Micro RFID
communication protocol

Communication protocol

Host command format :

Preamble + Length+ Device ID + Command code + command parameter + CRC
Preamble : 2BYTE, 0xAABB
Length :2BYTE, 1st BYTE (from Device ID to CRC)+ 2nd BYTE = 0
Device ID :2BYTE
Command code :1 BYTE
Command parameter : n byte , may be blank
CRC :1BYTE, each byte is XOR from device ID to last byte of Command Parameter

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

Example: write data (0x00112233445566778899AABBCCDDEEFF) to block 1

Host send: AABB160000000902010011223344556677889 9AA00BBCCDDEEFF0A

Reader return format :

Preamble + Length+ Device ID+ Command code + Status + data + CRC
Preamble : 2BYTE, 0xAABB
Length :2BYTE, 1st BYTE (from Device ID to CRC)+ 2nd BYTE = 0
Device ID :2 BYTE
Command code :1 BYTE
Status :1BYTE , 0 = success
Data : return data value
CRC : 1BYTE, each byte is XOR from device ID to last byte of Command Parameter

Command set

Baud rate : Data :1 = 9600; 2 = 14400; 3 = 19200; 4 = 28800;
5 = 38400; 6 = 57600; 7 = 115200

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x05fa	0x0000	0x01	-	1Byte baud rate code	
Reader Return	0xaabb	0x05fa		0x01	0	-	

Host send :AA BB 05 FA 00 00 01 03 F8
READER return :AA BB 05 FA 00 01 01 00 FA

Default baud rate is 9600 bps when power on .
Send Command baud rate : 19200 bps

Device ID

Data :Device ID, 0-65535
Default : 0

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x06f9	0x0000	0x02	-	2Byte Device ID	
Reader Return	0xaabb	0x05fa	New Device ID	0x02	0	-	

Host send :AA BB 06 F9 00 00 02 00 01 FA
READER return :AA BB 05 FA 00 01 02 00 F9

Read Device ID

Data : Nil

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x04fb		0x03	-	-	
Reader Return	0xaabb	0x05fa		0x03	0	-	

Host send :AA BB 04 FB 00 00 03 F8
READER return :AA BB 07 F8 00 01 03 00 00 01 FB

Read Reader version , 2 Byte

Data : Nil

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x04fb		0x04	-	-	
Reader Return	0xaabb	0x06f9		0x04	0	2Byte reader version	

Host send :AA BB 04 FB 00 00 04 FF
READER return :AA BB 07 F8 00 01 04 00 00 20 DD

Read reader serial No. , 8 Byte

Data : Nil

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x04fb		0x05	-	-	
Reader Return	0xaabb	0x0df2		0x05	0	8Byte Reader serial No	

Host send :AA BB 04 FB 00 00 05 FE
READER return :AA BB 0D F2 00 01 05 00 04 FB 00 00 05 FE AA 00 FA A2

Buzzer

Data : buzzer on period , 10 ms

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x05fa		0x06	-	0x0A(buzzer 100ms)	
Reader Return	0xaabb	0x05fa		0x06	0	-	

Host send :AA BB 05 FA 00 00 06 10 EC
READER return :AA BB 05 FA 00 01 06 00 FD

Mifare ISO14443A protocol

Set card protocol

Data : TYPE A = “A” (0x41) / TYPE A = “B” (0x42)

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x05fa		0x0A	-	0x41	
Reader Return	0xaabb	0x05fa		0x0A	0	-	

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Host send : AA BB 05 FA 00 00 0A 41 B1
READER return :AA BB 05 FA 00 01 0A 00 F1

Antenna on/off

Data :0 = close ,1 = open

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x05fa		0x0B	-	1Byte (0 OR 1)	
Reader Return	0xaabb	0x05fa		0x0B	0	-	

Host send :AA BB 05 FA 00 00 0B 01 F0
READER return :AA BB 05 FA 00 01 0B 00 F0

Led control

Data :0 = close ,1 = Red , 2 = Green , 3 = Yellow

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x05fa		0x27	-		
Reader Return	0xaabb	0x05fa		0x27	0	-	

