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DLL SPECIFICATION

CRT-310 (R04/U04)

MOTORIZED CARD READER



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•Windows DLL Specification:

CREATOR provide Windows32 DLL on windows platform, files names as follow:

1. CRT_310_UR04.H 32 digit dynamic library header files
2. CRT_310_UR04.LIB 32 digit input dynamic libraries
3. CRT_310_UR04.DLL Windows32 DLL file

•Applicable Card Type:

1. RFID Card: ISO/IEC 14443 TYPE A / B, MIFARE one (S50, S70, UL)
2. IC Card:
 - SLE4428, SLE4442
 - 24C01A, 24C02, 24C04, 24C08, 24C16, 24C32, 24C64
 - Contact CPU Card (T=0/T=1)
 - SAM/SIM Card (T=0/T=1)
3. Magnetic card (Read only)

Notes:

1. Code examples of DLL of Magnetic card and CPU card running on VC6, VB6, DELPHI7, C++BUILD6, PB9, VB2005.NET, V#2005.NET environment are provided. Please refer to according sales representative.

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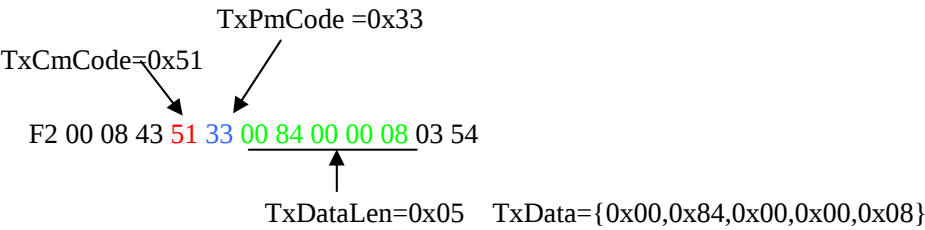
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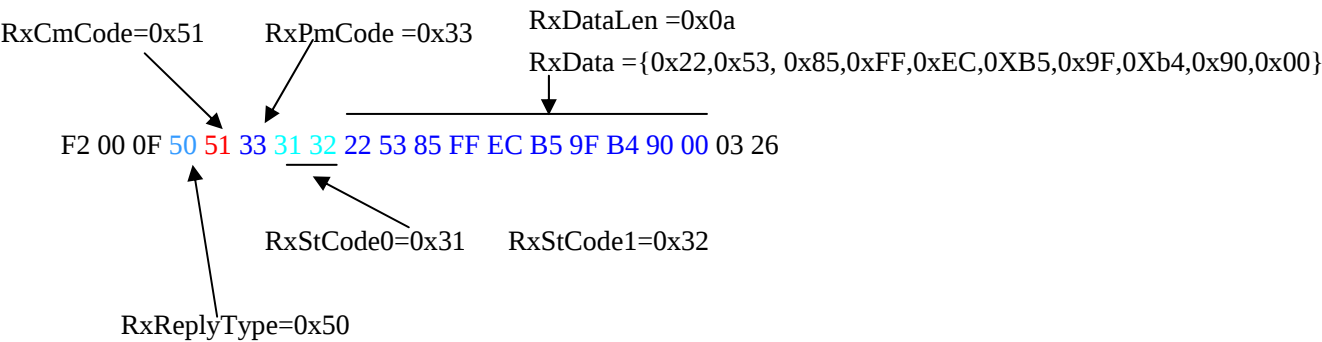
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1. Function Parameter Specification

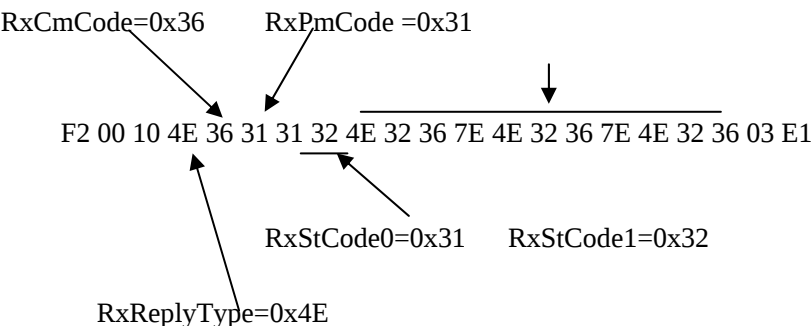
1. Transmit command format (Command format (HOST--> ICRW))



2. Receive command format (Positive response format (ICRW -> HOST))



3. Receive command format (Negative response format (ICRW -> HOST))



Notes:

Receive command (Successful): RxReplyType=0x50. (RxStCode0, RxStCode1 is state code).
Receive command (Error) : RxReplyType=0x4E. (RxStCode0, RxStCode1 is error state code).

