DERK 13.56MHz READER

DK25-ST Design Manual

V1.0

目录

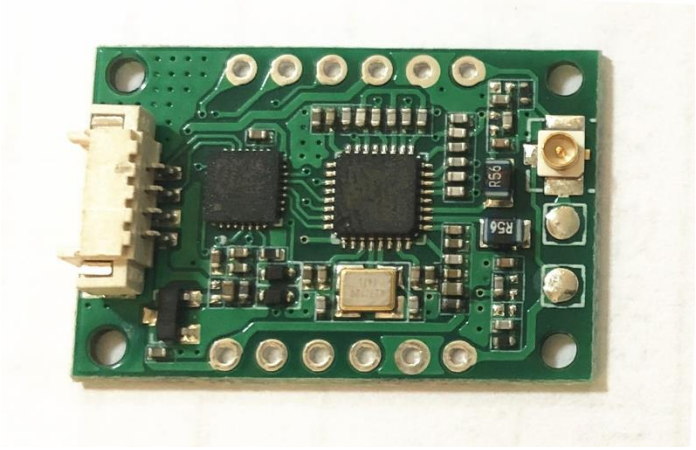
1、Product characteristics

CAERD	mifare one（M1）、S50、S70、NTAG2xx、F08、I-CODE-X；
voltage	3.3V~5.0V
ISO	ISO15693、ISO14443-A、ISO14443-B、ISO18092
current	30mA
Temp	-20~85℃
Interface	UART，1.25mm*4
Baud Rate	115200bps
Dimensions	28.6x19.1 x4.7 mm
Read Range	20mm~60mm

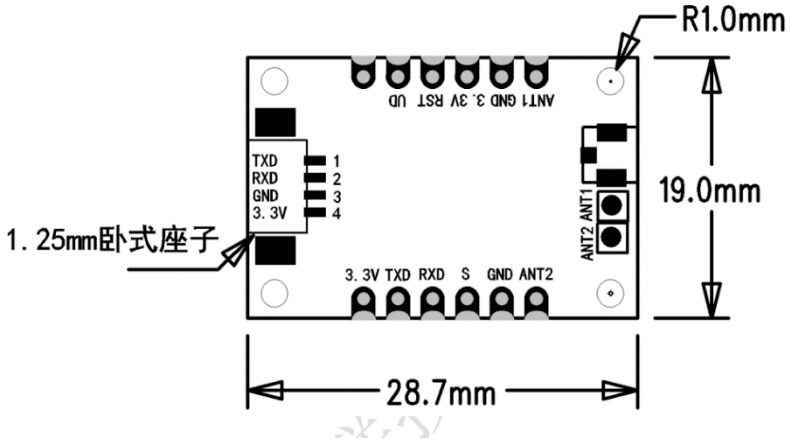
2、Hardware Interface

2.1 Module size interface

Picture of real products：



Pin schematic：



Interface Definition：

Interface	Funcution
ANT1	NFC_TX1
GND	GND
3.3V	VCC
RST	RST
UP	UPDATE
UP	UPDATE
3.3V	VCC
TXD	UART_TXD
RXD	UART_RXD

S	STATUS
GND	GND
ANT2	NFC_TX2

3、Communication Protocol

3.1 Communication transmission byte format

1 ） Connector： UART
2 ） Band Rate： 115200 bps
3 ） Start Bit： 1bit
4 ） Data： 8 bits
5 ） TSTP： 1 bit
6 ） Check：NO

3.2 FormatofFrame

MHR（0xAA）+Length（1Byte）+command（1Byte）+[address（1Byte）]+[data（N Byte）]

Length：Length = command length（1Byte）+ [address length（1Byte）] + [data length（N Byte）]

3.3 command

Type the command	CMD	Description
General	0x01	Get card UID
	0x02	Get card type
	0x95	Automatic card finder switch
	0xB0	Gets the firmware version number of the module
Mifare CMD	0x03	Write the key to be verified to the module (A key)
	0x04	Mifare read block
	0x05	Mifare write block
	0x0B	Write the key to be verified to the module (B key)
	0x0C	Set the type of key the module

