User Guide to the PullSDK Interfaces

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Contents

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1 Overview of the PullSDK Interfaces

The PullSDK interfaces are a group of functions, which are used to access the data of the C3 and C4 access control panels. PullSDK enables the developers of final application programs to access the access control panel more visually, conveniently, and concisely. The PullSDK interface provides the following functions:

Read and set the controller parameters

Read, set, and delete the related information (for example, time segment, user information, and holiday information) of the controller

Search for and modify the device information

2 Description of the PullSDK Interface Technology

In the eyes of the developers of final application programs, the PullSDK interfaces are a group of extract interfaces that are used to set and get the data in the access control panel. It seems that the developers are using the most universal SQL sentences while accessing the user data. In the eyes of the developers of application programs, the PullSDK interfaces seem to be a database server.

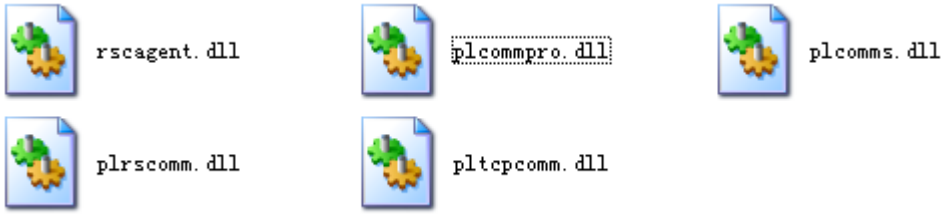
The PullSDK interfaces support the TCP/IP and RS485 communication protocol.

The PullSDK interfaces are developed by using the C language. Data communication is highly optimized, thus turning the PullSDK interfaces into the concise and efficient access interfaces.

Initially, the PullSDK interfaces are designed by referring to the SQL, but the most commonly used service model is the first consideration. Generally, the PullSDK interfaces are a group of elaborately abstracted interfaces, which attain a good balance between design, implementation, and use.

3 Installation of the PullSDK Interface

The PullSDK interface functions are contained in the plcommpro.dll file, which relies upon several other files. You need to copy the following five DLL files together to the system directory under Windows (windows/system32 under Windows XP).



(Note: Attached table 1 describes the functions of every file).

4 Detailed Description of the PullSDK Interface Functions

4.1 Connect

[Function]

int Connect(const char *Parameters)

[Objective]

The function is used to connect a device. After the connection is successful, the connection handle is returned.

[Parameter description]

Parameters:
[in]: Specify the connection options through the parameter, for example:
"protocol=RS485,port=COM2,baudrate=38400bps,deviceid=1,timeout=50000, passwd=";
"protocol=TCP,ipaddress=192.168.12.154,port=4370,timeout=4000,passwd=";

To connect a device, the system needs to transfer the device-related connection parameters.

protocol indicates the protocol used for communication. At present, RS485 and TCP can be used.

port: Communication port of the device. For example, if the RS485 protocol is used, you can set **port** to **COM1**: If the TCP is used, the default **port** is **4370** unless otherwise noted.

deviceid: Device ID used by the serial port.

baudrate: Baud rate used for the communication of the communication of the serial port.

ipaddress: IP address of the related device for TCP/IP communication.

timeout: Timeout time of the connection (unit: ms)If the network connection is in poor condition, you should set the parameter to a larger value. Usually, **timeout=5000 (5 seconds)** can meet the basic network needs. When the query result contains the error code of **-2**, you should set **timeout** to a larger value, for example, **timeout=20000 (20 seconds)**.

passwd: Connection password of the communication. If the parameter value is null, it indicates that no password is used.

(Note: The connection parameters are case-sensitive)

[Returned value]

If the device is connected successfully, the connection handle is returned. Otherwise, the error code of **0** is returned.