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2. API Specification (Communication Interface is Com Port)

2.1 Open Com Port (Default Baud Rate: 38400bps)

HANDLE APIENTRY CRT310ROpen (char *Port);

Parameter:

Port: The handle of com port

E.g.: CRT310ROpen ("COM1");

Return:

0 Com Port Open Failure

Possible Reason:

① Invalid Com Port

② Com Port Occupy by other device

<>0 Com Port Open Successful

Notes:

Call this function first before other operations and gain the handle of com port

It is available to open multiple com port, but one com port could only be opened once.

Call CRT310RClose() to close com port after all operation

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2.2 Open Com Port at Defined Baud Rate

HANDLE APIENTRY CRT310ROpenWithBaut (char *Port, unsigned int Baudrate);

Parameter:

Port: The handle of com port

Baudrate: Baud Rate

Baud Rate=9600, 19200, 38400, 57600, 115200

E.g.: CRT310ROpenWithBaut ("COM1",38400);

Return:

Handle of Com Port

0 Com port open failure

Possible Reason:

① Invalid Com Port Number

② This Com Port is Occupied by other device

<>0 Com port open successful

Notes:

Call this function first before other operations and gain the handle of com port

It is available to open multiple com port, but one com port could only be opened once.

Call CRT310RClose() to close com port after all operation

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2.3 Close Com Port

```
int APIENTRY CRT310RClose (HANDLE ComHandle);;
```

Parameter:

ComHandle: The handle of Com Port

Return:

=0 Successful

<>0 Failure

Notes:

CRT310ROpen () and CRT310ROpenWithBaut needs to use together. After usage, please call this function to close the com port.

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2.4 Command Execution Function

```
int APIENTRY RS232_ExeCommand (HANDLE ComHandle,BYTE Tx CmCode,BYTE Tx PmCode,
                                int TxDataLen,BYTE TxData[],
                                BYTE *RxReplyType,BYTE *RxStCode1,BYTE *RxStCode0,
                                int *RxDataLen,BYTE RxData[]);
```

Function:

Execute command and return result

Parameter:

ComHandle: Device Handle

TxCmCode: Command Code

TxPmCode: Parameter Code

TxDataLen: Length of Data Package

TxData: Data Package

RxReplyType:Return Reply Type

0x50 : Success

0x4E : Fail

0x10 : Cancel communication by machine (NAK)

0x20 : Communication error

0x30 : Cancel communication by HOST (DLE, EOT)

RxStCode0: Return state code 0 // Please see more detail from communication protocol

RxStCode1: Return state code 1 // Please see more detail from communication protocol

RxDataLen: Return package code

RxData: Return Data

Return:

=0 Success

<>0 Failure

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2.5 IC Card Transmission Function

```
int APIENTRY RS232_ICCardTransmit (HANDLE ComHandle,BYTE TxCmCode,BYTE TxPmCode,
                                   int TxDataLen,BYTE TxData[],
                                   BYTE *RxReplyType,BYTE *RxStCode1,BYTE *RxStCode0,
                                   BYTE *RxCmCode,BYTE *RxPmCode,
                                   int *RxDataLen,BYTE RxData[]);
```

Function:

Execute command and return result

(Compare to command execution command, add two parameter on this function: RxCmCode and RxPmCode)

Parameter:

ComHandle: Device Handle

TxCmCode: Command Code

TxPmCode: Parameter Code

TxDataLen: Length of Data Package

TxData: Data Package

RxReplyType:Return Reply Type

0x50 : Success

0x4E : Fail

0x10 : Cancel communication by machine (NAK)

0x20 : Communication error

0x30 : Cancel communication by HOST (DLE, EOT(10H, 04H))

RxCmCode: Return Command code

RxPmCode: Return Parameter code

RxStCode0: Return state code 0 // Please see more detain from communication protocol

RxStCode1: Return state code 1 // Please see more detain from communication protocol

RxDataLen: Return package code

RxData: Return Data

Return:

=0 Success

<>0 Failure

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2.6 Command Cancel Function

int APIENTRY CancelCommand(HANDLE ComHandle);

Function:

Cancel the current command, and procedure is the following:

- ① Send "DLE,EOT" to lower lower machine, and wait to receive "DLE,EOT"
- ② Cancel the waiting command. E.g.: use this command to cancel card in command when waiting

Parameter:

ComHandle: The handle of com port

Return:

- =0 Successful
- =-1 Failure

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3. API Specification (Communication Interface is USB)

3.1 USB interface Open Function

HANDLE APIENTRY CRT310UOpen();

Parameter:

Eg: CRT310Uopen();

Return:

- =0 (Open Device Error)
Possible reason:
 - ①The machine is not connected; please check the power cable and communication cable.
 - ②Power supply is not complied with specification, check if the power is 12V and for better work performance, the current should be around 1.5A
- <>0 Setting Device handle, open device success

Notes: 1) Call this function at first and gain device handle. After that, USB_ExeCommand can be used.
2) Close com port by using CRT310UClose() after the completion of all operations.

