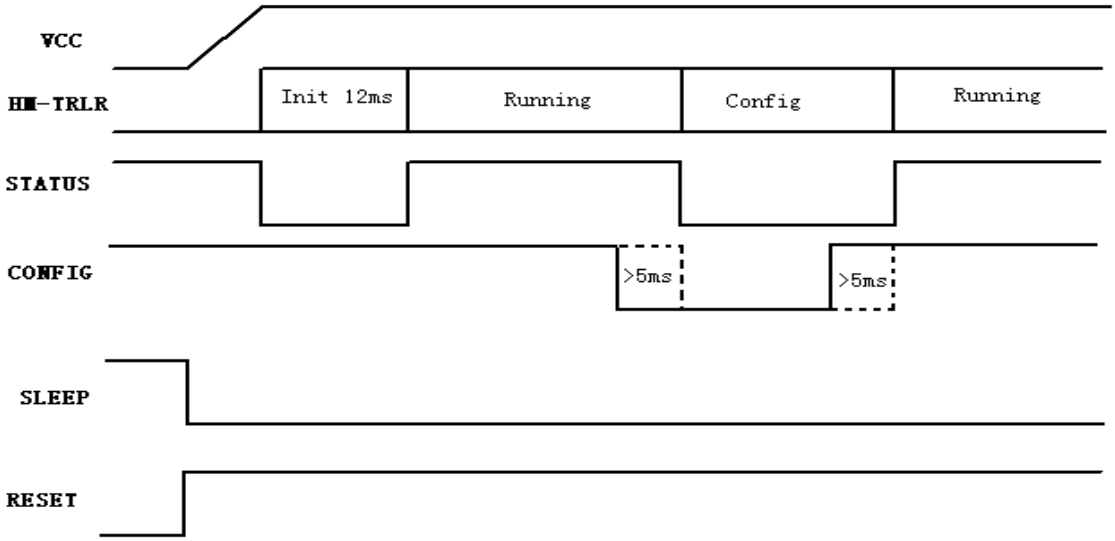
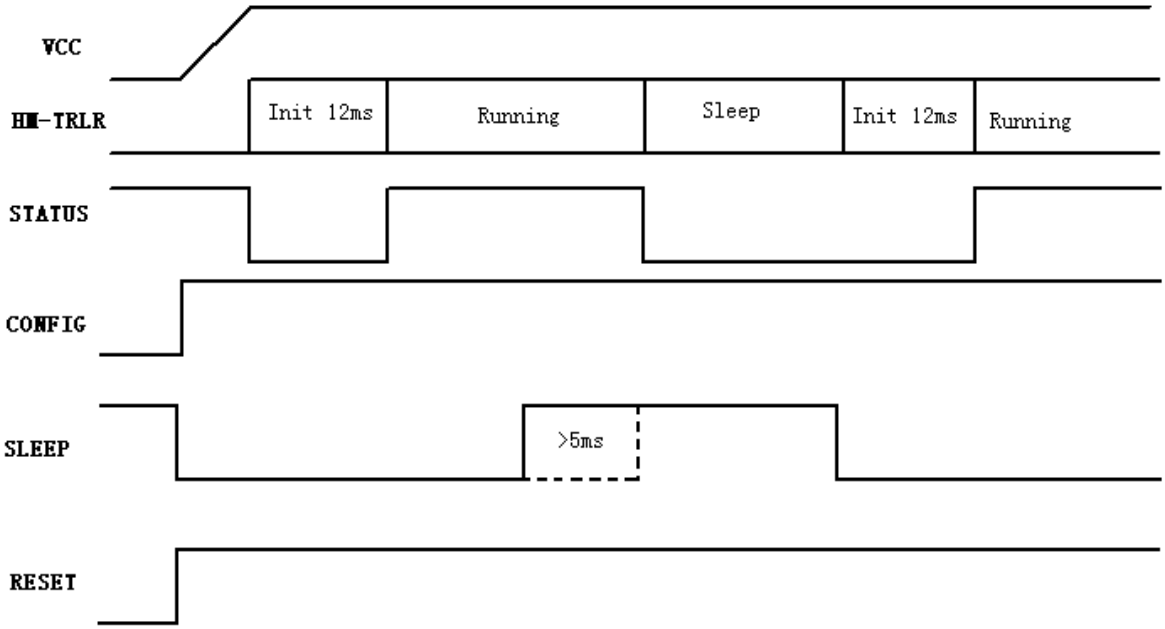
Configuration mode scheme