[Example]

Python:

```
params = “protocol=TCP,ipaddress=192.168.12.154,port=4370,timeout=4000,passwd=”
self.commpro = windll.LoadLibrary("plcommpro.dll")
constr = create_string_buffer(params)
self.hcommpro = self.commpro.Connect(constr)
```

c#:

```
params = “protocol=TCP,ipaddress=192.168.12.154,port=4370,timeout=2000,passwd=” ;
IntPtr h = Connect(params);
```

4.2 Disconnect

[Function]

Void Disconnect(HANDLE handle)

[Objective]

The function is used to disconnect the device.

[Parameter description]

handle

[in]: The handle that is returned when the connection is successful.

[Returned value]

None

[Example]

Python:

```
self.commpro.Disconnect(self.hcommpro)
```

self.hcommpro = 0

c#:

Disconnect(h);

h = IntPtr.Zero;

4.3 SetDeviceParam

[Function]

int SetDeviceParam(HANDLE handle, const char *ItemValues)

[Objective]

The function is used to set the controller parameters, for example, the device ID, door sensor type, driving time of the lock, and read interval.

[Parameter description]

handle

[in]: The handle that is returned when the connection is successful.

ItemValues

[in]: The device parameter value to be set; the multiple parameter values can be separated by commas; you can set at most 20 parameters at a time (Attached table 2 lists the parameter value attributes).

[Returned value]

When the returned value is **0** or a positive value, it indicates that the operation is successful. When the returned value is a negative value, it indicates an error. Attached table 5 lists the information about the error codes.

[Example]

Python:

items = ("DeviceID=1,Door1SensorType=2,Door1Drivertime=6,Door1Intertime=3")

p_items = create_string_buffer(items)

ret = self.commpro.SetDeviceParam(self.hcommpro, p_items)

c#:

int ret = 0;

items = ("DeviceID=1,Door1SensorType=2,Door1Drivertime=6,Door1Intertime=3")

ret = SetDeviceParam(h, items);

4.4 GetDeviceParam

[Function]

int GetDeviceParam(HANDLE handle, char *Buffer, int BufferSize, const char *Items)

[Objective]

The function is used to read the controller parameters, for example, the device ID, door sensor type, driving time of the lock, and read interval.

[Parameter description]

handle

[in]: The handle that is returned when the connection is successful.

Buffer

[in]: The buffer used to receive the returned data; the returned data is expressed in a text format; if the returned data is multiple params, the multiple params are separated by **commas**.

BufferSize

[in] The size of the buffer used to receive the returned data.

Items

[in]: The parameter names of the device to be read; the multiple parameter names are separated by commas; you can read at most 20 parameters at a time (Attached table 1 lists the parameter value attributes).

[Returned value]

When the returned value is **0** or a positive value, it indicates that the operation is successful. When the returned value is a negative value, it indicates that the operation fails. Attached table 5 lists the information about the error codes.

[Example]

Python:

```
buffer = create_string_buffer(2048)
items = ("DeviceID,Door1SensorType,Door1Drivertime,Door1Intertime")
p_items = create_string_buffer(items)
ret=self.commpro.GetDeviceParam(self.hcommpro, buffer, 256, p_items)
```

c#:

```
int ret = 0;
int BUFFERSIZE = 10 * 1024 * 1024;
byte[] buffer = new byte[BUFFERSIZE];
items = ("DeviceID,Door1SensorType,Door1Drivertime,Door1Intertime");
```

ret = GetDeviceParam(h, ref buffer [0], BUFFERSIZE, items);

4.5 ControlDevice

[Function]

int ControlDevice(HANDLE handle, LONG OperationID, LONG Param1, LONG Param2, LONG Param3, LONG Param4, const char *Options)

[Objective]

The function is used to control the actions of the controller.

[Parameter description]

handle

[**in**]: The handle that is returned when the connection is successful.

OperationID

[**in**] Operation contents: 1 for output, 2 for cancel alarm, 3 for restart device, and 4 for enable/disable normal open state.

Param1

[**in**] When the OperationID is output operation: If Param2 is the door output the parameter indicates the door number. If Param2 is auxiliary output, the parameter indicates the number of the auxiliary output interface (for details, see Attached table 3). If Param2 is cancel alarm, the parameter value is 0 by default.