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3.2 Close USB Interface Function

int APIENTRY CRT310UClose(HANDLE ComHandle);

Parameter:

ComHandle: Device handle

Return:

=0 Success

<>0 Fail

Notes:

CRT310UOpen() and CRT310UClose should be used together and use CRT310UClose to close port after the completion of all operations.

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3.3 Command Execution Function

```
int APIENTRY USB_ExeCommand(HANDLE ComHandle,BYTE Tx CmCode,BYTE TxPmCode,
                           int TxDataLen,BYTE TxData[],
                           BYTE *RxReplyType,BYTE *RxStCode0,BYTE *RxStCode1,
                           int *RxDataLen,BYTE RxData[]);
```

Function:

Execute command and return result

Parameter:

ComHandle: Device Handle

TxCmCode: Command Code

TxPmCode: Parameter Code

TxDataLen: Length of Data Package

TxData: Data Package

RxReplyType:Return Reply Type

0x50 : Success

0x4E : Fail

0x10 : Cancel communication by machine (NAK)

0x20 : Communication error

0x30 : Cancel communication by HOST (EOT)

RxStCode0: Return state code 0 // Please see more detail from communication protocol

RxStCode1: Return state code 1 // Please see more detail from communication protocol

RxDataLen: Return package code

RxData: Return Data

Return:

=0 Success

<>0 Fail (Close USB connection automatically, need to restart CRT310Uopen to connect device)

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3.4 IC Card Transmission Function

```
int APIENTRY USB_ICCardTransmit (HANDLE ComHandle,BYTE TxCmCode,BYTE TxPmCode,
                                int TxDataLen,BYTE TxData[],
                                BYTE *RxReplyType,BYTE *RxStCode1,BYTE *RxStCode0,
                                BYTE *RxCmCode,BYTE *RxPmCode,
                                int *RxDataLen,BYTE RxData[]);
```

Function:

Execute command and return result

(Compare to command execution command, add two parameter on this function: RxCmCode and RxPmCode)

Parameter:

ComHandle: Device Handle

TxCmCode: Command Code

TxPmCode: Parameter Code

TxDataLen: Length of Data Package

TxData: Data Package

RxReplyType:Return Reply Type

0x50 : Success

0x4E : Fail

0x10 : Cancel communication by machine (NAK)

0x20 : Communication error

0x30 : Cancel communication by HOST (DLE, EOT(10H, 04H))

RxCmCode: Return Command code

RxPmCode: Return Parameter code

RxStCode0: Return state code 0 // Please see more detain from communication protocol

RxStCode1: Return state code 1 // Please see more detain from communication protocol

RxDataLen: Return package code

RxData: Return Data

Return:

=0 Success

<>0 Fail (Close USB connection automatically, need to restart CRT310Uopen to connect device)

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4. Sample Code

4.1 Parts Command List

- CM: Command code PM: Parameters Code (More information refer to communication protocol)

CHAPTER	COMMAND	FUNCTION	CM	PM	DESCRIPTION
3.1	INITIALIZE	Initialize CRT-310	30H	30H	If card is inside, move card to card holding position
				31H	If card is inside, capture card to rear side without card holding position.
				32H	If card is inside, capture card to front side without card holding position.
				33H	If card is inside, does not move the card.
				34H	Same as 30H and capture card counter will work.
				35H	Same as 31H and capture card counter will work.
				36H	Same as 32H and capture card counter will work.
				37H	Same as 33H and capture card counter will work.
3.2	STATUS REQUEST	Inquire status	31H	30H	Report CRT-310 status
				31H	Report CRT-310status (With sensor status)
				32H	Report CRT-310 status (With sensor status)
3.3	CARD MOVE	Card movement	32H	30H	Move card to front side without card holding
				31H	Move card to rear side holding card position
				32H	Move card to RFID card operation position
				33H	Move card to IC card operation position
				34H	Move card rear side holding card position
				35H	Move card to rear side without holding card position.

