



RF Module

RF-521

User Manual

V1.0

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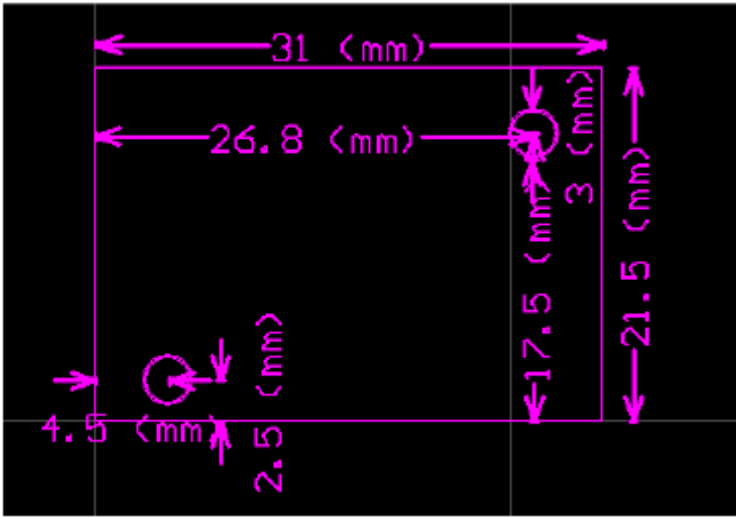
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1 RF-521 Specification

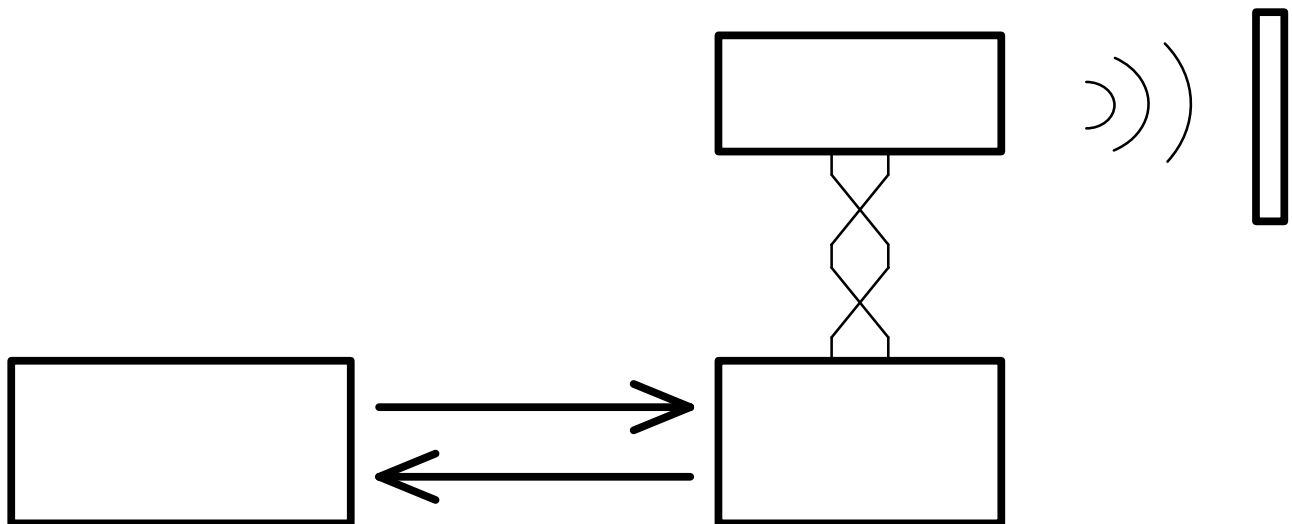
1-1 Specification

Part Number	RF-521
RF Transmit Frequency	13.56MHz
Supported Transponder	ISO 15693(R/W): TI HF-I Plus/TI HF-I Pro/TI HF-Standard/I-Code SLI ISO 14443-A(R/W) Mifare_One(S50), Mifare_One(S70)
Other function	ISO 18092 NFC(P2P)
Antenna impedance	Loop Antenna, 50 ohm
Operating Temperature	0°C to + 70°C
Storage Temperature	-10°C to + 85 °C
Storage Humidity	5 ~ 97% non-condensing
Power Supply	DC 3.3V
Power Consumption(MAX)	Operating: 80mA Standby: 4mA
Dimensions (Unit : mm)	 <p>31 (mm) 26.8 (mm) 3 (mm) 17.5 (mm) 4.5 (mm) 2.5 (mm) 21.5 (mm)</p> <p>31 x 21.5 x 5.3 (L x W x H)</p>
Weight	2g (around)
Communication Protocol	The Nation Standard UART format

1-2 Specification

Pin No.		Symbol	Description
CN1	1	RXD	Serial input
	2	TXD	Serial output
	3	Reset MCU	Reset RF-521
	4	GND	Ground reference
	5	VDD	Supply voltage
CN2	6	ANT GND	Ground
	7	ANT	RF output
	8	NC	

1-3 Typical application



2 Communication protocol

RF-521 is using the international Standard **UART** communication format, and with communication parameters set to **9600.N.8.1**.