Param2

[**in**]: When the OperationID is output operation, this parameter indicates the address type of the output point (1 for door output, 2 for auxiliary output), for details, see Attached table 3. When the OperationID is cancel alarm,, the parameter value is 0 by default. When the OperationID value is 4, that is enable/disable normal open state, the parameter indicates is enable/disable normal open state (0 for disable, 1 for enable).

Param3

[**in**]: When the OperationID is output operation, the parameter indicates the door-opening time (0 indicates the closed state, 255 indicates the normal open state, the value range is 1 to 60 seconds). The default value is 0.

Param4

[**in**] Reserved; the default value is **0**.

Option

[**in**]: The default value is null; it is used for extension.

[Returned value]

When the returned value is **0** or a positive value, it indicates that the operation is successful. When the returned value is a negative value, it indicates that the operation fails. Attached table 5 lists the information about the error codes.

[Example]

Python:

```
operation_id = 1
door_id = 1
index = 2
state = 6
ret = self.commpro.ControlDevice(self.hcommpro, operation_id, door_id, index, state, 0, ‘’)
```

c#:

```
int ret = 0;
int operid = 1;
int doorid = 0;
int outputadr = 0;
int doorstate = 8;
ret = ControlDevice(h, operid, doorid, outputadr, doorstate, 0, "");
```

4.6 SetDeviceData

[Function]

int SetDeviceData(HANDLE handle,const char *TableName, const char *Data, const char *Options)

[Objective]

The function is used to set the device data (for example, the time segment, user information, and holiday information). The device data can be one or multiple records.

[Parameter description]

handle

[**in**]: The handle that is returned when the connection is successful.

TableName

[in]: Data table name. Attached table 4 lists the available data tables.

Data

[in]: Data record; the data is expressed in a text format; the multiple records are separated by **\r\n**, and the "Field=Value" pairs are separated by **\t**.

Options

[in]: The default value is null; it is used for extension.

[Returned value]

When the returned value is **0** or a positive value, it indicates that the operation is successful. When the returned value is a negative value, it indicates that the operation fails. Attached table 5 lists the information about the error codes.

[Example]

Python:

```
table = "user"                # User information table
data = "Pin=19999\tCardNo=13375401\tPassword=1\r\nPin=2\tCardNo=14128058\tPassword=1"
p_table = create_string_buffer(table)
str_buf = create_string_buffer(data)
ret = self.commpro.SetDeviceData(self.hcommpro, p_table, str_buf, '')          # Upload the str_buf data to the user information table
```

c#:

```
int ret = 0;
string devtablename = "user";
string data = "Pin=19999\tCardNo=13375401\tPassword=1\r\nPin=2\tCardNo=14128058\tPassword=1";
string options = "";
ret = SetDeviceData(h, devtablename, data, options);
```

4.7 GetDeviceData

[Function]

int GetDeviceData(HANDLE handle, char *Buffer, int BufferSize, const char *TableName, const char *FieldNames,const char *Filter, const char *Options)

[Objective]

The function is used to read the device data (for example, the punch records, time segment, user information, and holiday information). The data can be one or multiple records.

[Parameter description]

handle

[**in**]: The handle that is returned when the connection is successful.

Buffer

[in]: The buffer used to receive the returned data; the returned data is expressed in a text format; if the returned data is multiple records, the multiple records are separated by **\r\n**.

BufferSize

[in] The size of the buffer used to receive the returned data.

TableName

[in]: Data table name. Attached table 4 lists the available data tables.

FieldNames

[in]: Field name list; the multiple fields are separated by semicolons; ***** indicates all fields, and the first line in the returned data field is the field names.

Filter

[in]: The conditions of reading the data; the character string in the format of "field name, operator, value" can support multiple conditions, which are separated by commas; for example:

<Field name>=<Value>(no space is allowed at two sides of **=**)

Options

[in]: Only used to download the access control records; when the parameter value is **NewRecord**, new records are downloaded. When the value is null, all records are downloaded.