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3.4	CARD ENTRY		33H	30H	Prohibit entry from front
				31H	Enable entry by switch
				32H	Enable entry by magnetic signal
				40H	Prohibit entry from rear
				41H	Enable entry from rear
3.5.1	Magnetic card operation	Magnetic card register operation	35H	31H	Only upload ISO-1 track data
				32H	Only upload ISO-2 track data
				33H	Only upload ISO-3 track data
				36H	Clear the data in the magnetic register without moving the card.
				37H	Only check the data status of magnetic register
				51H	Read ISO-1 track data by binary mode
				52H	Read ISO-2 track data by binary mode
3.5.2	Combine the magnetic card operation	Combination of magnetic card operation	36H	53H	Read ISO-3 track data by binary mode
				31H	Only-read ISO-1 track
				32H	Only-read ISO-2 track
				33H	Only-read ISO-3 track
				34H	Only-read ISO-1, ISO-2 track data
				35H	Only-read ISO-1, ISO-3 track data
				36H	Only-read ISO-2, ISO-3 track data
3.6	IC card Type		50H	30H	Auto check IC Card Type

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4.2 Call Function Specification

Communication Process of USB interface is followed:

1. Device Connection

USB interface call CRT310UOpen function

2. Communication Process

USB interface call USB_ExeCommand function

Close USB connection automatically if communication failure, need to restart CRT310Uopen to connect device

3. Close Connection

Call CRT310UClose function to close USB interface

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4.3 Sample Code (Magnetic Card Operation)

```

HANDLE hCom;    // Target device's HANDLE
int rc=0;       //Result
unsigned char CmCode;
unsigned char PmCode;
int  CmDataLen;
unsigned char CmData[1024];

unsigned char ReType;
unsigned char St0;
unsigned char St1;
int  ReDataLen;
unsigned char ReData[1024];
// Connect CRT-310
{
    hCom= CRT310UOpen ();
    if(hCom<=0)
    {
        // failed
        ...
    }
    else
    {
        // successfully.
        ...
    }
}
// Initialize
{
    memset(CmData,0x00,sizeof(CmData));
    CmCode=0x30; // Initialize command
    PmCode=0x36; // Parameter code
    CmDataLen=1; // Data size (bytes)
    CmData[0]=0x31;

    rc=USB_ExeCommand(hCom,CmCode,PmCode,CmDataLen,CmData,
                      &ReType,&St0,&St1,&ReDataLen,ReData);

    if(rc==0)
        // Initialize command successfully finished.
        if (ReType==0x50)
            {

```

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```

        // Received positive reply
        ...
    }
    else (ReType==0x4e)
    {
        // Received negative reply
        ...
    }
else
{
    //Communication Error
    // Initialize command failed.
    ...
}
}

// Setting Card In by Mag card
{
    memset(CmData,0x00,sizeof(CmData));
    CmCode= 0x33; // Card In
    PmCode=0x32; // Mag card from the front
    CmDataLen=0; // Data size
    rc=USB_ExeCommand(hCom,CmCode,PmCode,CmDataLen,CmData,
                      &ReType,&St0,&St1,&ReDataLen,ReData);
    if(rc!=0) || ReType != 0x50
    {
        // Command sending failed or command execution failed
        ResErrMsg(St0,St1);    // ResErrMsg is a function to show the reason of error
                               //Specific error status code, please refer to communication protocol
        ...
    }
}

// Request Status
{
    memset(CmData,0x00,sizeof(CmData));
    CmCode= 0x31; // Status request command
    PmCode= 0x30; // Parameter code
    CmDataLen=0; // Data size
    rc=USB_ExeCommand(hCom,CmCode,PmCode,CmDataLen,CmData,
                      &ReType,&St0,&St1,&ReDataLen,ReData);

    if(rc==0)
        if (ReType==0x50)
        {
            //Execute Ok

```

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```

        if(St0 == '0' && St1 == '2')
        {
            // status code="02"
            // Detected a card inside of CRT-310
            ...
        }
    }
    else (ReType==0x4e)
    {
        //Command execution failed
        ResErrMsg(St0,St1);
        ...
    }
else
{
    //Communication Error
    ...
}
}
// Read Track 1 of Mag card's tracks
{
    memset(CmData,0x00,sizeof(CmData));
    CmCode= 0x36; // Read Mag Card
    PmCode=0x31; // Track 1
    CmDataLen=0; // Data size
    rc=USB_ExecCommand(hCom,CmCode,PmCode,CmDataLen,CmData,
                        &ReType,&St0,&St1,&ReDataLen,ReData);
    if(rc==0)
    {
        if (ReType==0x50)
        {
            //Read track data OK
            if (ReData[0]==0x50)
            {
                CString Tra1Buf,t;
                int n;
                for(n=1; n<ReDataLen; n++)
                {
                    t.Format("%c",ReData[n]);
                    Tra1Buf += t;
                    t="";
                }
                //Tra1Buf is the buffer of track 1 data
            }
        }
    }
}