Search ISO14443-3 TYPE_A card

Parameter : search mode ; 0x26 = search active card ;0x52= search all status card
READER return :card Type
Command code :0x0C

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x05fa		0x0C	-	1Byte search mode	
Reader Return	0xaabb	0x07f8		0x0C	0	2Byte TagType	

Host send :AA BB 05 FA 00 00 0C 52 A4
If fail , Reader return :AA BB 05 FA 00 01 0C EC 1B
If success , READER return :AA BB 07 F8 00 01 0C 00 04 00 F1

ISO14443-3 TYPE_A card anti-collision

parameter :NA
READER return :card ID
Command code :0x0D

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x04fb		0x0D	-	-	
Reader Return	0xaabb			0x0D	0	Card ID	

Host send :AA BB 04 FB 00 00 0D F6
If success READER return :AA BB 09 F6 00 01 0D 00 96 C6 59 6B 98

lock ISO14443-3 TYPE_A card

parameter :4Byte card serial no
READER return :1Byte card memory size
Command code :0x0E

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x08f7		0x0E	NA	4Byte serial No	
Reader Return	0xaabb	0x06f9		0x0E	0	1Byte memory size	

Host send :AA BB 08 F7 00 00 0E 96 C6 59 6B 9B
If success , READER return :AA BB 06 F9 00 01 0E 00 08 FE

Selected ISO14443-3 TYPE_A card go to sleep mode

parameter :Nil
Command code :0x0F

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x04fb		0x0F	-	-	
Reader Return	0xaabb	0x05fa		0x0F	0	-	

Host send :AA BB 04 FB 00 00 0F F4
If success , READER return :AA BB 05 FA 00 01 0F 00 F4

Read Block by Key

parameter :1Byte , Keytype 0x60 ='A', 0x61 = 'B' + 1Byte block# + 6Byte key #

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x0cf3		0x12	-	1Byte key type + 1Byte block# + 6Byte Key#	
Reader Return	0xaabb	0x05fa		0x12	0	-	

Host send :AA BB 0C F3 00 00 12 60 00 FF FF FF FF FF FF 81
If success - READER return :AA BB 05 FA 00 01 12 00 E9
If fail - READER return :AA BB 05 FA 00 01 12 E7 0E

Read card block data

parameter : block# (0-255)
Command code :0x13

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x05fa		0x13	NA	1Byte block#	
Reader Return	0xaabb	0x15ea		0x13	0	16Byte (read value)	

Host send :AA BB 05 FA 00 00 13 00 E9
READER return :AA BB 15 EA 00 01 13 00 96 C6 59 6B 62 88 04 00 46 8E 25 17 59 50 49 02 CC
Host send :AA BB 05 FA 00 00 13 01 E8
READER return :AA BB 15 EA 00 01 13 00 AA 00 AA 00 AA 00 AA 00 AA 00 AA 00 AA 00 AA 00 AA 00 AA 00 AA 00 AA 00 AA 00 AA 00 AA 00 F8
Remark : red color "00" to identify "AABB" for Preamble

write block data

parameter : Block # (1-255)
Command code :0x14

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x15ea		0x14	-	1Byte block# + 16Byte (data value)	
Reader Return	0xaabb	0x05fa		0x14	0	-	

Host send :AA BB 15 EA 00 00 14 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 FF
READER return :AA BB 05 FA 00 01 14 00 EF

format Block# to Purse Function

parameter :M1 block#(1-255)+ 4Byte purse value
Command code :0x15

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x09f6		0x15	NA	1Byte block# + 4Byte (init value)	
Reader Return	0xaabb	0x05fa		0x15	0	NA	

Host send :AA BB 09 F6 00 00 15 01 0A 00 00 00 E8 (purse value : 0x0000000A)
READER return :AA BB 05 FA 00 01 15 00 EE

Read purse value

parameter : M1block#(1-255)
Command code :0x16

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x05fa		0x16	NA	1Byte block#	
Reader Return	0xaabb	0x09f6		0x16	0	4Byte (return value)	