DATA format are as follows:

HEADER						DATA			CHECK
SOH	PT	ID1	ID2	FC1	FC2	STX	DATA	ETX	BCC
01	Identify	RF521 ID		Function Code		02	Data	03	Check sum

Description:

1. SOH, STX and ETX are all contained with one byte and used for control byte, the definition is:

SOH=01H, STX=02H, ETX=03H

Note: The “SOH” is the start byte for current command set

The “STX” is the start byte for “Data”

The “ETX” is the end byte for “Data”

You will need these to judge the data length you transmitted or received; the data length will vary in depend on different command you given.

2. PT (Packet Type) is used to identify where is the message comes from; “S” means it comes from PC and “s” means from the RF-521.
3. ID1, ID2 are the ID codes of reader, the value is always “01”.
4. FC1 and FC2 are function codes, and related to the DATA, the relative data please refers to the next page.
5. BCC is checksum , from SOH to ETX one byte do “xor” , then do “or” 20H.
6. After each one Command is sent, Time Out should set 30ms (min.) ~ 50ms (max.).

Ex. RF-521 responds:

SOH	“S”	“01”	“A1”	STX	“010”	ETX	BCC
-----	-----	------	------	-----	-------	-----	-----

BCC = 01H xor 53H xor 30H xor 31H xor 41H xor 31H xor 02H
Xor 30H xor 31H xor 30H xor 03H or 20H =33H

3 Command list

No.	Code	Description	Page
1	"A1"	Read card and acquire card ID	7
2	"E1"	Acquire model name and firmware version	8
3	"E2"	Reset RF-521	9
4	"K0"	Read data in specified page/block	10
5	"K1"	Write data in specified page/block	12
6	"K2"	Choose want to use Key	13
7	"K3"	Set A/B Key value of 32 Sector groups	14
8	"K4"	Set up one group A/B Key keep in RAM of RF521.	15
9	"K5"	Increment in the adding and subtracting value function	17
10	"K6"	Decrement in the adding and subtracting value function	18
11	"K7"	Backup in the adding and subtracting value function	19
12	"K9"	Multi RFID Function(Read UID, Read Single Block Write Single Block, Lock Block, Write AFI, Write Locked Block, Kill)	20

4 Command description

4-1 “A1”: Read card and acquire card ID

Controller send :

SOH	“S”	ID1	ID2	“A”	“1”	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----

RF-521 responds :

SOH	“s”	ID1	ID2	“A”	“1”	STX	data	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

Data description:

- (1) The format of “data” will be: Card type (1 byte) + Card ID (16 byte).
- (2) Card number is “0” ~ “9”, “A” ~ “F”. ex. "000000000003EA88F".

Function description:

- (1) Use this function to acquire card ID number through reader.
- (2) The “data” will be “N” if no card presented or failed reading. Such as:
STX + “N” + ETX.
- (3) RF-521 remove data and close “read function” after it responded.
- (4) The “data” will send first by Low Byte.

Example :

Controller send :

SOH + "S01A1" + STX + ETX + BCC

RF-521 responds :

SOH + "s01A1" + STX + "N" + ETX + BCC (“N” means no card been read or failed reading)

SOH + "s01A1" + STX + "ME007000000123456" + ETX + BCC

4-2 “E1”: Acquire model name and firmware version

Controller send :

SOH	“S”	ID1	ID2	“E”	“1”	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----

RF-521 responds :

SOH	“s”	ID1	ID2	“E”	“1”	STX	date	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

Data description :

The value of “data” will include current firmware version and model name.

Function description :

Use this function to get model name and firmware version for current RF-521.

Example :

Controller send :

SOH + "S07E1" + STX + ETX + BCC

RF-521 responds :

SOH + "s07E1" + STX + "V1.00 RF-521" + ETX + BCC

Description :

- (1) The current firmware version is V1.00 and the model name is RF-521.
- (2) Sunion reserved the right to update firmware at any time without prior notice.