Attention:When enter to the configuration mode ,through to pull down the the CONFIG ,while the STATUS goes low. The user can change the parameter by AT command.

Sleep mode timing scheme



Attention: Sleep mode is control by SLEEP.

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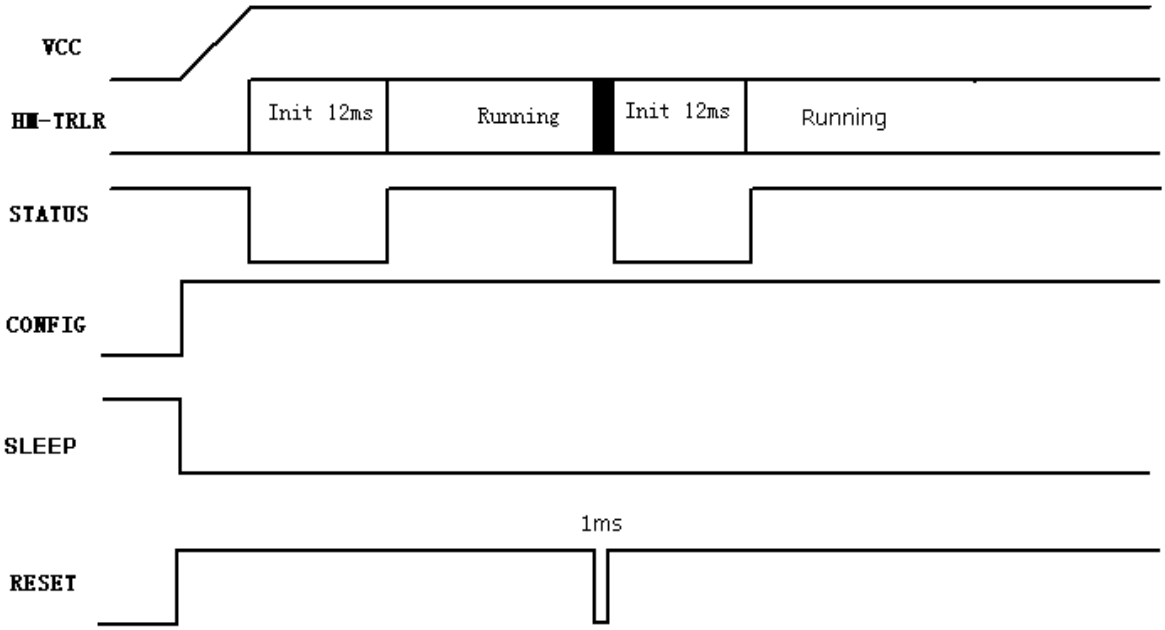
- **Reset mode timing scheme**



3.Channel frequency

HM-TRLR series module have different working frequencies according to its model.
The frequencies have divided to 16 channel. Frequencies list is as follow(Black said Jumper).