[Returned value]

When the returned value is **0** or a positive value, it indicates that the operation is successful (the returned value indicates the number of records). When the returned value is a negative value, it indicates that the operation fails. Attached table 5 lists the information about the error codes.

[Example]

Python:

```
table = "user"          # Download the user data from the user table
fielname = "*"          # Download all field information in the table
pfilter = ""            # Have no filtering conditions and thus download all information
options = ""
query_buf = create_string_buffer(4*1024*1024)
```

query_table = create_string_buffer(table)

query_fieldname = create_string_buffer(fieldname)

query_filter = create_string_buffer(filter)

query_options = create_string_buffer(options)

ret = self.commpro.GetDeviceData(self.hcommpro, query_buf, 4*1024*1024, query_table, query_fieldname, query_filter, query_options)

c#:

```
int ret = 0;
int BUFFERSIZE = 10 * 1024 * 1024;
byte[] buffer = new byte[BUFFERSIZE];
string devtablename = "user";
string str = "*";
string devdatfilter = "";
string options = "";
ret = GetDeviceData(h, ref buffer[0], BUFFERSIZE, devtablename, str, devdatfilter, options);
```

4.8 GetDeviceDataCount

[Function]

int GetDeviceDataCount(void *Handle, const char *TableName, const char *Filter,const char *Options)

[Objective]

The function is used to read the total number of records on the device and return the number of records for the specified data.

[Parameter description]

Handle

[**in**]: The handle that is returned when the connection is successful.

TableName

[in]: Data table name. Attached table 4 lists the available data tables.

Filter

[in]: The default value is null; it is used for extension.

Options

[in]: The default value is null; it is used for extension.

[Returned value]

When the returned value is **0** or a positive value, it indicates that the operation is successful (the returned value indicates the number of records). When the returned value is a negative value, it indicates that the operation fails. Attached table 5 lists the information about the error codes.

[Example]

Python:

```
table = 'user'
filter = ""
p_table = create_string_buffer(table)
p_filter = create_string_buffer(filter)
ret = self.commpro.GetDeviceDataCount(self.hcommpro, p_table, p_filter,'')
```

c#:

```
int ret = 0;
string devtablename = "user";
string devdatfilter = "";
string options = "";
ret = GetDeviceDataCount(h, devtablename, devdatfilter, options);
```

4.9 DeleteDeviceData

[Function]

int DeleteDeviceData(HANDLE handle, const char *TableName,const char *Data,const char *Options)

[Objective]

The function is used to delete the data (for example, user information and time segment) on the device.

[Parameter description]

handle

[**in**]: The handle that is returned when the connection is successful.

TableName

[in]: Data table name. Attached table 4 lists the available data tables.

Data

[in]: Data record; the data is expressed in a text format; the multiple records are separated by **\r\n**, and the "Field=Value" pairs are separated by **\t**.

Options

[in]: The default value is null; it is used for extension.

[Returned value]

When the returned value is **0** or a positive value, it indicates that the operation is successful. When the returned value is a negative value, it indicates that the operation fails. Attached table 5 lists the information about the error codes.

[Example]

Python:

```
table = “user”
data = "Pin=2"              # Conditions of deleting the data
p_table = create_string_buffer(table)
p_data = create_string_buffer(data)
ret = self.commpro.DeleteDeviceData(self.hcommpro, p_table, p_data, "")
```

c#:

```
int ret = 0;
string devtablename = "user";
string data = "Pin=2";
string options = "";
ret = DeleteDeviceData(h, devtablename, data, options);
```

4.10 GetRTLog

[Function]

int GetRTLog(HANDLE handle,char *Buffer, int BufferSize)

[Objective]

The function is used to get the device event records.

[Parameter description]

handle

[**in**]: The handle that is returned when the connection is successful.