4-3 “E2”: Reset RF-521

Controller send :

SOH	“S”	ID1	ID2	“E”	“2”	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----

RF-521 responds :

SOH	“s”	ID1	ID2	“E”	“2”	STX	data	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

Function description:

- (1) Use this function to reset RF-521.
- (2) If “data” value responded is “Y” means the set up is successful, “N” means failed, repeated or no data.
- (3) RF-521 will respond “Y” first then commence reset.

Example :

Controller send :

SOH + "S01E2" + STX + ETX + BCC

RF-521 responds :

SOH + "s01E2" + STX + “Y” + ETX + BCC (“Y” means the set up is successful)

4-4 “K0”: Read data in specified page/block

Controller send :

SOH	“S”	ID1	ID2	“K”	“0”	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

RF-521 responds :

SOH	“s”	ID1	ID2	“K”	“0”	STX	data	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

Data description :

- (1) “DATA” should be entered as: Card type (1 bytes) + Page/Block number (2 bytes).
- (2) “data” should be RF-521 responded as: Card type (1 bytes) + Card LOCK type (1 bytes) + Page/Block number (2 bytes) + Block Information (32 bytes).
- (3) When Read Mifare Card, the page/block number is fixed to 2 bytes. Number is “00” ~ “3F”(HEX) , 64 Blocks (0 Block is first)

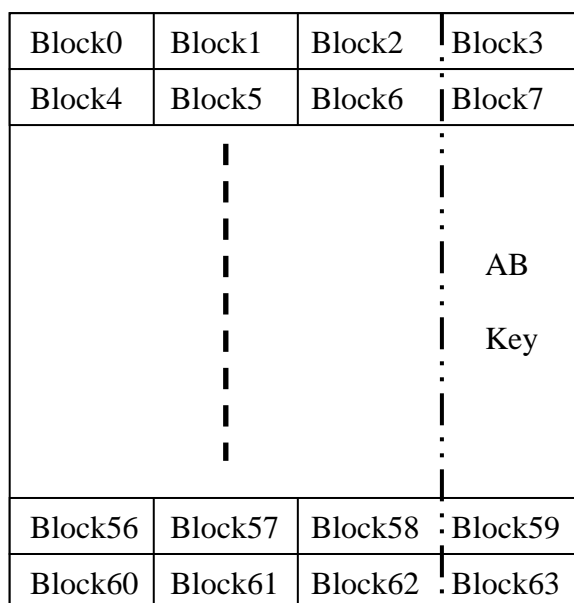


Figure 3: Mifare Card’s Block diagram

Function description:

- (1) Use this function to Read Mifare Card Block DATA.
- (2) Every Sector last Block is A/B Key values.
- (3) Read Every Sector A Key is always “0”.
- (4) Mifare Card doesn’t have LOCK function, Card LOCK type is “0”.
- (5) “K0” : The “Block Data” will send first by High Byte, and it is contrary to “A1”.

Example 1 :

Controller send :

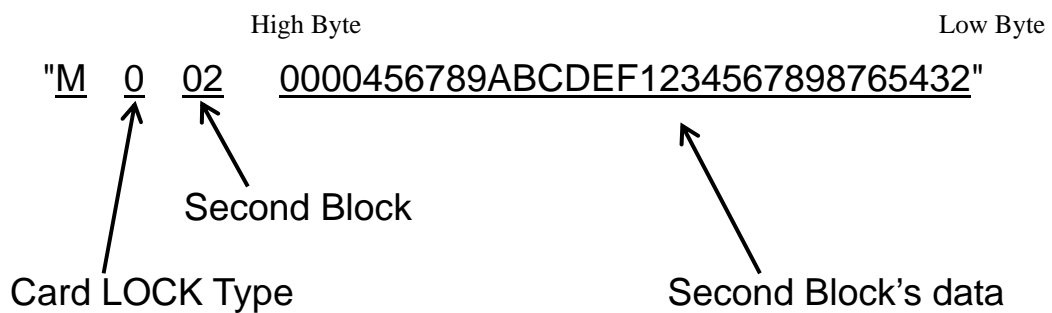
SOH + "S01K0" + STX + "M02" + ETX + BCC

RF-521 responds :

SOH + "s01K0" + STX +
"M0020000456789ABCDEF1234567898765432" + ETX + BCC

Description :

RF-521 responds :



Example 2 :

Controller send :

