RFID MODULE

Mifare Reader / Writer

SL013

User Manual

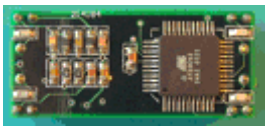
Version 3.3
Nov 2011
StrongLink

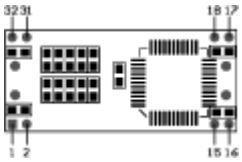
CONTENS

1. MAIN FEATURES

- Tags supported: Mifare 1k, Mifare 4k
- UART interface, baud 19,200 bps
- Power supply: DC4.5V ~ 5.5V
- Operating distance: Up to 80mm, depending on tag
- Storage temperature: -40 ºC ~ +85 ºC
- Operating temperature: -20 ºC ~ +70 ºC
- Size: 41×18 mm, as same as DIP32

2. PINNING INFORMATION





PIN	SYMBOL	TYPE	DESCRIPTION
1	RX	Input	Receiver Input: Pin for the received RF signal
2	TVSS	PWR	Transmitter Ground: supplies the output stage of TX1 and TX2
15	TXD	Output	Serial output port
16	RXD	Input	Serial input port
17	VCC	PWR	Power Supply
18	GND	PWR	Ground
31	TX2	Output	Transmitter 2: delivers the modulated 13.56 MHz energy carrier
32	TX1	Output	Transmitter 1: delivers the modulated 13.56 MHz energy carrier

3. COMMUNICATION PROTOCOL

3-1. Communication Setting

The communication protocol is byte oriented. Both sending and receiving bytes are in hexadecimal format. The communication parameters are as follows,

Baud rate: 19200 bps
Data: 8 bits
Stop: 1 bit
Parity: None
Flow control: None

3-2. Communication Format

Host to SL013:

Header	Len	Command	Data	Checksum

Header: Communication header, 2 byte.
From host to module: 0xAABB.
Len: Byte length counting from Command to Checksum inclusively, 1 byte.
Command: Command, 1 byte.
Data: Data, variable length depends on the command type.
Checksum: Exclusive ORed result from Len to Data inclusively, 1 byte.

SL013 to Host:

Header	Len	Command	Status	Data	Checksum

Header: Communication header, 2 byte.
From module to host: 0xAABB
Len: Byte length counting from Command to Checksum inclusively, 1 byte.
Command: Command, 1 byte.
Status: Command status, 1 byte
0x00 = succeed, 0xFF = fault
Data: Data, variable length depends on the command type.
Checksum: Exclusive ORed result from Len to Data inclusively, 1 byte.

Attention: If any byte from Length to Checksum equals to AA, add one byte 00 following to distinguish the Command head, but the Length byte do not change

3-3. Command Overview

Command	Description
0x01	Turn on/Turn off RF transmit
0x10	Select Mifare card
0x11	Read a data block
0x12	Write a data block
0x13	Initialize a value block
0x14	Read a value block
0x15	Increment value
0x16	Decrement value
0x20	Reset Mifare_ProX Card
0x21	Transmit_ Receive COS command to Mifare_ProX

3-4. Command List

3-4-1. Control RF Transmit

0xAABB	Len	0x01	Code	Checksum

Code: 0: turn off RF transmit, other turn on, 1 byte

Return:

0xAABB	Len	0x01	Status	Checksum

Example:

Host send: 0xAABB03010103

SL013 return: 0xAABB03010002

3-4-2. Select Mifare Card

0xAABB	Len	0x10	Checksum

Return:

0xAABB	Len	0x10	Status	Serial num	Type	Checksum

Serial num: Serial number of the card detected if the operation is success, 4 bytes.

Type: 0x00: Mifare Standard 1K(S50) card
0x01: Mifare Standard 4K(S70) card
0x02: Mifare ProX card

Example:

Host send: 0xAABB021012

SL013 return: 0xAABB081000123456780010

3-4-3. Read a data block

0xAABB	Len	0x11	Type	Block	Key	Checksum

Type: Key type (0: authenticate with key type A, 1: authenticate with key type B)

Block: The block number to be read, 1 byte

Key: Authenticate key, 6 bytes

Return:

0xAABB	Len	0x11	Status	Data	Checksum

Data: Block data returned if operation is success, 16 bytes.

Example:

Host send: 0xAABB0A110001FFFFFFFFFFFF1A

SL013 return: 0xAABB131100001122334455667788 99AA00BBCCDDEEFF02

3-4-4. Write a data block

0xAABB	Len	0x12	Type	Block	Key	Data	Checksum

Type: Key type (0: authenticate with key type A, 1: authenticate with key type B)

Block: The block number to be written, 1 byte

Key: Authenticate key, 6 bytes

Data: The data to write, 16 bytes

Return:

0xAABB	Len	0x12	Status	Checksum

Example:

Host send: 0xAABB1A120001FFFFFFFFFFFF00112233445566778899AA00BBCCDDEEFF09

SL013 return: 0xAABB03120011

3-4-5. Initialize a value block

0xAABB	Len	0x13	Type	Block	Key	Value	Checksum

Type: Key type (0: authenticate with key type A, 1: authenticate with key type B)
Block: The block number to be written, 1 byte
Key: Authenticate key, 6 bytes
Value: The value to write, 4 bytes.

Return:

0xAABB	Len	0x13	Status	Checksum

Example:

Host send: 0xAABB0E130002FFFFFFFFFFFF7856341217
SL013 return: 0xAABB03130010

3-4-6. Read a value block

0xAABB	Len	0x14	Type	Block	Key	Checksum

Type: Key type (0: authenticate with key type A, 1: authenticate with key type B)
Block: The block number to be read, 1 byte
Key: Authenticate key, 6 bytes

Return:

0xAABB	Len	0x14	Status	Value	Checksum

Value: Value returned if the operation is success, 4 bytes.

Example:

Host send: 0xAABB0E140002FFFFFFFFFFFF1C
SL013 return: 0xAABB071400785634121B

3-4-7. Increment value

0xAABB	Len	0x15	Type	Block	Key	Value	Checksum

Type: Key type (0: authenticate with key type A, 1: authenticate with key type B)
Block: The block number to be written, 1 byte
Key: Authenticate key, 6 bytes
Value: The value to be increased by, 4 bytes.

Return:

0xAABB	Len	0x15	Status	Checksum

Example:

Host send: 0xAABB0E150002FFFFFFFFFFFF020000001B
SL013 return: 0xAABB03150016

3-4-8. Decrement value

0xAABB	Len	0x16	Type	Block	Key	Value	Checksum

Type: Key type (0: authenticate with key type A, 1: authenticate with key type B)
Block: The block number to bewritten, 1 byte
Key: Authenticate key, 6 bytes
Value: The value to be decreased by, 4 bytes

Return:

0xAABB	Len	0x16	Status	Checksum

Example:

Host send: 0xAABB0E160002FFFFFFFFFFFF0200000018
SL013 return: 0xAABB03160015