Select	Channel	433MHz Band	470MHz Band	868MHz Band	915MHZ Band
CH_1○○ CH_2○○ CH_3○○ CH_4○○	0	430000000.00	470000000.00	863000000.00	915000000.00
CH_1●● CH_2○○ CH_3○○ CH_4○○	1	430500000.00	470400000.00	863500000.00	915500000.00
CH_1○○ CH_2●● CH_3○○ CH_4○○	2	431000000.00	470800000.00	864000000.00	916000000.00
CH_1●● CH_2●● CH_3○○ CH_4○○	3	431500000.00	471200000.00	864500000.00	916500000.00
CH_1○○ CH_2○○ CH_3●●	4	432000000.00	471600000.00	865000000.00	917000000.00

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CH_4○○					
CH_1●● CH_2○○ CH_3●● CH_4○○	5	432500000.00	472000000.00	865500000.00	917500000.00
CH_1○○ CH_2●● CH_3●● CH_4○○	6	433000000.00	472400000.00	866000000.00	918000000.00
CH_1●● CH_2●● CH_3●● CH_4○○	7	433500000.00	472800000.00	866500000.00	918500000.00
CH_1○○ CH_2○○ CH_3○○ CH_4●●	8	434000000.00	473200000.00	867000000.00	919000000.00
CH_1●● CH_2○○ CH_3○○ CH_4●●	9	434500000.00	473600000.00	867500000.00	919500000.00
CH_1○○ CH_2●● CH_3○○ CH_4●●	10	435000000.00	474000000.00	868000000.00	920000000.00
CH_1●● CH_2●● CH_3○○ CH_4●●	11	435500000.00	474400000.00	868500000.00	920500000.00
CH_1○○ CH_2 ○○ CH_3●● CH_4●●	12	436000000.00	474800000.00	869000000.00	921000000.00
CH_1●● CH_2○○ CH_3●● CH_4●●	13	436500000.00	475200000.00	869500000.00	921500000.00
CH_1○○ CH_2●● CH_3●● CH_4●●	14	437000000.00	475600000.00	870000000.00	922000000.00
CH_1●● CH_2●● CH_3●● CH_4●●	15	437500000.00	476000000.00	870500000.00	922500000.00

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4.Serial port check select

Module and controller using UART, we can select check mode((Black said Jumper).

Select	Parity
U_EVEN○○ U_ODD ○○	None Check
U_EVEN●● U_ODD ○○	EVEN Check
U_EVEN○○ U_ODD ●●	Odd Check

5.Wireless rate

- When the HM-TRLR module is working on FSK modulation. The wireless rate conform to baud rate. Theoretically it can transmit data boundless. We suggest that if the data package is too large ,you should use the subcontract transmission in order to avoid the air data interference.

- When the HM-TRLR module is working on LoRa modulation. The wireless rate is depend on signal bandwidth、spreading factor、coding rate、payload length.. However the receiver sensitivity is depend on signal bandwidth and spreading factor. The following table shows the relationship between the wireless rate and parameter.

Test conditions:
- Supply voltage = 3.3 V
- Temperature = 25° C
- CRC on payload enabled
- Payload length = 64 bytes
- Coding Rate = 1

SingnalBandWidth	SpreadingFactor	Sensitivity(dbm)	ActualBandRate(pbs)
62.5kHz	SF=7	-126	2169
62.5kHz	SF=8	-129	1187
62.5kHz	SF=9	-132	656
62.5kHz	SF=10	-135	296
62.5kHz	SF=11	-137	164
62.5kHz	SF=12	-139	91
125kHz	SF=7	-123	4338
125kHz	SF=8	-126	2375
125kHz	SF=9	-129	1312
125kHz	SF=10	-132	733
125kHz	SF=11	-133	328
125kHz	SF=12	-136	183
250kHz	SF=7	-120	8676
250kHz	SF=8	-123	4750
250kHz	SF=9	-125	2624
250kHz	SF=10	-128	1466
250kHz	SF=11	-130	778

250kHz	SF=12	-133	366
500kHz	SF=7	-118	17353
500kHz	SF=8	-121	9501
500kHz	SF=9	-124	5249
500kHz	SF=10	-127	2932
500kHz	SF=11	-129	1557
500kHz	SF=12	-130	830

6.Frequency Hopping with LoRa

Frequency hopping spread spectrum (FHSS) is typically employed when the duration of a single packet could exceed regulatory requirements relating to the maximum permissible channel dwell time. This is most notably the case in US operation where the 902 to 928 MHz ISM band which makes provision for frequency hopping operation. To ease the implementation of FHSS systems the frequency hopping mode of the LoRa modem can be enabled by setting hopping period and Frequency step .