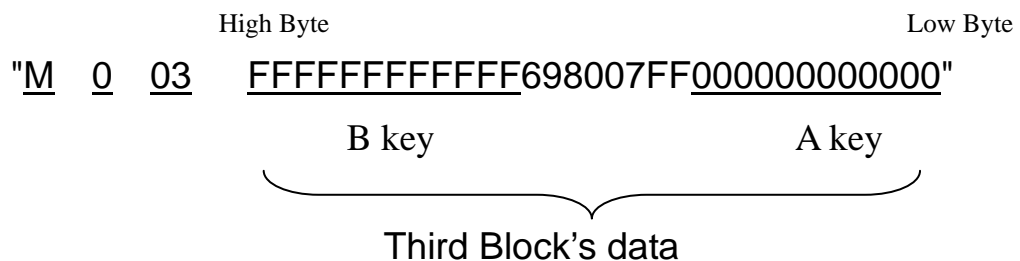
SOH + "S01K0" + STX + "M03" + ETX + BCC

RF-521 responds :

SOH + "s01K0" + STX +
"M003FFFFFFFFFFFF698007FF000000000000" + ETX + BCC

Description :

RF-521 responds :



4-5 “K1”: Write data in specified page/block

Controller send :

SOH	“S”	ID1	ID2	“K”	“1”	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

RF-521 responds :

SOH	“s”	ID1	ID2	“K”	“1”	STX	data	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

Data description :

- (1) DATA should be entered as cars type, page/block number and the information you want to input, just as follow:
Card type (1 byte) + Page/block number (2 bytes) + Information (16 bytes).
- (2) When Write Mifare Card, Card type is “M ” + Page/Block number ; The page/block number is “01” ~ “3F”(HEX) , 63 Blocks.
- (3) Responded “data” value will be as following:
 - a. If “data” is “Y” means writing is successful.
 - b. If “data” is “N” means failed or no data.
- (4) When Write data into specified page/block Sector A/B Key, please attend to “DATA” value. Because If Responded “data” is “Y” means writing is successful, Sector A/B Key was written and you can’t read this “DATA” value.

Function description:

- (1) Use this function to write information into desired block/Page of a card.
- (2) Use this function to write information into desired A/B Key of a Sector.

Example :

Controller send :

SOH + "S01K1" + STX + "M07111111111111698007FF000000000000"
+ ETX + BCC

RF-521 responds :

SOH + "s01K1" + STX + "Y" + ETX + BCC
(“Y” means the set up is successful)

4-6 “K2”: Choose want to use Key

Controller send :

SOH	“S”	ID1	ID2	“K”	“2”	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-------------	-----	-----

RF-521 responds :

SOH	“s”	ID1	ID2	“K”	“2”	STX	data	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-------------	-----	-----

Data description :

- (1) “DATA” should be compare with A/B Key, RF-521 sector groups you want to lock, just as follow: Card type (1 byte) + RF-521 Sector groups (2 bytes).
- (2) The range of Sector group of Reader is "01"- "20"(HEX) 32 groups altogether. "01" ~ "10": A Key use, "11" ~ "20": B Key use.
- (3) Responded “data” value will be as following:
If “data” is “Y” means page/block is successfully locked.
If “data” is “N” means failed.
- (4) DATA value is "00", it is unable to read and write to Block of the card, unless set up Sector group except "00" Group.

Function description:

- (1) The function can set up card prove spend A/B Key group.
- (2) Sector within RF521 pointed here is set up, does not have corresponding relation with Sector of the card.
- (3) Have the electricity after RF521 cuts out, need to reselect Sector group, if it will in order to Key of the preserving value not to choose (FFFFFFFFFFFF) will prove to the card.

Example :

Controller send :

SOH + "S01K2" + STX + "M08" + ETX + BCC

RF-521 responds :

SOH + "s01K2" + STX + "Y" + ETX + BCC

Description :

RF-521 responds :

"08": use "08" Sector, A key within RF521 will prove to the card.

4-7 “K3”: Set A/B Key value of 32 Sector groups

Controller send :

SOH	“S”	ID1	ID2	“K”	“3”	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

RF-521 responds :

SOH	“s”	ID1	ID2	“K”	“3”	STX	data	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

Data description :

- (1) DATA should be entered as cars type, Sector group and the information you want to input, just as follow: Card type (1 byte) + [Sector group(2 bytes)] + Information (12 bytes)
- (2) The range of Sector group of RF-521 is "01"- "20"(HEX) 32 groups altogether. " 01" ~" 10" : A Key use," 11" ~" 20" : B Key use.
- (3) Responded “data” value will be as following:
If “data” is “Y” means page/block is successfully locked.
If “data” is “N” means failed.