Buffer

[in] The buffer used to receive the returned data; the returned data is expressed in a text format.

BufferSize

[in]: The size of the buffer used to receive the returned data.

[Returned value]

When the returned value is **0** or a positive value, it indicates the number of records for the received data. When the returned value is a negative value, it indicates that the operation fails. Attached table 5 lists the information about the error codes.

[Example]

Python:

```
rt_log = create_string_buffer(256)
ret = self.commpro.GetRTLog(self.hcommpro, rt_log, 256)
```

c#：

```
int ret = 0;
int buffersize = 256;
byte[] buffer = new byte[256];
ret = GetRTLog(h, ref buffer[0], buffersize);
```

4.11 SearchDevice

[Function]

```
int SearchDevice(char *CommType,char *Address, char *Buffer)
```

[Objective]

The function is used to search for the access control panel in the LAN.

[Parameter description]

CommType

[in]: If the parameter value is **Ethernet**, the system searches for the devices of the specified communication type.

Address

[in]: Broadcast address; the system searches for the devices in the LAN within the specified IP address range; the default value is **255.255.255.255**.

Buffer

[in]: The buffer is used to save the detected devices. Users should determine the requested memory according to the number of devices in the corresponding network. For example, if the network has not more than 50 devices, it is recommended that users should request the memory of 32K; if the network has not more than 100 devices, it is recommended that users should request the memory of 64K.

[Returned value]

When the returned value is **0** or a positive value, it indicates the number of found access control panels. When the returned value is a negative value, it indicates that the operation fails. Attached table 5 lists the information about the error codes.

[Example]

Python:

```
dev_buf = create_string_buffer("", 64*1024)
ret=self.commpro.SearchDevice("UDP", "255.255.255.255", dev_buf)
```

c#：

```
int ret = 0;
string udp = "UDP";
string adr = "255.255.255.255";
byte[] buffer = new byte[64 * 1024];
ret = SearchDevice(udp,adr, ref buffer[0]);
```

4.12 ModifyIPAddress

[Function]

```
int ModifyIPAddress(char *CommType,char *Address, char *Buffer)
```

[Objective]

The function is used to modify the IP addresses of controllers through the UDP broadcast method.

[Parameter description]

CommType

[in]: Search for the devices with the communication type of **Ethernet**.

Address

[in]: Broadcast address; the default value is 255.255.255.255.

Buffer

[in]: The buffer is used to save the MAC addresses and new IP addresses of the target device.

[Returned value]

When the returned value is **0** or a positive value, it indicates the number of records for the received data. When the returned value is a negative value, it indicates that the operation fails. Attached table 5 lists the information about the error codes.

[Example]

Python:

```
mac = '00:17:61:01:88:27'          # MAC address of the target device
new_ip = '192.168.12.156'          # New IP address of the device
comm_pwd = ''
str = "MAC=%s,IPAddress=%s " % (mac,new_ip)
p_buf = create_string_buffer(str)
modify_ip = self.commpro.ModifyIPAddress("UDP", "255.255.255.255", p_buf)
```

c#:

```
int ret = 0;
string udp = "UDP";
string address = "255.255.255.255";
string buffer = "MAC=00:17:61:01:88:27" + "," + "IPAddress=192.168.12.156";
ret = ModifyIPAddress(udp,address,buffer);
```

4.13 PullLastError

[Function]

int PullLastError()

[Objective]

The function is used to obtain the error ID when the failure result is returned.

[Parameter description]

None

[Returned value]

Error ID.

[Example]

Python:

```
ret = self.commpro.PullLastError()
```

c#：

int ret = 0;

ret = PullLastError();

4.14 SetDeviceFileData

[Function]

int SetDeviceFileData(void *Handle, const char *FileName, char *Buffer,int BufferSize,const char *Options)

[Objective]

The function is used to transfer a file from the PC to the device. It mainly used to transfer the updade file. The updade file name is emfw.cfg.

[Parameter description]

Handle

[in]: The handle that is returned when the connection is successful.

