

W2160 User Datasheet (V1.0)



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1. GENERAL DESCRIPTION

W2160 is a highly integrated USB card reader, it integrates image scanning technology on the traditional smart card reader .It can support QR code or bar code scanning , and has a contact card slot and support contactless card operation. The reader also has a magnetic stripe card reading function, and can be equipped with a second-generation ID card information reading function to meet various needs of customers.

2. READER FEATURES

- Support the contact card that satisfies standard ISO 7816—1/2/3/4
- Support the contact I2C memory card, SLE4428, SLE4442,AT88SC1608
- Support the contactless card that satisfies standard ISO14443 TYPEA and TYPEB
- Support the Magnetic Strip card satisfies standard ISO 7810, ISO 7811,ISO 7812 and ISO 7813
- full speed USB communication ,HID protocol
- LED indicates the power or communication status
- Embedded buzzer that can be controlled by the user
- With the DLL, user can operate card conveniently

Module	Description
Scanner	2D:QR code/ PDF417code; 1D: Code 128, Code 93, F-6, ITF-14, EAN-13, MSI-Plessey, Code 39 ,Code 11,etc.
Support Card type	Contact card : ID-1 size slot;Support T0, T1 protocol,I2C Memory Card ,SLE4428,SLE4442, AT88SC 1608; Support 1.8V/3V/5V card Contactless card: TYPEA /TYPEB/MAFIRE ONE Read Range of Contactless Card is 0~4.5CM Magnetic strip card: Support the second track and the third track reading PSAM: Support 4 PSAM slots
Communication	Full Speed USB Interface with 12Mbps,HID communication Protocol
Indication	3 LEDS & Buzzer; the red led indicates power status, the green led indicates contact card operation status, the blue led indicates contactless card operation status
Power Supply	USB power supply
MTBF	5000 hours

Working Current	≤500mA
Dimension	127*79*65(mm)
Temperature	0°C ~ 50°C
Humidity	20% ~ 90%
Shell Material	ABS
Operation system	Win XP/ Vista/ Win 7/Win 8/ Win 10/linux/

3. COMMUNICATION PROTOCOL OF READER

Remarks: All the command data is in hex .

PC –to-Reader data

Protocol data	Abbreviations	lenth	Data Definitions
Headers	NAD (slot ID)	1	0x12: contact user card 0x15: contactless card 0x16: SAM slot1 0x17: SAM slot2 0x18: SAM slot3 0x19: SAM slot4 0x1A: Magnetic Strip card 0x00: self-defined command to reader
	LEN1	1	High byte of the APDU length
	LEN0	1	Low byte of the APDU length
APDU	CLA	1	
	INS	1	
	P1	1	
	P2	1	
	Lc	1	
	DATA	0-FF	

(DLL function can add the headers automatically ,the user only need organize the data)

Reader-to-PC data

Protocol data	Abbreviations	lenth	Data Definitions
Headers	NAD	1	Slot ID exchange its half-byte
	LEN1	1	0x00
	LEN0	1	Low byte of the data and SW
Data	DATA	0-FF	Card`s data
	SW1	1	Status word high byte
	SW2	1	Status word low byte

(DLL function can add the headers automatically ,the user only need organize the data)

Example1: Reset Contact CPU card

Reader to PC

12	00	05	00	12	00	00	00
↓	↓	↓	↓	↓	↓	↓	↓
NAD	LEN1	LEN0	CLA	INS	P1	P2	Lc

Reader to PC

21	00	13	3B6D0000574446224A864341301F131C12				90	00
↓	↓	↓	↓				↓	↓
NAD	LEN1	LEN0	(←-----DATA-----→)				SW1	SW2

Example2: Select CPU card MF (3F00)

PC to Reader:

12	00	07	00	A4	00	00	02	3F	00
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
NAD	LEN1	LEN0	CLA	INS	P1	P2	Lc	(DATA)	

Reader to PC

21	00	02	61	XX
↓	↓	↓	↓	↓
NAD	LEN1	LEN0	SW1	SW2

4. THE FUNTIONS OF DLL

1) open the device function

```
HANDLE WINAPI CT_open(  
    char *name,  
    unsigned int param1,  
    unsigned char param2  
);
```

Parameters:

name: "hid1","hid2","hidN" etc, 1<=N<=9

param1: Default 0

param2: Default 0

Return :

INVALID_HANDLE_VALUE(-1) open failed;

INVALID_HANDLE_VALUE(fd) open success;

(fd : descriptor of the device)

2) Set NAD function

```
void WINAPI ICC_set_NAD(  
    HANDLE fd,  
    unsigned char nad  
);
```

Parameters:

fd :

nad : slot ID (default 0x00)

Return:

NO

.....