Function description:

- (1) Use this function to Set A/B Key value of 32 Sector groups.
- (2) If user want to use “K0” ~ “K2”, first to set “K3”.
- (3) As want to revise within Mifare card, must establish Key of this Sector to the mould group first, Then choose to want Key of authentication, could read and write the materials within Mifare card in this way.
- (4) When using the K3, even in the absence of supply power to the RF521, Key still exist Sector.

Example :

Controller send :

SOH + "S01K3" + STX + "M12123456789ABC" + ETX + BCC

RF-521 responds :

SOH + "s01K3" + STX + "Y" + ETX + BCC

Description :

Controller send :

"M12" : Set "20"(HEX) Sector group

"123456789ABC" : Write Information to "20"(HEX) Sector group.

4-8 “K4”: Set up one group A/B Key keep in RAM of RF521, turn off the power immediately after the disappearance.

Controller send :

SOH	“S”	ID1	ID2	“K”	“4”	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

RF-521 responds :

SOH	“s”	ID1	ID2	“K”	“4”	STX	data	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

Data description :

- (1) DATA should be entered as cars type, Sector group and the information you want to input, just as follow: **Card type (1 byte) + [Sector group "01" (2 bytes)] + Information (12 bytes)**
- (2) Responded “data” value will be as following:
If “data” is “Y” means page/block is successfully locked.
If “data” is “N” means failed.

Function description :

- (1) The function can set up one group A/B Key keep in RAM of RF521, but RAM after cutting out will not keep. That is to say Key value will disappear, so it must set up “K4” again.
- (2) Can just use “K0”~“K1” movements effectively after needing to use this function, **there can only be one group to because RAM exists, even the group has " 01" ~" 10" (A Key) ,RF521 will be regarded as the same group A Key, and if the group has " 11" ~" 20" (B Key) , Then RF521 will be regarded as the same group B Key.**
- (3) After setting “K4”, may not need to set “K2”.
- (4) If users want to change A/B Key, please re-set command.

Example :

Controller send :

SOH + "S01K4" + STX + "M01123456789ABC" + ETX + BCC

RF-521 responds :

SOH + "s01K4" + STX + "Y" + ETX + BCC

● Block frame in the adding and subtracting value function

1. Must be written into 3 Values first in Block, one of them should be written into backward, Address value secondly, write into 4 is it need to write into backward to have 2 among more them, as follows

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Address	Address	Address	Address	Value				Value				Value			

2. Be careful, each Block3 of Sector for set up access of Sector this control, once Blcok3 set up mistake can cause unable to deposit and withdraw Sector this.

4-9 “K5”: Increment in the adding and subtracting value function

Controller send :

SOH	“S”	ID1	ID2	“K”	“5”	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

RF-521 responds :

SOH	“s”	ID1	ID2	“K”	“5”	STX	data	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

Data description :

- (1) DATA should be entered as cars type, Sector group and the information you want to input, just as follow: **Card type (1 byte) + [Page/block number "01" (2 bytes)] + Information (8 bytes)**
- (2) Responded “data” value will be as following:
 If “data” is “Y” means page/block is successfully locked.
 If “data” is “N” means failed.

Function description :

1. The function in stored value reach designated Block.
2. The materials structure of Block must accord with the structure (Page16), Could use this function.

Example :

Controller send :

SOH + "S01K5" + STX + "M0100000001" + ETX + BCC

RF-521 responds :

SOH + "s01K5" + STX + "Y" + ETX + BCC

4-10 “K6”: Decrement Increment in the adding and subtracting value function

Controller send :

SOH	“S”	ID1	ID2	“K”	“6”	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

RF-521 responds :

SOH	“s”	ID1	ID2	“K”	“6”	STX	data	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

Data description :

- (1) DATA should be entered as cars type, Sector group and the information you want to input, just as follow: **Card type (1 byte) + [Page/block number "01" (2 bytes)] + Information (8 bytes)**
- (2) Responded “data” value will be as following:
 If “data” is “Y” means page/block is successfully locked.
 If “data” is “N” means failed.

Function description :

1. The function to do the reducing value to designated Block.
2. The materials structure of Block must accord with the structure (Page16), Could use this function.

Example :

Controller send :

SOH + "S01K6" + STX + "M0100000001" + ETX + BCC

RF-521 responds :

SOH + "s01K6" + STX + "Y" + ETX + BCC

4-11 “K7”: Backup in the adding and subtracting value function

Controller send :

SOH	“S”	ID1	ID2	“K”	“7”	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

RF-521 responds :

SOH	“s”	ID1	ID2	“K”	“7”	STX	data	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

Data description :

- (1) DATA should be entered as cars type, Sector group and the information you want to input, just as follow: **Card type (1 byte) + [Page/Block number source (2 bytes)] + Block number purpose (2 bytes)**
- (2) Responded “data” value will be as following:
 If “data” is “Y” means page/block is successfully locked.
 If “data” is “N” means failed.