Host send :AA BB 05 FA 00 00 16 01 ED
READER return :AA BB 09 F6 00 01 16 00 0A 00 00 00 EB

Decease Purse value

parameter :M1block#(1-255)
Command code :0x17

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x09f6		0x17	NA	1Byte block# + 4Byte (purse value)	
Reader Return	0xaabb	0x05fa		0x17	0		

Host send :AA BB 09 F6 00 00 17 01 02 00 00 00 E2
READER return :AA BB 05 FA 00 01 17 00 EC

Add purse value

parameter :1Byteblock#+ 4Byte (purse value)
Command code :0x18

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x09f6		0x18	NA	1Byte block# + 4Byte (add value)	
Reader Return	0xaabb	0x05fa		0x18	0		

Host send :AA BB 09 F6 00 00 18 01 08 00 00 00 E7
READER return :AA BB 05 FA 00 01 18 00 E3

save purse block data to card Buffer

parameter :M1block#(1-255)
Command code :0x19

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x05fa		0x19	NA	1Byte block#	
Reader Return	0xaabb	0x05fa		0x19	0		

Host send :AA BB 05 FA 00 00 19 01 E2
READER return :AA BB 05 FA 00 01 19 00 E2

save card Buffer purse value to block data

parameter : M1block#(1-255)
Command code :0x1A This command is used after (Command code :0x19)

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x05fa		0x1A	NA	1Byte block#	
Reader Return	0xaabb	0x05fa		0x1A	0		

Host send :AA BB 05 FA 00 00 1A 02 E2
READER return :AA BB 05 FA 00 01 1A 00 E1

Halt Ultra Light

Data :NA

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xAABB	0x04FB		0x0F	NA		
Reader Return	0xAABB	0x05FA		0x0F	0	NA	

select a Ultra Light card

Data :NA

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xAABB	0x05FA		0x33	NA	NA	
Reader Return	0xAABB	0x05FA		0x33	0	7Byte Card Id	

read Ultra Light card

Data :1Byte start block#

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xAABB	0x05FA		0x13	-		
Reader Return	0xAABB	0x05FA		0x13	0	4 Block data (16Byte)	

write Ultra Light card

Data :1Byte , write block# + 4Byte data

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xAABB	0x05FA		0x34	-	-	
Reader Return	0xAABB	0x05FA		0x34	0	7Byte serial no.	

TYPE-A Reset

	Preamble	Length	Device ID	Command code	Status	Data Value	CRC
Host send	0xaabb	0x04fb		0x1B	-	-	
Reader Return	0xaabb			0x1B	0	Reset info.	

ISO15693 Protocol

ISO15693 Inventory

Data : NA

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	0x04fb		0x40	-	-	
reader return	0xaabb	0x0ef1		0x40	0	-	

Inventory

AA BB 04 FB 00 00 40 BB

AA BB 0E F1 00 01 40 00 99 34 16 E9 11 00 00 07 E0 14

ISO15693_Stay_Quiet

Data Value : 8 Byte UID

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	0x0cf3		0x41	-	-	
reader return	0xaabb	0x05fa		0x41	0	-	

Stay quiet

AA BB 0C F3 00 00 41 34 16 E9 11 00 00 07 E0 8F

AA BB 05 FA 00 01 41 00 40

ISO15693_Select

Data : 8 Byte UID

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	0x0cf3		0x42	-	-	
reader return	0xaabb	0x05fa		0x42	0	-	

Select

AA BB 0C F3 00 00 42 34 16 E9 11 00 00 07 E0 8C

AA BB 05 FA 00 01 42 00 43

ISO15693_Reset_To_Ready

Data Value :1 Byte Model+ 8 Byte UID
Model :bit0 = Select flags;bit1 = Address flags

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	0x0df2		0x43	-	-	
reader return	0xaabb	0x05fa		0x43	0	-	

Reset to ready
AA BB 0D F2 00 00 43 00 34 16 E9 11 00 00 07 E0 8C
AA BB 05 FA 00 01 43 00 B8