Example:

```
ICC_set_NAD(fDev,0x12); //set NAD is 0x12,contact card slot
```

3) Reset the card

```
unsigned WINAPI ICC_reset(  
    HANDLE fd,  
    unsigned char *lenr,  
    unsigned char *resp  
);
```

Parameters:

fd :
lenr : the length of ATR (answer to reset)
resp : ATR

Return status:

0x9000 Success
0x6200 No Ccard
0x6FF0 Time Out

4) send APDU function

Comm. : CLA INS P1 P2 Lc DATA [Le]

Resp : DATA

```
unsigned WINAPI ICC_tsi_api(  
    HANDLE fd,  
    unsigned char len,  
    unsigned char *comm,  
    unsigned char *lenr,  
    unsigned char *resp  
);
```

Parameters:

fd :
len : The Length of comm
comm. : APDU
lenr : The length of the data from card
resp : The data from card

Return status:

0x6FF0: Time Out
Others: SW1 SW2 from card

5) close the device function

```
int WINAPI CT_close(  
    HANDLE fd  
);
```

Parameter:

fd : the return of CT_open

Return:

-1: failed
0: success

Operating Process of the card

```
CT_open          //open the device
ICC_set_NAD      //Set slot ID (default 0x00)
ICC_reset       //Reset card
...
ICC_tsi_api      //send APDU
...
CT_close        //Close the device
```

Application Example:

Get The Version Of Reader:

```
HANDLE fDev;
unsigned char lens;      //
unsigned char lenr;      //
unsigned char comm[300]; //
unsigned char resp[300]; //
unsigned int sw;         //
char tmpbuf[300];        //
CString strDisplay;      //

fDev =CT_open(hid1,0,0);
ICC_set_NAD(fDev,0x00); //set NAD 0x00
memcpy(comm,"\x00\x19\x00\x00\x00",5); // get Version
lens=5; //
sw=ICC_tsi_api(fDev,lens,comm,&lenr,resp); //
if(sw!=0x9000) //
{
    MessageBox("Get Reader Firmware Version Error!");
}else
{
    BinToCHex((unsigned char *)tmpbuf,resp,lenr); //
    tmpbuf[lenr*2]=0;
    strDisplay=CString(tmpbuf);
    MessageBox("Firmware Version is "+strDisplay);
}

ICC_set_NAD(fDev,0x12); //set NAD 0x12 contact card slot
sw=ICC_reset(fDev,&lenr,resp) //reset card
memcpy(comm,"\x00\xa4\x00\x00\x02\x3f\x00",7); // select MF
lens=7; //
sw=ICC_tsi_api(fDev,lens,comm,&lenr,resp); //
```

5. SELF-DEFINED COMMAND

Self-defined command to device							
NAD	CLA	INS	P1	P2	Lc	Data	Specification
00	00	19	00	00	00		Get The Version Of Reader
00	00	19	01	01	Le	data	Get The Serial Number Of Reader (Le<=20) Data: The Serial Number Of Reader (in hex)
15	B0	15	0E	00	01	00	Close RF field

Self-defined command to contact card							
NAD	CLA	INS	P1	P2	Lc	Data	Specification
12	00	12	00	00	00		Reset
	00	B0	P1	P2	LEN		Read data from the memory card SLE4442: P1 default 0; P2 address SLE4428: P1(high byte of address) P2(low byte of address) LEN (data length) LEN=0, read 256 bytes
	00	20	00	00	LEN	PIN	Check PIN SLE4442: pin is 3bytes; SLE4428: pin is 2bytes;
	00	D6	P1	P2	LEN	Data	Write data to the memory card
	00	24	00	00	LEN		Change PIN

Self-defined command to contactless card							
NAD	CLA	INS	P1	P2	Lc	Data	Specification
15	00	12	00	00	00		Reset CPU card (ISO14443 TYPEA/B)
	80	11	09	00	00		Reset Mifare one
	80	11	02	00	08	Key type(1 byte)+ block number(1 byte) +key Key type-keyA:0X60 Key type-keyB:0X61	Authentication block
	80	11	03	00	01	block number	Read data
	80	11	04	00	11	block number+ data(16 bytes)	Write data

80	11	05	00	05	block number+ amount (4 bytes)	Init wallet
80	11	06	00	05	block number+ amount (4 bytes)	Increase
80	11	07	00	05	block number+ amount (4 bytes)	Decrease

Self-defined Command to magnetic strip card							
NAD	CLA	INS	P1	P2	Lc	Data	Specification
1A	80	17	03	P2	00		In KBW mode ,the data of magnetic strip card P2: 2. only the second strip data 3. only the third strip data 6. the second and the third strip data
	80	17	03	00	01	data	Read magnetic strip data in command mode data: 2. only the second strip data 3. only the third strip data 6. the second and the third strip data
	00	19	06	P2	00		Change mode P2: 0, set to KBW mode 1, set to command mode
	00	19	20	P2	00		Waiting time (in command mode) P2: time (S) (time < 180s)

SW1 SW2:

0x9000: Success

0x6D00: Not support command

0x6700: Length error

0x6FF0: Time out (communicate error)

0x6985: Write-protect (memory card)

0x6982: Not reach the secure state (mifare one)

0x63CX: X is the number of attempt (mifare one)

0x 6983/6984: Authentication failed (mifare one)

0x 6FF0: Init error (mifare one)

0x 6FF3: Write error (mifare one)

0x6902: Time out (magnetic strip card)