Function description :

1. The function to copy A Block materials to B Block, but only limited to the same Sector.
2. The materials structure of Block must accord with the structure (Page16), Could use this function.

Example :

Controller send :

SOH + "S01K7" + STX + "M0102" + ETX + BCC

RF-521 responds :

SOH + "s01K7" + STX + "Y" + ETX + BCC

4-12 “K9”: Multi RFID Functions

Controller send :

SOH	“S”	ID1	ID2	“K”	“2”	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

RF-521 responds :

SOH	“s”	ID1	ID2	“K”	“2”	STX	data	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	------	-----	-----

4-12-1 Data description

- The format of “DATA” is:

Command 1	Command 2	Parameter
-----------	-----------	-----------

Command 1 : Tag type, 2 bytes.

Command 2 : Function, 2 bytes.

They are called C1, C2 for short.

Parameter : Its definition and length vary from command to command.

Command1(C1) :

7	6	5	4	3	2	1	0
Command				XXXX			

Table1: Command1 list

Command	Description
0000	Read UID
0001	Read Single Block
0010	Write Single Block
0011	Lock Block
0100	R.F.U
0101	R.F.U
0110	Write AFI
0111	Lock AFI
1000	R.F.U
1001	R.F.U
1010	Write Locked Block
1011	Kill
1100	R.F.U
1101	R.F.U
1110	R.F.U
1111	R.F.U

Command2(C2) :

7	6	5	4	3	2	1	0
Tag type				XXXX			

Table2: Tag type list

Tag type	Description
0000	ALL TYPES
0001	R.F.U
0010	Tag-it HF-I Plus
0011	Tag-it HF-I Pro
0100	R.F.U
0101	R.F.U
0110	ICODE2
0111	R.F.U
1000	R.F.U
1001	R.F.U
1010	R.F.U
1011	R.F.U
1100	R.F.U
1101	R.F.U
1110	R.F.U
1111	R.F.U

*1: R.F.U = Reserve for Use

2. Tag type and supported command table:

Table3: Tag type & Supported Command table

Command		Tag type						
		All types	Non use	Tag-it HF-I Plus	Tag-it HF-I Pro	Non use	Non use	ICODE2
		0000	0001	0010	0011	0100	0101	0110
0000	Read UID	V		V	V			V
0001	Read Single Block			V	V			V
0010	Write Single Block			V	V			V
0011	Lock Block			V	V			V
0100	R.F.U							
0101	R.F.U							
0110	Write AFI			V	V			V
0111	Lock AFI			V	V			V
1000	R.F.U							
1001	R.F.U							
1010	Write Locked Block				V			
1011	Kill				V			
1100	R.F.U							
1101	R.F.U							
1110	R.F.U							
1111	R.F.U							

*1: R.F.U = Reserve for Use

*2: V = Supported

*3: A tag type has corresponding commands, if the host sends a command that the tag type doesn't support to module then it will respond an "N" which means failure °

3. C1, C2 Combination table :

Table4

Command C1	Tag type C2	C1, C2 pair
Read UID	All types	"0000"
	R.F.U	"0010"
	TI HF-I Plus	"0020"
	TI HF-I Pro	"0030"
	R.F.U	"0040"
	R.F.U	"0050"
	I-CODE2	"0060"
Read Single Block	TI HF-I Plus	"1020"
	TI HF-I Pro	"1030"
	R.F.U	"1040"
	R.F.U	"1050"
	I-CODE2	"1060"
Write Single Block	TI HF-I Plus	"2020"
	TI HF-I Pro	"2030"
	R.F.U	"2040"
	R.F.U	"2050"
	I-CODE2	"2060"
Lock Block	TI HF-I Plus	"3020"
	TI HF-I Pro	"3030"
	R.F.U	"3040"
	R.F.U	"3050"
	I-CODE2	"3060"
Write AFI	TI HF-I Plus	"6020"
	TI HF-I Pro	"6030"
	R.F.U	"6040"
	I-CODE2	"6060"
Lock AFI	TI HF-I Plus	"7020"
	TI HF-I Pro	"7030"
	R.F.U	"7040"
	I-CODE2	"7060"
Write Locked Block	TI HF-I Pro	"A030"
Kill	TI HF-I Pro	"B030"

4-12-1 Function description

4-12-2.1 Read UID (Command = 0000)

DATA:

C1	C2	Parameter
0000xxxx	xxxxxxxx	None
2 byte	2 byte	0 byte

data:

<Read successfully>

'M'	UID
1 byte	16 byte

<Read unsuccessfully>

Return 'N'

Example1

Controller send :

SOH + "S01K9" + STX+ "0020" + ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "ME00712345678ABCD" + ETX + BCC

Description :

"0020": C1 = Read UID, C2 = Tag-it HF-I Plus

"M" – Multi-Page

UID : "E00712345678ABCD"

Example2

Controller send :

SOH + "S01K9" + STX+ "0060" + ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "N" + ETX + BCC

Description :

"0060": I-Code2

RF-521 responds "N" means failed.