```

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```

else if (ReData[0]==0x4e)
{
    //Read track data Error
    switch(ReData[2])
    {
        case 36 :    //No start bits (STX)
            break;
        case 37 :    //No stop bits (ETX)
            break;
        case 30 :    //Byte Parity Error(Parity))
            break;
        case 38 :    //Parity Bit Error(LRC)
            break;
        case 34 :    //Card Track Data is Blank
            break;
        case 33 :    //Only(SS-ES-LRC)
            break;
    }
}
else (ReType==0x4e)
{
    // Command execution failed
    ResErrMsg(St0,St1);
}
else
{
    //Communication Error
}
}

// Read Track 2 of Mag card's tracks
{
    memset(CmData,0x00,sizeof(CmData));
    CmCode= 0x36; // Read Mag Card
    PmCode=0x32; // Track 2
    CmDataLen=0; // Data size
    rc=USB_ExeCommand(hCom,CmCode,PmCode,CmDataLen,CmData,
        &ReType,&St0,&St1,&ReDataLen,ReData);
    if(rc==0)
        if (ReType==0x50)
        {
            //Read track data OK
            if (ReData[0]==0x50)

```

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```

{
    CString Tra1Buf,t;
    int n;
    for(n=1; n<ReDataLen; n++)
    {
        t.Format("%c",ReData[n]);
        Tra1Buf += t;
        t="";
    }
    //Tra1Buf is the buffer of track 2 data
}
else if (ReData[0]==0x4e)
{
    //Read track data Error
    switch(ReData[2])
    {
        case 36 :    //No start bits (STX)
            break;
        case 37 :    //No stop bits (ETX)
            break;
        case 30 :    //Byte Parity Error(Parity))
            break;
        case 38 :    //Parity Bit Error(LRC)
            break;
        case 34 :    //Card Track Data is Blank
            break;
        case 33 :    //Only(SS-ES-LRC)
            break;
    }
}
}
else (ReType==0x4e)
{
    // Command execution failed
    ResErrMsg(St0,St1);
}
else
{
    //Communication Error
}
}
// Read Track 3 of Mag card's tracks
{

```

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```

memset(CmData,0x00,sizeof(CmData));
CmCode= 0x36; // Read Mag Card
PmCode=0x33; // Track 3
CmDataLen=0; // Data size
rc=USB_ExeCommand(hCom,CmCode,PmCode,CmDataLen,CmData,
                  &ReType,&St0,&St1,&ReDataLen,ReData);
if(rc==0)
    if (ReType==0x50)
    {
        //Read track data OK
        if (ReData[0]==0x50)
        {
            CString Tra1Buf,t;
            int n;
            for(n=1; n<ReDataLen; n++)
            {
                t.Format("%c",ReData[n]);
                Tra1Buf += t;
                t="";
            }
            //Tra1Buf is the buffer of track 3 data
        }
        else if (ReData[0]==0x4e)
        {
            //Read track data Error
            switch(ReData[2])
            {
                case 36 :    //No start bits (STX)
                    break;
                case 37     //No stop bits (ETX)
                    break;
                case 30 :    //Byte Parity Error(Parity))
                    break;
                case 38 :    //Parity Bit Error(LRC)
                    break;
                case 34 :    //Card Track Data is Blank
                    break;
                case 33 :    //Only(SS-ES-LRC)
                    break;
            }
        }
    }
    else (ReType==0x4e)

```

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```

{
    // Command execution failed
    ResErrMsg(St0,St1);
}
else
{
    //Communication Error
}
}

// Move card to the front
{
    memset(CmData,0x00,sizeof(CmData));
    CmCode= 0x32; // Move Card
    PmCode=0x30; // The front
    CmDataLen=0; // Data size
    rc=USB_ExecCommand(hCom,CmCode,PmCode,CmDataLen,CmData,
                      &ReType,&St0,&St1,&ReDataLen,ReData);
    if(rc!=0 || ReType != 0x50)
    {
        // Command sending failed or command execution failed
        ResErrMsg(St0,St1);    // ResErrMsg is a function to show the reason of error
                               //Specific error status code, please refer to communication protocol

        ...
    }
}

// Closes communications between the Host Computer and the CRT-310
{
    CRT310UClose (hCom);
}

```