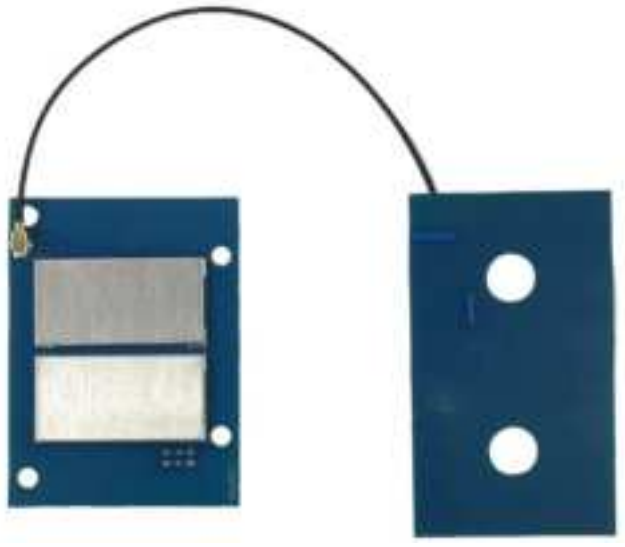
REYAX

27-NOV-2024 56312E32

RYRR20W

User Manual



Protocol Format

Baud rate=19200bps

Data sent format

Length	Command	Data	Checksum

- Length: 1 byte, number of bytes from Length byte to the last byte of Data.
- Command: 1 byte, Application-layer command.
- Data: length depends on the command type, from 0x00 to 0xFC bytes.
- Checksum: 1 byte, Exclusive OR (XOR) results from length byte to the last byte of data.

Data returned format

- Success:

Length	Command	Data	Checksum

- Failure:

Length	Invert Command	Checksum

NOTE: "Failure" means that the communication between module and card failed.

1. ISO14443A TYPE A Request

Function: IS014443A request cards,cards include MIFARE and other ISO14443A cards. In the returned results, user could judge the length of serial number via the returned data package length, and judge the card type by ATQA, also judge whether the card supports ISO14443-4 by SAK.

Host sends:

Frame	0x20	Mode	Checksum

Mode: 1 byte, 0 : WUPA; 1 : REQA;

Success

Frame	0x20	Data	Checksum

Data:4, 7 or 10 bytes card serial number + 2bytes ATQA + 1byte SAK.
*Please also judge the card type by ATQA & SAK, for the ATQA and SAK values of different card type, please consult the RFID IC manufacturer.

Failure:

Frame	0xDF	Checksum

Example: (use WUPA)	
Send:	0x03 0x20 0x00 0x23
Receive:	0x0C 0x20 0x12 0x4B 0xCC 0xD3 0x81 0x3A 0x77 0x44 0x00 0x00 0xE2
UID:	124BCCD3813A77

2. MIFARE Ultralight EV1 / Ultralight C Card Read

Function: Read the data from MIFARE Ultralight EV1 / Ultralight C cards. A read command will read 4 blocks data from the card. If read start block is the last block (Ox0F), then these 4 blocks data are the 15th, 0th, 1st and 2nd block.

Host sends:

Frame	0x41	Start Block	Checksum

Start Block: 1 byte,the start block number to be read.

Success

Frame	0x41	Data	Checksum

Data:16 bytes card data of 4 blocks, a read operation read 4 blocks from the start block.

Failure:

Frame	0xBE	Checksum

Example: (Read block number data= 0x08)	
Send:	0x03 0x41 0x08 0x4A
Receive:	0x12 0x41 0x11 0x22 0x33 0x44 0x55 0x66 0x77 0x88 0x99 0xAA 0xBB 0x12 0x34 0x45 0x6C 0xDE 0x82
Read block08 Data:	0x11 0x22 0x33 0x44 0x55 0x66 0x77 0x88 0x99 0xAA 0xBB 0x12 0x34 0x45 0x6C 0xDE

3. FeliCa Read TAG UID

Function: Use this command to acquire and identify a card. Acquisition of Manufacture ID (Im) and Manufacture Parameter (PMm) is possible with this command.

Host sends:

Frame	0x2F	APDU command	Checksum

APDU: 0x06 00 FF FF 01 01

Success

Frame	0x2F	Response	Checksum

Response: Felica card answers.