The formula relations:

HoppingPeriod(ms) = (2^{SF}/BW)* FreqHoppingValue

SF = SpreadingFactor

BW = SingnalBandWidth

FreqHoppingValue = 1~255

FreqStep = 61Hz*FreqStepValue

FreqStepValue = 0~65535

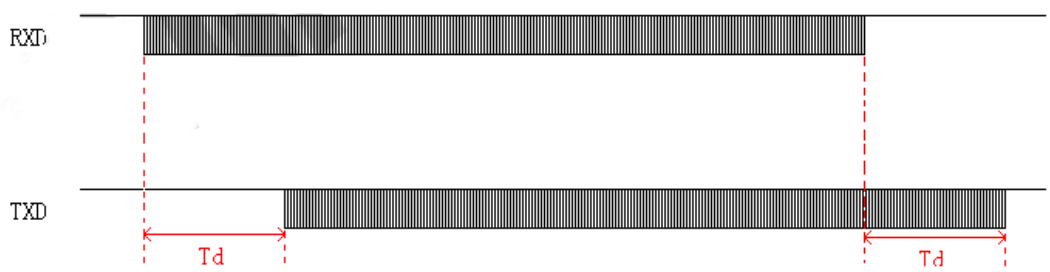
7.Node ID Function with FSK

When HM-TRLR working in FSK. The module can be set up the node ID. When the ID function is enable ,The sender first send the receiver node ID bytes, The receiver only receive with its node ID that matches the data. When the Node ID function enable cases, The module can also set the broadcast ID function, If broadcast function enable, The receiver can receive node ID of the data, but also receives the broadcast data.

Note: when the ID function is enabled, Interval time of two frame greater than Td time, The first byte of each frame is a node ID or broadcast ID.

8. Td Delay time

- **FSK modulate Td time**
  Data into RXD pin of module 1,Then data from module 2 TXD pin out, The time spent
  The diagram below:



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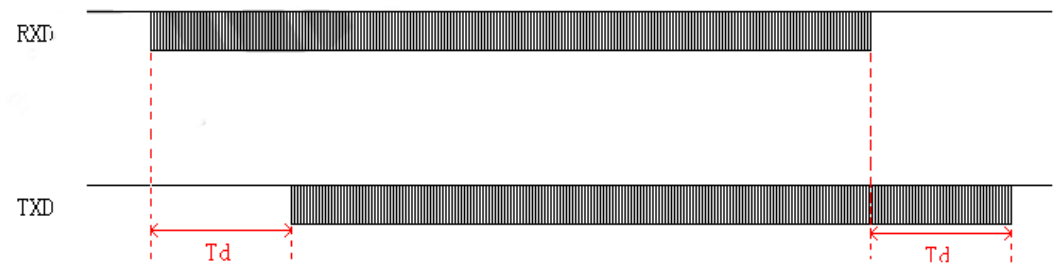
BandRate(bps)	Td
1200	73ms
2400	37ms
4800	19ms
9600	10ms
14400	7ms
19200	6ms
38400	4ms
56000	3ms
57600	3ms
115200	2ms

- **LoRa modulate Td time**

In LoRa modulation, Wireless data transmission is the subcontract, If the length of data is more than payload length and wireless rate less than the rate of serial port, The receiver of data will be interrupted. In the sending end, If the receive buffer is full the STATUS will lower the output to prompt the user.

Wireless rate is greater than the rate of serial port, As the following figure.



Wireless rate is less than the rate of serial port, As the following figure.