FileName

[in]: The name of the file transferred to the device, for example, a **emfw.cfg** file.

Buffer

[in]: The data buffer used to transfer a file.

BufferSize

[in] Length of the transferred data.

Options

[in]: The default value is null; it is used for extension.

[Returned value]

When the returned value is **0** or a positive value, it indicates that the operation is successful. When the returned value is a negative value, it indicates that the operation fails. Attached table 5 lists the information about the error codes.

[Example]

Python:

file_name = ”emfw.cfg”

buff_len = len(file_name)

pfile_name = create_string_buffer(file_name)

pbuffer = create_string_buffer(buff_len)

ret = self.commpro.SetDeviceFileData(self.hcommpro, pfile_name, pbuffer, buff_len, "")

c#:

int ret = 0;

string filename = "emfw.cfg ";

FileStream fsFile = File.OpenRead(this.openFileDialog1.FileName);

string buffersize = (int)fsFile.Length;

byte[] buffer = new byte[buffersize];

string options = "";

ret = SetDeviceFileData(h, filename, ref buffer[0], buffersize, options);

4.15 GetDeviceFileData

[Function]

int GetDeviceFileData(void *Handle,char *Buffer,int *BufferSize,const char *FileName,const char *Options)

[Objective]

The function is used to obtain a file from the device to the PC. It can obtain user file, record file and etc.

[Parameter description]

Handle

[in]: The handle that is returned when the connection is successful.

FileName

[in] The name of the file obtained from the device, for example, the user file's name is user.dat, record file's name is transaction.dat.

Buffer

[in]: Buffer used to receive the data.

BufferSize

[in]: Length of the received data.

Options

[in]: The default value is null; it is used for extension.

[Returned value]

When the returned value is **0** or a positive value, it indicates that the operation is successful. When the returned value is a negative value, it indicates that the operation fails. Attached table 5 lists the information about the error codes.

[Example]

Python:

```
file_name = ”user.dat”
pfile_name = create_string_buffer(file_name)
pbuffer = create_string_buffer(4*102*1024)
ret = self.commpro.GetDeviceFileData(self.hcommpro, pbuffer, buff_len, pfile_name, "")
```

c#:

```
int ret = 0;
int buffersize = 4 * 1024 * 1024;
byte[] buffer = new byte[buffersize];
string filename = "user.dat";
string options = "";
ret = GetDeviceFileData(h, ref buffer[0], ref buffersize, filename, options);
```

4.16 ProcessBackupData

[Function]

```
int ProcessBackupData(const unsigned char *revBuf, int fileLen, char *outBuf,
int outSize)
```

[Objective]

To process the backup file of the firmware.

[Parameter description]

revBuf

[in] The uploaded files;

fileLen

[in] The file length;

outBuf

[in] To receive the returning data;

outsize

[in] The max length of the receiving data.

[Returned value]

The returning value is 0 or positive number for success operation. Otherwise, the operation is failed. For the error codes, please refer to the Appendix 5.

[Example]

Python：

```
filename = “sddata.dat”
buff_len = len(filename)
buf = create_string_buffer(filename)
buffer = create_string_buffer(16*1024*1024)
ret = self.commpro. ProcessBackupData(buf, buff_len, ref buffer[0], 16 * 1024 * 1024)
```

c#：

```
byte[] buffer = new byte[16 * 1024 * 1024];
byte[] buf = new byte[16 * 1024 * 1024];
int BufferSize = 0;
int ret = -1;
string filename = "user.dat";
StreamReader proFile = new StreamReader(filename);
BufferSize = proFile.BaseStream.Read(buf, 0, 16 * 1024 * 1024);
ret = ProcessBackupData(buf, BufferSize, ref buffer[0], 16 * 1024 * 1024);
```

