PR101-MF

Reader/Write 3 in 1 programmer

User Manual

ID Innovations

Advanced Digital Reader Technology

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Summary

The PR101-MF series card Read/Write programmer is meant to be used with the Mifare reader IC and is compatible with different types Mifare chips. The programmer is connected to a PC through a RS232 interface or a RS232 emulated USB port, working independently or cooperating within a system net.

Specification

- Part number: PR101-MF 3 in 1
- Read range: up to 5cm
- Out put to PC: RS232/USB
- Baud-rate 9600 bit/s
- Case ABS
- Frequency 13.56Mhz
- Power (L×W×H):152×115×53
- Weight 600g
- Operating temperature： -20 ^{o}C --- +75 ^{o}C
- Storage temperature -40 ^{o}C --- +85 ^{o}C

CPU	STC89c54rd+ Industry level
Main chip	Philips CLRC632
Memory	8K
Supported chip	ISO/IEC14443 TypeA -Mifare One S50 -Mifare One S70 -Mifare Ultra Light -Mifare Pro -Mifare DESFIRE -SHC1102 ISO/IEC14443 TypeB -TRH1064 -SR176 -SIRX4K -AT88SF020 -SMARTCARD ISO/IEC15693 -I.CODE SLI -Tag it -SRF55V02P -SRF55V10P
Read/write function	Serial number/ bytes in any block

UART Protocols

- Command frame（9600,N,8,1）

	STX	ID	CMD/STATUS	LEN	DATA	BCC	ETX
VALUE	0x02						0x03
LENGTH	1byte	1 byte	1 byte	1 byte	LEN bytes	1 byte	1 byte
COMMENT	Start Frame	0x00—0xff, Device Address default:0x01	When Sent: CMD When receive: STATUS	**DATA NUM**	DATA	XOR From STX to DATA	Frame end

- CMD/STAUS、DATA LENGTH、DATA

Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
System Command	Link	0x00	0x00		Ok=0 Err=Other	0x00	
	For Example	0x00,0x00			0x00,0x00		
	Reset	0x01	0x00		Ok=0 Err=Other	0x00	
	For Example	0x01,0x00			0x00,0x00		

Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
System Command	Change baudrate	0x02	0x01	B Baudrate Baudrate value 2400 B=0x00 4800 B=0x01 9600 B=0x02 (default) 14400 B=0x03 19200 B=0x04 28800 B=0x05 57600 B= 0x06	OK=0 Err=other	0x00	
	For example:	0x02, 0x01,0x01			0x00,0x00		
	Buzzer control	0x03	0x04 or 0x00	ABCD A=0x00 buzzer off =0x01 buzzer on =0x02 buzzer on BCD*10 ms BCD: When A=2 the time is given by the value BCD For example, if the time value is 123, then B=0x01, C=0x02, D=0x03	OK=0 Err=other	0x00	

Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
	For example:	A=0 or 1 : 0x03,0x04,0x00 A=2 :0x03,0x04,0x02,0x01,0x02,0x03			0x00,, 0x00,		
	Changing reader's ID	0x05	0x01	I (10 decimal serial number)	OK=0 Err=other	0x00	
	For example:						
MF0 IC S50、S70 Command	Request Card	0x10	0x00		Ok=0 Err=Other	0x02	NN 0x4400 = ultra_light 0x0400 = Mifare_One(S50) 0x0200 = Mifare_One(S70) 0x4403 = Mifare_DESFire 0x0800 = Mifare_Pro 0x0403 = Mifare_ProX 0x0033 = SHC1102
	For example:	0x10,0x00,			0x00,0x02,0x04,0x00		
	Halt Module	0x11	0x00		Ok=0 Err=Other	0x00	
	For example	0x11,0x00,			0x00,, 0x00,		
	Read Seris No.	0x12	0x00		Ok=0 Err=Other	0x04	NNNN
	For example	0x12, 0x00,			0x00,, 0x04, 0x1B,0x2C,0x3D,0x4E		

Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
	Read Block Data	0x13	0x08	BAPPPPPP B: BlockNo. S50:0x00-0x3f S70:0x00-0xff A:=0-PICC_AUTHENT1A =1-PICC_AUTHENT1B =2-NO_AUTHEN PPPPPP: 6bytes Key	Ok=0 Err=Other	0x0F	DDDDDDDDDDDDDDDD 16 Bytes Data
	For example	0x13,0x08, 0x01,0x00,0xFF,0xFF,0xFF,0xFF,0xFF,0xFF,			0x00, 0x0F, 0x11, 0x22, 0x33, 0x44, 0x55, 0x66, 0x77, 0x88, 0x99, 0x00, 0xAA, 0xBB, 0xCC, 0xDD, 0xEE, ,0xFF		
MF0 IC S50、S70 Command	Write Block Data	0x14	0x18	BAPPPPPP DDDDDDDDDDDDDDDD B: BlockNo. S50:0x00-0x3f S70:0x00-0xff A:=0-PICC_AUTHENT1A =1-PICC_AUTHENT1B =2-NO_AUTHEN PPPPPP: 6bytes Key DDDDDDDDDDDDDDDD 16 Bytes Data	Ok=0 Err=Other	0x00	
	For example	0x14, 0x18, 0x01,0x00,0xFF,0xFF,0xFF,0xFF,0xFF,0xFF, 0x11, 0x22, 0x33, 0x44, 0x55, 0x66, 0x77, 0x88, 0x99, 0x00, 0xAA, 0xBB, 0xCC, 0xDD, 0xEE, ,0xFF			0x00,, 0x00,		

Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
	Verify Key A	0x15	0x0e	BAPPPPPPMMMMMM B: BlockNo. S50:0x00-0x3f S70:0x00-0xff A:=0-PICC_AUTHENT1A =1-PICC_AUTHENT1B =2-NO_AUTHEN PPPPPP: 6 Bytes Old Key A MMMMMM: 6 Bytes Old Key A	Ok=0 Err=Other	0x00	
	For example	0x15, 0x0e, 0x01,0x00,0xFF,0xFF,0xFF,0xFF,0xFF,0xFF, 0x11, 0x22, 0x33, 0x44, 0x55, 0x66			0x00,, 0x00,		
MF0 IC S50、S70 Command	Read Purse	0x16	0x08	BAPPPPPP B: BlockNo. S50:0x00-0x3f S70:0x00-0xff A:=0-PICC_AUTHENT1A =1-PICC_AUTHENT1B =2-NO_AUTHEN PPPPPP: 6 Bytes Key	Ok=0 Err=Other	0x04	DDDD
	For example	0x15, 0x0d, 0x01,0x00,0xFF,0xFF,0xFF,0xFF,0xFF,0xFF			0x00, 0x04, 0x11, 0x22, 0x33, 0x44		

Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
MF0 IC S50、S70 Command	Write Purse	0x17	0x0c	BAPPPPPPDDDD B: BlockNo. S50:0x00-0x3f S70:0x00-0xff A:=0-PICC_AUTHENT1A =1-PICC_AUTHENT1B =2-NO_AUTHEN PPPPPP: 6 Bytes Key DDDD: 4 Bytes Purse Value	Ok=0 Err=Other	0x00	
	For example	0x17, 0x0c, 0x01,0x00,0xFF,0xFF,0xFF,0xFF,0xFF,0xFF,0x11, 0x22, 0x33, 0x44,			0x00, 0x00,		
MF0 IC S50、S70 Command	Increment Purse	0x18	0x0c	BAPPPPPPDDDD B: BlockNo. S50:0x00-0x3f S70:0x00-0xff A:=0-PICC_AUTHENT1A =1-PICC_AUTHENT1B =2-NO_AUTHEN PPPPPP: 6 Bytes Key DDDD: 4 Bytes Purse Value	Ok=0 Err=Other	0x00	
	For example	0x18, 0x0c, 0x01,0x00,0xFF,0xFF,0xFF,0xFF,0xFF,0xFF,0x11, 0x22, 0x33, 0x44,			0x00, 0x00,		

Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
MF0 IC S50、S70 Command	Decrement Purse	0x19	0x0c	BAPPPPPPDDDD B: BlockNo. S50:0x00-0x3f S70:0x00-0xff A:=0-PICC_AUTHENT1A =1-PICC_AUTHENT1B =2-NO_AUTHEN PPPPPP: 6 Bytes Key DDDD: 4 Bytes Purse Value	Ok=0 Err=Other	0x00	
	For example	0x19, 0x0c, 0x01,0x00,0xFF,0xFF,0xFF,0xFF,0xFF,0xFF,0x11, 0x22, 0x33, 0x44,			0x00, 0x00,		
MF0 IC S50、S70 Command	Mult-Block -Data bulk Reading	0x1A	0x09	BAPPPPPPN B: BlockNo. S50:0x00-0x3f S70:0x00-0xff A:=0-PICC_AUTHENT1A =1-PICC_AUTHENT1B =2-NO_AUTHEN PPPPPP: 6 Bytes Key N: Read Block Num **(warning: the password in all sectors should be same)**	Ok=0 Err=Other	N*16	16*N byte Data
	For example	0x1A, 0x09, 0x00,0xFF,0xFF,0xFF,0xFF,0xFF,0xFF,0x0c			0x00, N*16,…….		

*Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
MF0 IC S50、S70 Command	Halt card	0x1B	0x00		Ok=0 Err=Other	0x00	
	For example						
	request IDLE card	0x1C					
	For example						
	Sending EEPROM key	0X28	0x08	SAPPPPPP S: block number S50:0x00-0x0f A:=0-PICC_AUTHENT1A =1-PICC_AUTHENT1B =2-NO_AUTHEN PPPPPP: 6 bytes key	0x00	0x00	
	For example						
	send EEPROM data	0X29	0x11	BDDDDDDDDDDDDDDD B: EEPROM No. 0x00-0x1f D..D:EEPROM data	0x00	0x00	
	For example						
	read EEPROM data	0X2A	0x01	B B: EEPROM No. 0x00-0x1f	0x00	0x10	
	For example						
Desfire							

*Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
Desfire	Reset command	0x20	0x01	0x41	0x00	N	N bytes data
	For example						
	ProCom_CMD	0x21	N	N byte data	0x00	N	N bytes data
	For example						
	ProCom_CMD	0x21	N	N bytes data	0x00	N	N bytes data
	For example						
ISO14443 TYPE B AT88SF020	Halt card	0x30	0x01	A A:=0-REQB =1-WUPB	0x00	0x0c	NNNNNNNNNNN 12byte serial number
	For example						
	Password certify	0x33	0x08	PPPPPPPP P…P:8 byte password	0x00	0x00	
	For example						
	Read data block	0x34	0x01	BPPPPPPPP B:1 byte data for block serial	0x00	0x08	DDDDDDDD 8 bytes data
	For example						
	Write data block	0x35	0x09	BDDDDDDDD B:1byte data for block serial D…D:8 bytes data	0x00	0x00	
	For example						
	lock	0x36	0x04	DDDD D…D:4 bytes encrypt data	0x00	0x00	

*Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
ISO14443 TYPE B AT88SF020	For example						
	counting	0x37	0x06	DDDDDD D…D:6 bytes data for signature	0x00	0x00	
	For example						
	ATTRIB	0x38	0x04	DDDD	0x00	0x00	
	For example						
ISO15693, I-code, SLI, Tag it ISO14443 TYPE B AT88SF020	Read single tag serial No.	0x50	0x00		0x00	0x09	DSSSSSSSS D:1 字节 DSFID S…S:8 bytes serial number
	For example						
	Read multiple-cards serial number	0x51	0x01	N Read cards qty	0x00	0x09*N	DSSSSSSSS…DSSSSSSS D:1byte DSFID S…S:8byte serial number
	For example						
	Obtain system Info	0x52	0x09	FSSSSSSSS F: Indication Bit4:=1 (valid command only for the card in SELECT condition) Bit5: =1 (valid command only when UID matched)	0x00	0x0e	FSSSSSSSSDAPPP F: S…S: 8 byte serial number D:1 byte DSFID A:1 byte AFI Ppp:
	For example						

*Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
ISO15693, I-code, SLI, Tag it ISO14443 TYPE B AT88SF020	Write DSFID	0x53	0x0A	FSSSSSSSSD F: Indication Bit4:=1 (valid command only for the card in SELECT condition) Bit5: =1 (valid command only when UID matched) BIT6:=1 TAGit =0 ICODE SLI S…S: 8 bytes serial number D:1 byte DSFID	0x00	0x00	
	For example						
	Lock DSFID	0x54	0x09	FSSSSSSSS F: Indication Bit4:=1 (valid command only for the card in SELECT condition) Bit5: =1 (valid command only when UID matched) BIT6:=1 TAGit =0 ICODE SLI S…S: 8 bytes serial number	0x00	0x00	
	For example						

*Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
ISO15693, I-code, SLI, Tag it ISO14443 TYPE B AT88SF020	Write AFI	0x55	0x0A	FSSSSSSSSA F: Indication Bit4:=1 valid command only for the card in SELECT condition) Bit5: =1 (valid command only when UID matched) BIT6:=1 TAGit =0 ICODE SLI S…S: 8bytes serial number A:1 byte AFI	0x00	0x00	
	For example						
	Lock AFI	0x56	0x09	FSSSSSSSS F: Indication Bit4:=1 (valid command only for the card in SELECT condition) Bit5: =1 (valid command only when UID matched) BIT6:=1 TAGit =0 ICODE SLI S…S: 8 bytes serial number	0x00	0x00	
	For example						

*Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
ISO15693, I-code, SLI, Tag it ISO14443 TYPE B AT88SF020	Read data block	0x57	0x0B	FSSSSSSSSBX F: Indication =0x22 ICODE SLI TAGit EM4034 =0x03 EM4035 S…S: 8bytes serial number B:1 byte block serial number X:0x01	0x00	0x04	DDDD 4 字节数据
	For example						
	Write data block	0x58	0x0E	FSSSSSSSSBDDDD F: Indication =0x22 ICODE SLI =0x62 TAGit =0x02 EM4034 =0x03 EM4035 S…S: 8bytes serial number B: 1 byte block serial umber DDDD:4 bytes serial number	0x00	0x00	
	For example						

*Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
ISO15693, I-code, SLI, Tag it ISO14443 TYPE B AT88SF020	Lock data block	0x59	0x0A	FSSSSSSSSB F: Indication Bit4:=1 (valid command only for the card in SELECT condition) Bit5: =1(valid command only when UID matched) BIT6:=1 TAGit =0 ICODE SLI S…S: 8bytes serial number B:1 bytes serial number	0x00	0x00	
	For example						

*Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
EM4035	HW authentication w/o Selection	0x60	0x01	N: =1 Super User Key =2 secret key 1 =4 secret key 2 =8 secret key 3			
	For example						
	Read UID	0x61	0x01	B: B:BLOCKNUM 12			
	For example						
	Read data block	0x62	0x01	B B:BLOCKNUM			
	For example						
	Write EM4035	0x63	0x09	BDDDDDDDD B:BLOCKNUM DDDDDDDDD:write block			
	For example						

*Command Type	Function	Send			Return		
		Command	DATA Length	DATA	STAUS	DATA Length	DATA
SIM CARD	LOGIN	0x70		PPPP 4 bytes password			
	For example						
	Change Sim Card Password	0x71		PPPP 4 bytes password			
	For example						
	WRITE	0X72		NPPPP N: =0 SUK =1 KEY1 =2 KEY2 =3 KEY3			
	For example						
	RESET	0X73					
	For example						

Card Operating

1. **Warning: Accesss Bits! Read card manual before proceeding or card may be blocked!!!**
2. Block operation:
   a) For STD MF-S50'
   SECOTOR is from 0 to 15.The BLOCK is from 0 to 63
   b) For STD MF-S70'
   SECOTOR is from 0 to 39(1 sector include 4 blocks in the first 32 sectors, and 1 sector include 16 blocks in the last 8 sectors), The BLOCK is from 0 to 255
   c) For S70 or Ultra-light
   .You may change the Block in the Protocols**.**

3. **Warning: BLOCK3 of each Sector is a control area which can change the password A and password B. It is very important to write the correct number in this block otherwise will cause the sector damaging!!!**

4. For the safety purpose, the demo software we provide is only available for password A operating which normally use very often. (you can change the password A)

5. For the Password B conducting, we locked the function for safety purpose. Please use the protocol as a reference to operate it.

6. You can switch the module into low consumption mode by using command "HALT Module" and command "REQUEST" before starting to use again.

7. When using the Purse function, you must Write Purse with any amount to initialize it.

8. When you operating the "write block" and "changing the password A", the VB demo will automatically add a "0"before the number you write. When you operating the purse "write" "increase" "decrease", the VB demo will automatically add a "0"followed the number you write.

9. The software will automatically do the Caps for the character you type in.

10. All the writing and password and purse operating can only between "0"—"F".

11. For the Purse "write" "increase" "decrease", the money amount is DDDD 4 bits. For example, 5$ will be 0x00,0x00,0x00,0x05.

12. It is not necessary to have checksum password for the Ultra-light card writing. It is A:=2-NO_AUTHEN (Refer to the Protocols)

13. Saving a password into EEPROM
    The address of the RC500 chip for password is 80--1FF. There are 6 bytes for Key A or Key B, plus reversing saving, there are 12 bytes for key A or Key B and 24 bytes for both keys.
    There are totally 384 bytes in EEPROM organized as 16 blocks.

* The commands in RED are not capable for all models.