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Testing Conditions:

- Spread Factor = 9
- Singal Band Width = 250kHz
- Code Rate = 1
- PayLoad = 32 bytes

BaudRate（bps）	Td
1200	Max 410ms
2400	Max 270ms
4800	Max 200ms
9600	Max 166ms
14400	Max 153ms
19200	Max 146ms
38400	Max 138ms
56000	Max 136ms
57600	Max 135ms
115200	Max 134ms

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(三) HM-TRLR-S AT Instruction

1.Introduction

The controller through IO port make HM-TRLR-S transceiver been to configuration mode.Then through serial port send AT command to Modify the performance parameters.

2.Command format

Command used capital letter ASCII to write and used <CR> to end. When to module receive command it will explain and reply it.

2.1 Set the command format

The controller use command to set up HM-TRLR-S transceiver parameters. Command set AT as the beginning,then command type and parameters, etc.

Command format: AT+CmdType=Para1,Para2…<CR>
Successfuly command reply: OK<CR>
Command fail reply:ERROR:n<CR>

2.2 Read Command format

The controller read command format to HM-TRLR-S transceiver parameter.Command set AT as the beginning,then command type and question marks, etc.

Command format: AT+CmdType=?<CR>
Successfuly command reply: CmdType:Para1,Para2…<CR>
Command fail reply:ERROR:m<CR>

2.3 Return error parameters

When command execution error, the module will return ERROR: n.

parameter	Value	remark
m	0~2	m = 0：The command format is wr ng. m = 1：The parameter is wrong. m = 2：The command is failed.

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3. Command type

3.1 Set Uart BaudRate command

The baudrate refers to the controller communication speed, when set, after the completion of new baudrate takes effect immediately, The controller should with new baudrate and communication module.

Table 3-1.1 AT+SPR(SerialPortRate) command

Command type	Command	response	remark
Set command	AT+SPR=n	OK	Succeed:OK , Failure:ERROR:m
		ERROR:m	
Read command	AT+SPR=?	+SPR:n	Succeed: +SPR:n, Failure:ERROR:m
		ERROR:m	

Table 3-1.2 Parameters

Parameter	Range	remark
n	0~9	0--1200bps 5--19200bps 1--2400bps 6--38400bps 2--4800bps 7--56000bps 3--9600bps 8--57600bps 4--14400bps 9--115200bps

3.2 Transmit power command

Transmit power command means the Transmit power of module.It will work
When the setting is completed and exit the configuration mode.

Table 3-2.1 AT+POWER command

Command type	Command	response	remark
Set command	AT+POWER=n	OK	Succeed:OK Failure:ERROR:m
		ERROR:m	
Read command	AT+POWER=?	+POWER:n	Succeed:+POWER:n , Failure:ERROR:m
		ERROR:m	

Table 3-2.2 Parameters

Parameter	Range	remark
n	0~7	0—20dbm 5—8dbm 1—17dbm 6—5dbm 2—15dbm 7—2dbm 3—10dbm

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3.3 AT+SYNW command

Module sync word can be set by 1-8 bytes.Module can't communicate with different sync word.

Table 3-3.1 AT+SYNW Command

Command type	Command	response	remark
Set command	AT+SYNW=XXYYZZ…	OK	Succeed:OK Failure:ERROR:m
		ERROR:m	
Read command	AT+ SYNW =?	+SYNW: XXYYZZ…	Failure:ERROR:m
		ERROR:m	

Table 3-3.2 Parameters

Parameter	Range	remark
XXYYZZ …	Less than 16 characters	Used 0~9, A~F character to express

For example :if sync word is "0x12,0x34,0xAB,0xEF",Then AT command is :
"AT+SYNW=1234ABEF\r\n"

3.4 AT+SYNL (Syncwordlength) Command

Module sync word can be set by0-8 bytes.Module can't communicate with different sync word. Suggest that the sync word should more than 2. if is '0' ,there is no sync word.

Table 3-4.1 AT+SYNL Command

Command type	Command	response	remark
Set command	AT+SYNL=n	OK	Succeed:OK Failure:ERROR:m
		ERROR:m	
Read command	AT+ SYNL =?	+SYNL: n	Failure:ERROR:m
		ERROR:m	

Table 3-4.2 parameter

Parameter	Range	remark
n	0~8	

3.5 AT+NODE command

In FSK mode. The node function can be set.

