Represented by:

FIRST Components s.r.l.
www.first-components.com
technical@first-components.com
+39 0332 1888005

31-MAR-2023 56312E35

RYRR20D

Command Manual



Command Manual apply to REYAX

The following are displayed in ASCII string, Baud rate 19200, 8, N, 1 Red word for command, green word for response.

1. ISO14443A Read/ Write TAG memory

0108000304FF0000 'Entry command mode, need to be released after booting REYAX
REYAX RYRR20I

010C00030410008001210000 'Parameter setup
Register write request.

010C00030410002001090000 'Parameter setup
Register write request.

0109000304F0000000 'Parameter setup
AGC Toggle

0109000304F1FF0000 'Parameter setup
AM PM Toggle

0109000304A0000000 'Read the card number of ISO14443A Mifare Ultralight,
write twice if it could not read.

14443AREQA. '042E41E3425F1D8080 is the card number, 7F is the signal strength.
[042E41E3425F1D8080,7F]

Example: Write single block	
010F000304180021<Block number><Data>0000	
Block number	07
Data	AAAABBBB
Send:	010E00030418A207AAAABBBB0000
Receive:	Request mode. []

Example: Read 4 blocks	
010B000304180020<Block number>0000	
Block number	07
Send:	010A00030418300700000
Receive:	Request mode. [AAAABBBB0000000000000000000000FA42]

Copyright © 2023, REYAX TECHNOLOGY CO., LTD.

2. ISO15693 Read Invertory and Read/Write Block

0108000304FF0000 'Entry command mode, need to be released after booting REYAX RYRR20I
REYAX RYRR20I

010C00030410008001210000 'Parameter setup
Register write request.

010C00030410002001000000 'Parameter setup
Register write request.

0109000304F0000000 'Parameter setup
AGC Toggle

0109000304F1FF0000 'Parameter setup
AM PM Toggle

010B000304140401000000 'Read ISO15693 card number,
ISO 15693 Inventory request. '17C7BA76500104E0 is the card number, 7F is the signal strength.
[17C7BA76500104E0,7F]

Example: Write single block	
010F000304180021<Block number><Data>0000	
Block number	01
Data	44332211
Send:	010F000304180021014433221 10000
Receive:	Successful: Request mode. [00] Failure: Request mode. []

Example: Read single block	
010B000304180020<Block number>0000	
Block number	01
Send:	010B000304180020010000
Receive:	Successful: Request mode. [00AAAAAAAA] Failure: Request mode. []

FIRST Components srl
Copyright © 2023, REYAX TECHNOLOGY CO., LTD.

Example: Read single block	
010C000304180023<First Block><Number of Blocks>0000	
First Block	01
Number of Blocks	03
Send:	010C000304180023010300000
Receive:	Request mode. [00000000001111111222222233333333]
Block01 to 04 Data:	00000000001111111222222233333333

3. Felica Read TAG UID

0108000304FF0000 'Entry command mode, need to be released after booting REYAX RYRR20I
REYAX RYRR20I

010C00030410008001210000 'Parameter setup
Register write request.

010C000304100020011A0000 'Parameter setup
Register write request.

0109000304F0000000 'Parameter setup
AGC Toggle

0109000304F1FF0000 'Parameter setup
AM PM Toggle

010900030444000000 'Read Felica card number,
FeliCa polling. '**012E5508F8569941** is the card number, 7F is the signal strength.
[012E5508F8569941,7F]

4. other

0108000304FE0000 'Query Firmware Version
REYAX RYRR20D V1.0-1

FIRST Components srl
Copyright © 2023, REYAX TECHNOLOGY CO., LTD.

Command Manual apply to EWT

Protocol Format

Baud rate=19200bps

Data sent format

Frame	Command	Data	Checksum

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

Data returned format

- Success:

Frame	Command	Data	Checksum

- Failure:

Frame	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.