Failure:

Frame	0xD0	Checksum

Example: (issue APDU command= 06 00 FF FF 01 01)	
Send:	0x08 0x2F 0x06 0x00 0xFF 0xFF 0x01 0x01 0x21
Receive:	0x16 0x2F 0x14 0x01 0x01 0x2E 0x3D 0x23 0xBA 0x07 0x5C 0x45 0x00 0xF1 0x00 0x00 0x00 0x01 0x43 0x00 0x88 0xB4 0x36
IDm:	012E3D23BA075C45
PMm:	00F1000000014300
System code:	88B4

4. FeliCa Read Without Encryption

Function: Use this command to read Block Data.

Host sends:

Frame	0x2F	APDU command	Checksum

APDU: 0x10 06 01 2E 3D 23 BA 07 5C 45 01 09 00 01 80 00

Success

Frame	0x2F	Response	Checksum

Response: Felica card answers.

Failure:

Frame	0xD0	Checksum

Example: (UID: 012E3D23BA075C45 Read block 08 data)	
Send:	0x12 0x2F 0x10 0x06 0x01 0x2E 0x3D 0x23 0xBA 0x07 0x5C 0x45 0x01 0x09 0x00 0x01 0x80 0x08 0x3F
Receive:	0x1F 0x2F 0x1D 0x07 0x01 0x2E 0x3D 0x23 0xBA 0x07 0x5C 0x45 0x00 0x00 0x01 0x00 0x00 0x11 0x22 0x33 0x44 0x55 0x66 0x66 0x66 0x66 0x66 0x66 0x66 0x66 0x66 0xC9
Read Block08 Data:	0x00 0x00 0x11 0x22 0x33 0x44 0x55 0x66 0x66 0x66 0x66 0x66 0x66 0x66 0x66 0x66

5. ISO15693 Inventory

Function: Find a card in RF effective field. If success, to set the tag as CURRENT TAG.

Host sends:

Frame	0x5C	AFI	Checksum

AFI: 1byte AFI ,detect card equal to AFI only.
If not use AFI, then host sends:

Frame	0x5C	Checksum

Success

Frame	0x5C	UID	Checksum

UID: 8bytes(LSB in first), UID of CURRENT TAG.

Failure:

Frame	0xD0	Checksum

Example:	
Send:	0x03 0x5C 0x00 0x5F
Receive:	0x0A 0x5C 0x17 0xC7 0xBA 0x76 0x50 0x01 0x04 0xE0 0xFF
UID:	17 C7 BA 76 50 01 04 E0

6. ISO15693 Read Single Block

Function: Read data block of CURRENT TAG.

Host sends:

Frame	0x54	BlockNumber	Checksum

BlockNumber: 1byte, the block number to be read.

Success

Frame	0x54	Data	Checksum

Failure:

Frame	0xD0	Checksum

Example: Read block 01 data	
Send:	0x03 0x54 0x01 0x56
Receive:	0x06 0x54 0xAA 0xAA 0xAA 0xAA 0x52
Read Block01 Data:	0xAA 0xAA 0xAA 0xAA

7. ISO14443B Request

Function: ISO14443-4 TYPE B card request.

Host sends:

Frame	0x60	Mode	AFI	Checksum

Mode: 1 byte, 0 : WUPB ; 1 : REQB
AFI : 1 byte,the AFI to request,if request all AFI,please use 0x00.

Success

Frame	0x60	Data	Checksum

Data: Total 13 bytes,12 bytes of ATQB: 0x50(1 bytes), PUPI(4 bytes), application data(4 bytes), protocol information(3 bytes), none : 0x00.

Failure:

Frame	0x9F	Checksum

Example: (use WUPA)	
Send:	0x04 0x60 0x00 0x00 0x64
Receive:	0x0F 0x60 0x50 0x6D 0xE3 0xE3 0x20 0x47 0x48 0x00 0x20 0x80 0x81 0x71 0x00 0x2D
PUPI:	0x6D 0xE3 0xE3 0x20
Application data:	0x47 0x48 0x00 0x20
Protocol information:	0x80 0x81 0x71