Table 3-5.1 AT+NODE command

Command type	Command	response	remark
Set command	AT+NODE=n,mode	OK	Succeed:OK Failure:ERROR:m
		ERROR:m	
Read command	AT+ NODE =?	+NODE: n,mode	Failure:ERROR:m
		ERROR:m	

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Table 3-5.2 parameter

Parameter	Range	remark
n	0~1	0—Node function disable 1—Node function enable
mode	0~1	0—only match NID 1-match NID and BID

3.6 Node ID command

In FSK mode. The node ID can be set.

Table 3-6.1 AT+NID Command

Command type	Command	response	remark
Set command	AT+NID=n…	OK ERROR:m	Succeed:OK Failure:ERROR:m
Read command	AT+ NID =?	+NID:n ERROR:m	Failure:ERROR:m

Table 3-6.2 parameter

Parameter	Range	Instruction
0	0~255	

3.7 AT+BID command

In FSK mode ,AT+BID can be set.

Table 3-7.1 AT+BID command

Command type	Command	response	remark
Set command	AT+BID=n…	OK ERROR:m	Succeed:OK Failure:ERROR:m
Read command	AT+ BID =?	+BID:n ERROR:m	Failure:ERROR:m

Table 3-7.2 parameter

Parameter	Range	remark
0	0~255	

3.8 AT+LRCRC command

In LoRA mode,CRC Function enable or disable

Table 3-8.1 AT+LRCRC command

Command type	Command	response	remark
Set command	AT+LRCRC=n	OK ERROR:m	Succeed:OK Failure:ERROR:m
Read command	AT+LRCRC=?	+LRCRC:n ERROR:m	Failure:ERROR:m

Table 3-8.2 parameter

Parameter	Range	remark
n	0~1	0-disabe CRC function 1-enable CRC function

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3.9 LoRa Signal Band Width choose command.

In the LoRa mode, According to the demand to set signal band width. The larger this value, then Wireless rate is faster.

Table 3-9.1 AT+LRSBW(Signal Band Width)command

Command type	Command	response	remark
Set command	AT+LRSBW=n	OK	Succeed:OK
		ERROR:m	Failure:ERROR:m
Read command	AT+LRSBW=?	+LRBW:n	Succeed: +LRSBW:n,
		ERROR:m	Failure:ERROR:m

Table 3-9.2 parameter

Parameter	Range	remark
n	6~9	6—62.5KHZ 7—125KHZ 8—250KHZ 9—500KHZ

3.10 LoRa spreading factor choose command

When the module in the Lora mode. You can set spreading factor according to the demand. If the larger the value of SF, The higher receiving sensitivity and the slower of wireless rate

Table 3-10.1 AT+LRSF(Spreading Factor) command

Command type	Command	response	remark
Set command	AT+LRSF=n	OK	Succeed:OK
		ERROR:m	Failure:ERROR:m
Read command	AT+LRSF=?	+LRSF:n	Succeed: +LRSF:n,
		ERROR:m	Failure:ERROR:m

Table 3-10.2 Parameter

Parameter	Range	remark
n	7~C	7—SF=7 A—SF=10 8—SF=8 B—SF=11 9—SF=9 C—SF=12

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3.11 LoRa Forward Error Correction Code choose command.

When the module in the LoRa mode.Data transfer adopt Forward Error Correction Code ,this command is choose it Coding Rate.

Table 3-11.1 AT+LRCR(Coding Rate)Command

Command type	Command	response	remark
Set command	AT+LRCR=n	OK	Succeed:OK Failure:ERROR:m
		ERROR:m	
Read command	AT+LRCR=?	+LRCR:n	Succeed: +LRCR:n, Failure:ERROR:m
		ERROR:m	

Table 3-11.2 Parameter

Parameter	Range	remark
n	0~3	0—CR4/5 1—CR4/6 2—CR4/7 3—CR4/8

3.12 LoRa hopping enable command.

When the module in the LoRa mode, module has FHSS function.