ISO15693_Read

Data Value : 1 ByteModel+ 8 ByteUID+ start address + no.of block < 0x10
Model :bit0 = Select flags;bit 1 = Address flags

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	0x0ff0		0x44	-		
reader return	0xaabb	-		0x44	0	-	

Read Block :
AA BB 0F F0 00 00 44 02 34 16 E9 11 00 00 07 E0 00 0E 85

ISO15693_Write

Data Value :1 ByteModel+ 8 ByteUID+ Block#+ 4 Byte (Data Value)
Model :bit0 = Select flags;bit1 = Address flags

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	0x12ed		0x45	-		
reader return	0xaabb	05fa		0x45	0	-	

Write block
AA BB 12 ED 00 00 45 06 34 16 E9 11 00 00 07 E0 03 00 00 00 04 94
AA BB 05 FA 00 01 45 00 44

ISO15693_Lock_Block

Data Value :1 ByteModel+ 8 ByteUID+ Block#
Model :bit0 = Select flags;bit1 = Address flags

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	0x0ef1		0x46	-		
reader return	0xaabb	0x05fa		0x46	0	-	

Lock block
AA BB 0E F1 00 00 46 06 34 16 E9 11 00 00 07 E0 03 8F
AA BB 05 FA 00 01 46 00 47

ISO15693_Write_AFI

Data Value :1 ByteModel+ 8 Byte UID+ 1 Byte (Data Value)
Model :bit0 = Select flags;bit1 = Address flags

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	0x0ef1		0x47	-		
reader return	0xaabb	0x05fa		0x47	0	-	

Write AFI
AA BB 0E F1 00 00 47 06 34 16 E9 11 00 00 07 E0 88 05
AA BB 05 FA 00 01 47 00 46

ISO15693_Lock_AFI

Data Value :1 ByteModel+ 8 ByteUID
Model :bit0 = Select flags;bit1 = Address flags

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	0x0df2		0x48	-		
reader return	0xaabb	0x05fa		0x48	0	-	

Lock AFI
AA BB 0D F2 00 00 48 06 34 16 E9 11 00 00 07 E0 81
AA BB 05 FA 00 01 48 00 B3

ISO15693_Write_DSFID

Data Value :1 ByteModel+ 8 ByteUID+ 1 Byte (Data Value)
Model :bit0 = Select flags;bit1 = Address flags

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	0x0ef1		0x49	-		
reader return	0xaabb	0x05fa		0x49	0	-	

Write DSFID as 0x99
AA BB 0E F1 00 00 49 06 34 16 E9 11 00 00 07 E0 99 1A
AA BB 05 FA 00 01 49 00 48

ISO15693_Lock_DSFID

Data Value :1 ByteModel+ 8 ByteUID
Model :bit0 = Select flags;bit1 = Address flags

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	0x0df2		0x4a	-		
reader return	0xaabb	0x05fa		0x4a	0	-	

Lock DSFID
AA BB 0D F2 00 00 4A 06 34 16 E9 11 00 00 07 E0 83
AA BB 05 FA 00 01 4A 00 B1

ISO15693_Get_System_Information

Data Value :1 ByteModel+ 8 Byte UID
Model :bit0 = Select flags;bit1 = Address flags

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	0x0df2		0x4b	-		
reader return	0xaabb			0x4b	0	-	

Get system information
AA BB 0D F2 00 00 4B 00 28 07 01 F7 60 F7 12 00 E5
AA BB 13 EC 00 01 4B 00 0F 34 16 E9 11 00 00 07 E0 99 88 3F 03 88 31

ISO15693_Get_Block_Security

Data Value :1 ByteModel+ 8 ByteUID+ start address + Block#(<0x40)
Model :bit0 = Select flags;bit1 = Address flags

	Preamble	Length	Device ID	Command code	status	Data Value	CRC
Host send	0xaabb	-		0x4c	-		
reader return	0xaabb	-		0x4c	0	-	

Get block security
AA BB 0F F0 00 00 4C 02 34 16 E9 11 00 00 07 E0 38 08 B3
AA BB 0D F2 00 01 4C 00 00 00 00 00 00 00 00 00 BF