5 Appendix

5.1 Attached Table 1: Detailed Description of Interface Files

File Name	Description
plcommpro.dll	Dynamic connection database interface of the PullSDK function
plcomms.dll	Database on which the PullSDK interfaces rely
plrscomm.dll	Database on which the PullSDK interfaces rely
pltcpcomm.dll	Database on which the PullSDK interfaces rely
rscagent.dll	Database on which the PullSDK interfaces rely

5.2 Attached Table 2: Description of Controller Parameters

Attribute Name	Parameter	Read/Write Type	Remarks
Number of doors	LockCount	Read only	
Number of readers	ReaderCount	Read only	
Customized input quantity	AuxInCount	Read only	
Customized output quantity	AuxOutCount	Read only	
Communication Password	ComPwd	Read/write	
IP Address	IPAddress	Read/write	Default: 192.168.1.201
Gateway	GATEIPAddress	Read/write	Default value is IPAddres
Subnet mask	NetMask	Read/write	Default: 255.255.255.0
Anti-passback rule (Door 1 and Door 2 each other is anti-passback, when Door 2 will be opened before Door 1 has opened , and Door 1 can't open two consecutive door)	AntiPassback	Read/write	One-door and two-way controller 1: Enable the anti-passback function between the readers of Door 1 Two-door and single-way controller 1: Enable the anti-passback function between Door 1 and Door 2 Two-door and two-way controller 1: Enable the anti-passback function between the readers of Door 1 2: Enable the anti-passback function between the readers of Door 2 3: Enable the anti-passback function between the readers of Door 1 and between the readers of Door 2 respectively 4: Enable the anti-passback function between Door 1 and Door 2 Four-door and single-way controller

Attribute Name	Parameter	Read/Write Type	Remarks
			1: Enable the anti-passback function between Door 1 and Door 2 2: Enable the anti-passback function between Door 3 and Door 4 3: Enable the anti-passback function between Door 1 and Door 2, and between Door 3 and Door 4 4: Enable the anti-passback function between Door 1/2 and Door 3/4 5: Enable the anti-passback function between Door 1 and Door 2/3 6: Enable the anti-passback function between Door 1 and Door 2/3/4
Interlock (Door 1 and Door 2 each other is interlock. When the Door 1 in the opening , the Door 2 can only be turned off. Instead the Door 2 is opened, the Door 1 can not be opened.)	InterLock	Read/write	Two-door controller 1: Interlock Door 1 and Door 2 mutually Four-door control 1: Interlock Door 1 and Door 2 mutually 2: Interlock Door 3 and Door 4 mutually 3: Interlock Door 1, Door 2 and Door 3 mutually 4: Interlock Door 1 and Door 2 mutually, and interlock Door 3 and Door 4 mutually 5: Interlock Door 1, Door 2, Door 3 and Door 4 mutually
Duress Password	Door1ForcePassWord Door2ForcePassWord Door3ForcePassWord Door4ForcePassWord	Read/write	Max: 8 digits
Emergency Password	Door1SupperPassWord Door2SupperPassWord Door3SupperPassWord Door4SupperPassWord	Read/write	Max: 8 digits
Lock at door closing	Door1CloseAndLock Door2CloseAndLock Door3CloseAndLock Door4CloseAndLock	Read/write	1: Enabled 0: Disabled
Door sensor type	Door1SensorType Door2SensorType Door3SensorType Door4SensorType	Read/write	0: Not available 1: Normal open 2: Normal closed
Lock driver time length	Door1Drivertime Door2Drivertime	Read/write	The value range is 0 to 255. 0: Normal closed