4-12-2.2 Read Single Block (Command = 0001)

DATA:

C1	C2	Parameter
0001xxxx	xxxxxxxx	Block Address
2 byte	2 byte	2 byte

data:

<Read successfully>

'M'	Status	Block Address	Block Data
1 byte	1 byte	2 byte	16 byte

Status: '0' unlocked, '1' locked.

<Read unsuccessfully>

Return 'N'

- ◎ Block Data: types are 8 bytes and the high 8 bytes are filled with zeroes.
- ◎ Block Address Range:
 TI HF-I Plus: 00H – 3FH
 TI HF-I Pro: 00H – 0BH
 I-CODE2: 00H – 1BH

Example1

Controller send :

SOH + "S01K9" + STX+ "102005" + ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "M0050000000012345678" + ETX + BCC

Description :

Controller send :

"1020" : Read Single Block, TI HF-I Plus

"05" : Block 05H

RF-521 responds :

"M": Multi page.

"0": Unlocked.

"05": Block 05H

"12345678": Block data.

Example2

Controller send :

SOH + "S01K9" + STX+ "102005" + ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "M2050000000012345678" + ETX + BCC

Description :

Controller send :

"1020" : Read Single Block, TI HF-I Plus

"05" : Block 05H

RF-521 responds :

"M": Multi page.

"2": locked.

"05": Block 05H

"12345678": Block data.

4-12-2.3 Write Single Block (Command = 0010)

DATA:

C1	C2	Parameter	
0010xxxx	xxxxxxxx	Block Address	Block Data
2 byte	2 byte	2 byte	16 byte

data:

< Write successfully>

Return "Y".

<No card>

Return "N".

<Locked block>

'M'	Status	Block Address	Block Data
1 byte	1 byte	2 byte	16 byte

◎ Status: '0' unlocked, '2' locked.

◎ Block Data: the Block data.

◎ Block Address Range:

TI HF-I Plus: 00H – 3FH

TI HF-I Pro: 00H – 0BH

I-CODE2: 00H – 1BH

Example1

Controller send :

SOH + "S01K9" + STX+ "2020010000000012345678" + ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "Y" + ETX + BCC

Description :

"2020" : Write Single Block, TI HF-I Plus

"01" : Block 01H

"12345678": Block data.

RF-521 responds "Y" means write successfully.

Example2

Controller send :

SOH + "S01K9" + STX+ "20200F0000000012345678" + ETX +
BCC

RF-521 responds :

SOH + "s01K9" + STX + "M20F0000000033126689" + ETX + BCC

Description :

Controller send :

"2020" : Write Single Block, TI HF-I Plus

"0F" : Block 0FH

RF-521 responds :

"M": Multi page.

"2": locked.

"0F": Block 0FH

"12345678": Block data.

Example3

Controller send :

SOH + "S01K9" + STX+ "2060090000000012345678" + ETX +
BCC

RF-521 responds :

SOH + "s01K9" + STX + "N" + ETX + BCC

Description :

"2060" : Write Single Block, I-Code2

"09" : Block 09H

"12345678": Block data.

RF-521 responds "N" means failed.

4-12-2.4 Lock Block (Command = 0011)

DATA:

C1	C2	Parameter
0011xxxx	xxxxxxxx	Block Address
2 byte	2 byte	2 byte

data:

<Lock successfully>

Return "Y".

<Lock unsuccessfully>

Return "N".

⊙A locked block will never be changed and unlocked. But TI HF-I Pro will write again, please refer to **Write Locked Block (Command = 1010), Page33**.

⊙After the block 0BH of Tag-it HF-I Pro Card is locked, it can't be read or written anymore and this is irreversible. Only block 0BH of Tag-it HF-I Pro Card has this feature. Please refer to **Write Locked Block (Command = 1010), Page33**.

Example1

Controller send :

SOH + "S01K9" + STX+ "30200A" + ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "Y" + ETX + BCC

Description :

"3020" : Lock Block, TI HF-I Plus

"0A" : Block 0AH

RF-521 responds "Y" means write successfully.