8. **Query Firmware Version**

Send:	0108000304FE0000
Receive:	REYAX RYRR20W V1.0-4

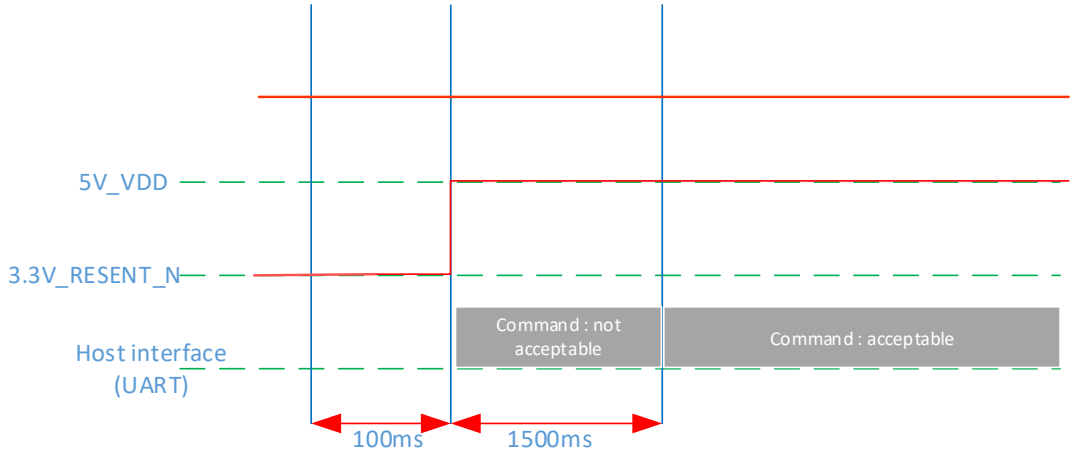
9. **Software Reset**

Send:	0108000304000000
Receive:	RESET

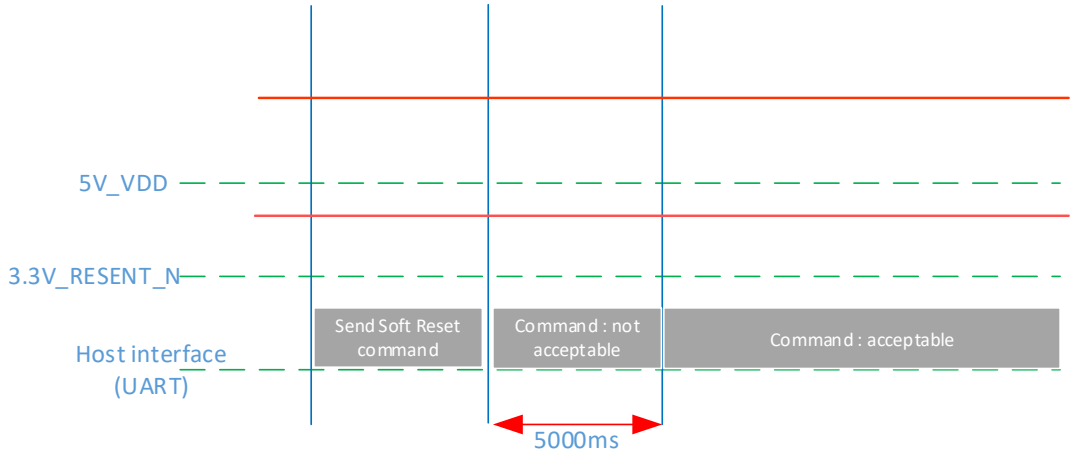
Notice:

1. Please refer to page11~13 for the boot sequence and command response sequence. If want to send command continuously, need to wait for the response of the last command before sent next.
2. After the RYRR20W is bootup, it will self-calibrate every 1 hour, and the time is about 5 seconds.
3. When module is no response to the message due to the usage exceeding the module specifications, signal interference or strong electric field (for example: HBM ±2KV, MM ±200V), it is recommended to RESET the module through HW Reset.
4. In addition, it is recommended to reset RYRR20W through SW reset regularly (every hour) to initialize the internal parameters of RYRR20W.

10. HW Reset Sequence



11. SW Reset Sequence



12. Command Sequence(situation: without card)

13. Command Sequence(situation: with card)

CERTIFICATION INFORMATION

• FCC compliance

Notice:
Any changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

Notice:
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

For a host using a certified modular with a standard fixed label, if (1) the module's FCC ID is not visible when installed in the host, or (2) if the host is marketed so that end users do not have straightforward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module: "Contains Transmitter Module FCC ID: 2BKAFRYRR20W" or "Contains FCC ID: 2BKAFRYRR20W" must be used. The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID.

• NCC compliance

「取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。」

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HISTORY

Updated data	changes	FW version	Redactor
20240926	1. First version	V1.0-3	
20241024	1. Add ISO14443B request command	V1.0-4	
20241127	1. Add CERTIFICATION INFORMATION		

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