Table 3-12.1 AT+LRHF(HFSS) Command

Command type	Command	response	remark
Set command	AT+LRHF=n	OK	Succeed:OK Failure:ERROR:m
		ERROR:m	
Read command	AT+LRHF=?	+HFSS:n	Succeed: +HFSS:n, Failure:ERROR:m
		ERROR:m	

Table 3-12.2 Parameter

Parameter	Rang	remark
n	0~1	0-disable HFSS function 1- enable HFSS function note: when SBW=500kHz and SF =12, HFSS function disable

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3.13 LoRa Data packet Length set command.

When the module in the LoRa mode.Data transmission in the form of subcontract, this command to set the length of data packet.

Table 3-13.1 AT+LRPL(Packet Length) Command

Command type	Command	response	Instruction
Set command	AT+LRPL=n	OK	Succeed:OK Failure:ERROR:m
		ERROR:m	
Read command	AT+LRPL=?	+LRPL:n	Succeed: +LRPL:n Failure:ERROR:m
		ERROR:m	

Table 3-13.2 Parameter

Parameter	Range	Instruction
n	1~127	1~127 data rang is 1~127byte suggest: more than 16

3.14 LoRa hopping period value command.

When the module in the LoRa mode, the hopping period value can be set.

Table 3-14.1 AT+LRHPV(Hopping Period Value) Command

Command type	Command	response	remark
Set command	AT+LRHPV=n	OK	Succeed:OK Failure:ERROR:m
		ERROR:m	
Read command	AT+LRHPV=?	+LRHPV:n	Succeed: +LRHPV:n Failure:ERROR:m
		ERROR:m	

Table 3-14.2 Parameter

Parameter	Range	remark
n	0~255	Suggest: More than 5

3.15 LoRa Frequency Step Value command.

When the module in the Lora mode, Frequency Step Value can be set.

Table 3-15.1 AT+LRFSV(Frequency Step Value) command

Command type	Command	response	remark
Set command	AT+LRFSV=n	OK	Succeed:OK Failure:ERROR:m
		ERROR:m	
Read command	AT+LRFSV=?	+LRFSV:n	Failure:ERROR:m
		ERROR:m	

Table 3-15.2 Parameter

Parameter	Range	remark
n	0~65535	

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3.16 Mode command

The modulation of HM-TRLR can be changed,

Table 3-16.1 AT+MODE Command

Command type	Command	response	remark
Set command	AT+MODE=n	OK	Succeed:OK Failure:ERROR:m
		ERROR:m	
Read command	AT+MODE =?	+MODE:n	Failure:ERROR:m
		ERROR:m	

Table 3-16.2 Parameter

Parameter	Range	remark
n	0~3	0–LoRa Mode 1–OOK Mode 2–FSK Mode 3–GFSK Mode In the OOK mode, baudrate no more than 9600 bps

3.17 AT+BAND Command

Frequence band can be changed.

Table 3-17.1 AT+BAND Command

Command type	Command	response	remark
Set command	AT+BAND=n	OK	Succeed:OK Failure:ERROR:m
		ERROR:m	
Read command	AT+BAND=?	+BAND:n	Failure:ERROR:m
		ERROR:m	

Table 3-17.2 Parameter

Parameter	Range	remark
n	0~3	0--434MHZ Band 1--470MHZ Band 2--868MHZ Band 3--915MHZ Band

3.18 Test command

Connect test .

Table 3-18.1 AT Command

Command type	Command	response	remark
command	AT	OK	Failed: ERROR:m
		ERROR:m	

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3.19 AT&W command

When parameters was changed. HM-TRLR can't save parameters into Flash Memory automatically . If you want to permanently save the parameters, use the AT&W command for save.