Example2

Controller send :

SOH + "S01K9" + STX+ "303005" + ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "N" + ETX + BCC

Description :

"3030" : Lock Block, TI HF-I Pro

"05" : Block 05H

RF-521 responds "N" means failed.

4-12-2.5 Write AFI (Command = 0110)

DATA:

C1	C2	Parameter
0110xxxx	xxxxxxxx	AFI value
2 byte	2 byte	2 byte

data:

< Write successfully>

Return "Y".

< Write unsuccessfully>

Return "N".

Example1

Controller send :

SOH + "S01K9" + STX+ "602080" + ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "Y" + ETX + BCC

Description :

"6020" : Write AFI, TI HF-I Plus

"80" : AFI Value

RF-521 responds "Y" means write successfully.

Example2

Controller send :

SOH + "S01K9" + STX+ "603090" + ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "N" + ETX + BCC

Description :

"6030" : Write AFI, TI HF-I Pro

"90" : AFI Value

RF-521 responds "N" means failed.

4-12-2.6 Lock AFI (Command = 0111)

DATA:

C1	C2	Parameter
0111xxxx	xxxxxxxx	None
2 byte	2 byte	0 byte

data:

<Lock successfully>

Return "Y".

<Lock unsuccessfully>

Return "N".

Example1

Controller send :

SOH + "S01K9" + STX+ "7020" + ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "Y" + ETX + BCC

Description :

"7020" : Lock AFI, TI HF-I Plus

RF-521 responds "Y" means Lock successfully.

Example2

Controller send :

SOH + "S01K9" + STX+ "7030" + ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "N" + ETX + BCC

Description :

"7030" : Lock AFI, TI HF-I Pro

RF-521 responds "N" means failed.

4-12-2.7 Write Locked Block (Command = 1010)

- ◎ This function is valid only in Tag-it HF-I Pro card.
- ◎ This function is used to write a locked block by password and UID.
- ◎ This function is enabled only after the Password is activated.
- ◎ The content of block 0BH is the Password and it is activated by locking block 0BH.
- ◎ Password can be neither read nor written after activated.

DATA:

C1	C2	Parameter			
1010xxxx	0011xxxx	Tag UID	Pwd	Block Address	Block Data
2 byte	2 byte	16 byte	8 byte	2 byte	8 byte

data:

< Write successfully>

Return "Y".

< no Tag>

Return "N".

< Fail: Incorrect UID, Password or Block address is out of range.>

'M'	Status	Block Address	Block Data
1 byte	1 byte	2 byte	16byte

Status: '0' unlocked, '2' locked.

Example1

Controller send :

SOH + "S01K9" + STX +

"A030E007C4A509C21562AAAAAAA0712345678" + ETX + BCC

(Write Locked Block 、TI HF-I Pro 、Tag UID =

E007C4A509C21562 、Pwd = AAAAAAAA 、Block Address = 07 、

Block Data = 12345678)

RF-521 responds :

SOH + "s01K9" + STX + "Y" + ETX + BCC

Example2

Controller send :

SOH + "S01K9" + STX+

"A030E007C4A509C21562AAAAAAAAA0712345678" + ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "M2070000000012341234" + ETX + BCC

4-12-2.8 Kill (Command = 1011):

- ◎ This function is valid only in Tag-it HF-I Pro card.
- ◎ This function is used to kill a tag.
- ◎ A killed tag will not respond any request and it is irreversible.
- ◎ This function is enabled only after the Password is activated.
- ◎ The content of block 0BH is the Password and it is activated by locking block 0BH.
- ◎ Password can be neither read nor written after activated.

DATA:

C1	C2	Parameter	
1011xxxx	0011xxxx	Tag UID	Pwd
2 byte	2 byte	16 byte	8 byte

data:

<Kill successfully>

Return "Y".

<Kill unsuccessfully>

Return "N".

Example1

Controller send :

SOH + "S01K9" + STX+ "B030E007C4A509C21562AAAAAAAA" +
 ETX + BCC
(Kill 、 TI HF-I Pro 、 Tag UID = E007C4A509C21562 、 Pwd =
AAAAAAAA)

RF-521 responds :

SOH + "s01K9" + STX + "Y" + ETX + BCC (Kill successfully)

Example2

Controller send :

SOH + "S01K9" + STX+ "B030E007C4A509C21562AAAAAAAA" +
 ETX + BCC

RF-521 responds :

SOH + "s01K9" + STX + "N" + ETX + BCC (Kill unsuccessfully)