		USES
Ultralight CMD	0x09	Ultralight read block
	0x1C	Ultralight read several blocks
	0x1D	Ultralight write several blocks
ISO14443-A CPU	0x15	ISO14443-A CPU card active
	0x17	ISO14443-A CPU card APDU iInstruction interface
	0x18	Card power off command, close antenna command interface
ISO15693	0x90	ISO15693 read one block
	0x91	ISO15693 read several blocks
	0x92	ISO15693 write one block
	0x93	ISO15693 write several blocks
	0x94	ISO15693 lock block
The module feedback	0xE0	Card type error feedback instruction
	0xE1	No card error feedback instruction found
	0xE2	Key mismatch error feedback instruction
	0xE3	Read block failed error instruction
	0xE4	Write block failure error instruction
	0xFE	ACK Confirm the order
	0xFF	NACK Deny command

3.3.1 General

a) Get card UID

CMD 0x01

send：

FH	Length		CMD
0xAA	0x01		0x01

No card ：

FH	Length	CMD
0xAA	0x01	0xE1

Card on：

FH	Length	CMD	Card UID
0xAA	UIDLength + 1	0x01	4 – 8 bytes

Card UID Length：

Card	UIDLength
ISO14443-A CPU	4
ISO14443-B	8
Mifare	4
ISO15693	8
Ultralight	7
DF	7

b) Get card type

CMD 0x02

FH	Length	CMD
0xAA	0x01	0x02

No Card：

FH	Length	CMD
0xAA	0x01	0xE1

Card ON：

FH	Length	CMD	Card type
0xAA	0x02	0x02	1byte

Card type：

0x00	Undefined

0x01	Mifare
0x02	Ultraligh）
0x03	ISO14443-B
0x04	ISO14443-A CPUcard
0x05	ISO15693

d）Turn on/off the auto card search command

CMD 0x95

FH	Length	CMD	on/off	Time	Parameter
0xAA	0x04	0x95	1byte	1byte	1byte

BIT	含义
Bit 0 – Bit 1	0：Undefined 1： CPU card to mifare one 2： CPU card to CPU card 3：Undefined
Bit 2	Undefined
Bit 3	0：Duplicate card not recognized 1：dentification copy card
Bit 4	0：No card type is returned 1：Return card type
Bit 5	0：Do not return bank card number 1：Return your bank card number
Bit 6	Undefined
Bit 7	Undefined

3.3.2 Mifare one command

a）Write M1 card KEY A KEY to the module

CMD 0x03

FH	Length	CMD	key
0xAA	0x07	0x03	6 bytes

Return on successful operation:

FH	Length	CMD
0xAA	0x01	0xFE

b）M1 read command

CMD 0x04

FH	Length	CMD	block address
0xAA	0x02	0x04	1byte

No card ：

FH	Length	CMD
0xAA	0x01	0xE1

Return on successful operation:

FH		Length	CMD	block address	块数据
0xAA		0x12	0x04	1 byte	16 byte

c）M1write

CMD 0x05

FH	Length	CMD	block address	块数据
0xAA	0x12	0x05	1 byte	16 byte

No card：

FH	Length	CMD
0xAA	0x01	0xE1

Return on successful operation:

FH	Length	CMD
0xAA	0x01	0xFE

g） Write M1 card KEY B KEY to the module

CMD 0x0B

FH	Length	CMD	key
0xAA	0x0B	0x03	6 bytes

Return on successful operation:

FH	Length	CMD

0xAA	0x01	0xFE

h） Set the type of key the module USES

CMD 0x0C

FH	Length	CMD	Key type
0xAA	0x02	0x0C	1 byte

Return on successful operation:

FH	Length	CMD
0xAA	0x01	0xFE

0x0A is KEY A，0x0B isKEY B，default: KEY A

3.3.3 Ultralight command

a）UL read block

CMD 0x09

FH	Length	CMD	block address
0xAA	0x02	0x09	1 byte

No card：

FH	Length	CMD
0xAA	0x01	0xE1

Return on successful operation:

FH	Length	CMD	block address	Data blocks
0xAA	0x06	0x90	1 byte	4 bytes

b）UL write bloks

CMD 0x0A

FH	Length	CMD	block address	Data blocks
0xAA	0x06	0x0A	1 byte	4 bytes

No card：

FH	Length	CMD
0xAA	0x01	0xE1

Return on successful operation:

FH	Length	CMD
0xAA	0x01	0xFE

b）UL read blocks

CMD 0x1C

FH	Length	CMD	Start block	End block
0xAA	0x03	0x1C	1 byte	1 byte

No card：

FH	Length	CMD
0xAA	0x01	0xE1

Return on successful operation:

FH	Length	CMD	address	Data
0xAA	Blocks *4 + 2 bytes	0x1C	1 bytes	Blocks*4 bytes

b）UL write blocks

CMD 0x1D

FH	Length	CMD	Start block	Data
0xAA	n	0x1D	1 byte	< 240 bytes

No card：

FH	Length	CMD
0xAA	0x01	0xE1

Return on successful operation:

FH	Length	CMD
0xAA	0x01	0xFE

3.3.4 ISO14443-A CPU card command

a）ISO14443-A card Activa command

CMD 0x15

FH	Length	CMD
0xAA	0x01	0x15

Return on successful operation:

FH	Length	CMD
0xAA	0x01	0xFE

b）ISO14443-A PDU Command interface

CMD 0x17

FH	Length	CMD	APDU CMD
0xAA	n+1 byte	0x17	N bytes

Return on successful operation:

FH	Length	CMD	APDU CMD
0xAA	n+1byte	0x17	N bytes

c）Card power off instruction

CMD 0x18

FH	Length	CMD
0xAA	0x01	0x18

Return on successful operation:

FH	Length	CMD
0xAA	0x01	0xEA

3.3.5 ISO15693 command

a） read one block

CMD 0x90

FH	Length	CMD	block address
0xAA	0x02	0x90	1 bytes

No card：

FH	Length	CMD
0xAA	0x01	0xE1

Return on successful operation:

FH	Length	CMD	block address	Data blocks
0xAA	0x06	0x90	1byte	4 bytes

b） read several blocks

CMD 0x91

FH	Length	CMD	Start block add	Blocks number
0xAA	0x03	0x91	1 byte	1 byte

No card：

FH	Length	CMD
0xAA	0x01	0xE1

Return on successful operation:

FH	Length	CMD	block address	Datas
0xAA	Blocks Length+2 bytes	0x91	1 byte	Blocks * 4 bytes

c） write one block

CMD 0x92

FH	Length	CMD	block	block

			address	
0xAA	0x06	0x92	1 byte	4 byte

No card：

FH	Length	CMD
0xAA	0x01	0xE1

Return on successful operation:

FH	Length	CMD
0xAA	0x01	0xFE

例：

向模块发送：AA 06 92 00 01020304

返回（ACK）：AA 01 FE

注： 红色表示 FH， 黄色表示指令 Length， 绿色表示指令，灰色表示地址，青色表示数据

数据表示要写入卡片的数据，一个块 4 个 byte

d） ISO15693 写多个块

CMD 0x93

FH	Length	CMD	Start addr	Blocks num	datas
0xAA	n+3	0x93	1 byte	1 byte	Blocks num * 4 bytes

No card：

FH	Length	CMD
0xAA	0x01	0xE1

Return on successful operation:

FH	Length	CMD
0xAA	0x01	0xFE

e） lock one block

CMD 0x94

FH	Length	CMD	block address
0xAA	0x02	0x94	1 byte

No card：

FH	Length	CMD
0xAA	0x01	0xE1

Return on successful operation:

FH	Length	CMD
0xAA	0x01	0xFE