Notice: written times of Flash memory are limited. To avoid damage, the written times within 10000 times is the best.

Table 3-19.1 AT&W command

Command type	Command	response	remark
Set command	AT&W	OK ERROR:m	Failed: ERROR:m

3.20 Default setting

1)HM-TRLR-D-YYY-433 Module default setting

Command	default	remark
AT+SPR=n	n=3	Baud rate 9600pbs
AT+POWER=n	n=0	Power 20dbm
AT+SYNL=n	n=6	6 bytes
AT+NODE=n,mode	n=0,mode=0	Disable ID Node function
AT+LRCRC=n	n=1	Lora mode,CRC enable
AT+LRSBW=n	n=7	SBW = 125KHz
AT+LRSF=n	n=9	SF = 9
AT+LRCR=n	n=0	CodeRate=4/5
AT+LRHF=n	n=0	FHSS is disable
AT+LRPL=n	n=32	Package lenth 32bytes
AT+LRHPV=n	n=10	Hopping period
AT+LRFSV=n	n=1638	Frequence step 100KHz
AT+MODE=n	n=0	LoRa mode
AT+BAND=n	n=0	433MHz band

2)HM-TRLR-D-YYY-470 Module default setting

Command	default	remark
AT+SPR=n	n=3	Baud rate 9600pbs
AT+POWER=n	n=0	Power 20dbm
AT+SYNL=n	n=6	6 bytes
AT+NODE=n,mode	n=0,mode=0	Disable ID Node function
AT+LRCRC=n	n=1	Lora mode,CRC enable
AT+LRSBW=n	n=7	SBW = 125KHz
AT+LRSF=n	n=9	SF = 9
AT+LRCR=n	n=0	CodeRate=4/5
AT+LRHF=n	n=0	FHSS is disable
AT+LRPL=n	n=32	Package lenth 32bytes
AT+LRHPV=n	n=10	Hopping period
AT+LRFSV=n	n=1638	Frequence step 100KHz
AT+MODE=n	n=0	LoRa mode
AT+BAND=n	n=1	470 MHz band

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3)HM-TRLR-D-YYY-868 Module default setting

Command	default	remark
AT+SPR=n	n=3	Baud rate 9600pbs
AT+POWER=n	n=0	Power 20dbm
AT+SYNL=n	n=6	6 bytes
AT+NODE=n,mode	n=0,mode=0	Disable ID Node function
AT+LRCRC=n	n=1	Lora mode,CRC enable
AT+LRSBW=n	n=7	SBW = 125KHz
AT+LRSF=n	n=9	SF = 9
AT+LRCR=n	n=0	CodeRate=4/5
AT+LRHF=n	n=0	FHSS is disable
AT+LRPL=n	n=32	Package lenth 32bytes
AT+LRHPV=n	n=10	Hopping period
AT+LRFSV=n	n=1638	Frequence step 100KHz
AT+MODE=n	n=0	LoRa mode
AT+BAND=n	n=2	868MHz band

4)HM-TRLR-D-YYY-915 Module default setting

Command	default	remark
AT+SPR=n	n=3	Baud rate 9600pbs
AT+POWER=n	n=0	Power 20dbm
AT+SYNL=n	n=6	6 bytes
AT+NODE=n,mode	n=0,mode=0	Disable ID Node function
AT+LRCRC=n	n=1	Lora mode,CRC enable
AT+LRSBW=n	n=7	SBW = 125KHz
AT+LRSF=n	n=9	SF = 9
AT+LRCR=n	n=0	CodeRate=4/5
AT+LRHF=n	n=0	FHSS is disable
AT+LRPL=n	n=32	Package lenth 32bytes
AT+LRHPV=n	n=10	Hopping period
AT+LRFSV=n	n=1638	Frequence step 100KHz
AT+MODE=n	n=0	LoRa mode
AT+BAND=n	n=3	915MHz band

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4、Document Change List

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1.0	*All*	*Initial released version*	*2014-3*
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