Failure:

Frame	0xDF	Checksum

Example: (ATQA and SAK here are example values, not necessarily correct)	
Send:	0x03 0x20 0x00 0x23
Receive:	0x0C 0x20 0x12 0x4B 0xCC 0xD3 0x81 0x3A 0x77 0x11 0x12 0x01 0xA4
UID:	124BCCD3813A77

Copyright © 2023, REYAX TECHNOLOGY CO., LTD.

2. MIFARE Ultralight/Ultralight C/Ultralight EV1 Card Read

Function: Read the data from MIFARE UltraLight/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 00

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

Copyright © 2023, REYAX TECHNOLOGY CO., LTD.

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

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	Chechsum

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

Failure:

Frame	0xD0	Checksum

Example: Use AFI	
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

FIRST Components srl
Copyright © 2023, REYAX TECHNOLOGY CO., LTD.

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

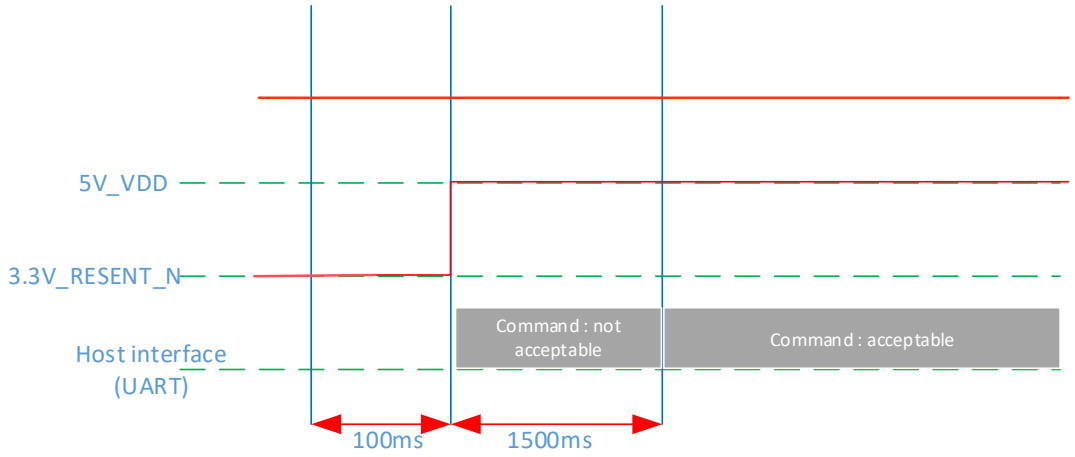
Example: Read block 01 data	
Send:	0x03 0x54 0x01 0x56
Receive:	0x06 0x54 0xAA 0xAA 0xAA 0xAA 0x52
Read Block01 Data:	0xAA 0xAA 0xAA 0xAA

Notice:

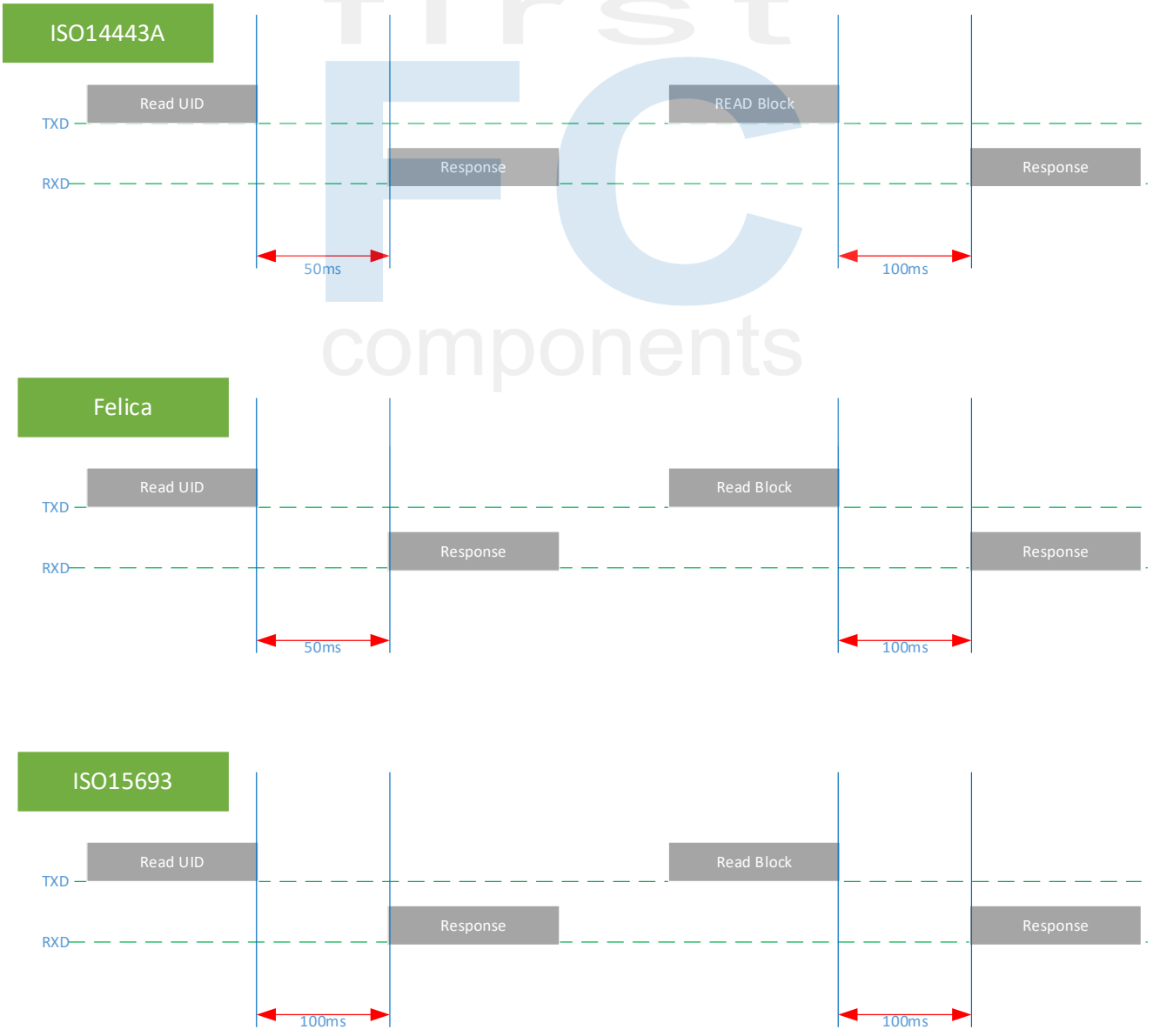
1. Please refer to page11~13 for the boot sequence and command response sequence. If want to send command continuously, need to wait for the reponse of the last command before sent next.
2. After the RYRR20D is bootup, it will self-calibrate every 1 hour, and the time is about 5 seconds.
3. When module 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 RYRR20D through SW reset regularly (every hour) to initialize the internal parameters of RYRR20D.

FIRST Components srl
Copyright © 2023, REYAX TECHNOLOGY CO., LTD.

7. HW Reset Sequence



8. Command Sequence(situation: without card)



FIRST Components srl
Copyright © 2023, REYAX TECHNOLOGY CO., LTD.

9. Command Sequence(situation: with card)



9πϒ Ι·ʎf ϒ ăΙ·fŜă Ϫ ₣₦ăúmŎ2ϒLJ2yŜyűă¢Ŏ2ϒ
² Ŝōăλűŝ ϒ KűűLJăϒκκ₣₦ăúmŎ2ϒLJ2yŜyűă¢Ŏ2ϒ
9Κϒ ΡΛt ϒ ăΙ·fŜăϪ ₣₦ăúmŎ2ϒLJ2yŜyűă¢Ŏ2ϒ
² Ŝōăλűŝ ϒ KűűLJăϒκκ₣₦ăúmŎ2ϒLJ2yŜyűă¢Ŏ2ϒ

first FC components
E-mail : sales@first-components.com
Website : https://first-components.com

Copyright © 2023, REYAX TECHNOLOGY CO., LTD.