Attribute Name	Parameter	Read/Write Type	Remarks
	Door3Drivertime Door4Drivertime		255: Normal open 1 to 254: Door-opening duration
Timeout alarm duration of door magnet	Door1Detectortime Door2Detectortime Door3Detectortime Door4Detectortime	Read/write	The value range is 0 to 255. Unit: second
Verify mode	Door1VerifyType Door2VerifyType Door3VerifyType Door4VerifyType	Read/write	1:Fingerprint 4: Card 6:Card or fingerprint 10:Card and fingerprint 11: Card and password
Multi-card opening (The Door can be opened by more than one person through verified by, In Attached table 4<**Multi-card opening table** > set group number of multi-card to open the door , Person in the group which is more than one authentication, set most five people.)	Door1MultiCardOpenDoor Door2MultiCardOpenDoor Door3MultiCardOpenDoor Door4MultiCardOpenDoor	Read/write	0: Disabled 1: Enabled
Opening the door through the first card	Door1FirstCardOpenDoor Door2FirstCardOpenDoor Door3FirstCardOpenDoor Door4FirstCardOpenDoor	Read/write	0: Disabled 1: First-card normal open
Active time segment of the door (time segment in which a valid punch)	Door1ValidTZ Door2ValidTZ Door3ValidTZ Door4ValidTZ	Read/write	Default: 0 (the door is not activated)
Normal-open time segment of the door	Door1KeepOpenTimeZone Door2KeepOpenTimeZone Door3KeepOpenTimeZone Door4KeepOpenTimeZone	Read/write	Default: 0 (the parameter is not set)
Punch interval	Door1Intertime Door2Intertime Door3Intertime	Read/write	0 means no interval (unit: second)

Attribute Name	Parameter	Read/Write Type	Remarks
	Door4Intertime		
MCU Watchdog	WatchDog	Read/write	0: Disabled 1: Enabled
4 doors turn 2 doors	Door4ToDoor2	Read/write	0: Disabled 1: Enabled
The date of Cancel Normal Open	Door1CancelKeepOpenDay Door2CancelKeepOpenDay Door3CancelKeepOpenDay Door4CancelKeepOpenDay	Read only	
The time of backup SD card	BackupTime	Read/writ	The value range is1 to 24
Reboot the device	Reboot	Write only	Reboot=1
Synchronization time	DateTime	Write only	DateTime= ((Year-2000)*12*31 + (Month -1)*31 + (Day-1))*(24*60*60) + Hour* 60 *60 + Minute*60 + Second; For example, the now datetime is 2010-10-26 20:54:55, so DateTime= 347748895; And calculate the reverse "DateTime = 347748895"; Second = DateTime % 60; Minute = (DateTime / 60) % 60; Hour = (DateTime / 3600) % 24; Day = (DateTime / 86400) % 31 + 1; Month= (DateTime / 2678400) % 12 + 1; Year = (DateTime / 32140800) + 2000;
Door4 turn to Door2	Door4ToDoor2	Read/write	0: Disabled 1: Enabled
One-way / two-way Reader	InBIOTowWay	Read/write	0: One-way 1: Two-way
Device fingerprint identification version	~ZKFPVersion	Read only	9: 9.0 version 10: 10.0 version

5.3 Attached Table 3: Description of ControlDevice Parameters

OperationID	Description	Param1	Param2	Param3	Param4	Options
1	Output operation	Door number or auxiliary	1: Door ouptput	0: disable 255: normal	reserved	Expansion parameter

		output number	2: auxiliary output（the address type of output operation）	open state 1~60: normal open or the duration of normal open （If Param2=1, the value of Param3 makes sense）		is null
2	Cancel alarm	0（null）	0（null）	0（null）	reserved	Expansion parameter is null
3	Restart device	0（null）	0（null）	0（null）	reserved	Expansion parameter is null
4	Enable/disable normal open state	Door number	0: disable 1: enable	0（null）	reserved	Expansion parameter is null

Note: If OperationID=1, Param2 determine the Param1 value is door number or auxiliary output number. If Param1 is door number, the max value is the door number that the device permitted. If the Param1 is auxiliary output number, the max value is the auxiliary output number that the device permitted.

5.4 Attached Table 4: Description of Structure of Function Tables

Table Name	TableName	Field	Remarks
Card number information table	user	CardNo, Pin, Password, Group, StartTime, EndTime	The **StartTime** and **EndTime** should be specified in a correct format. YYYYMMDD; for example: 20100823; **Group** indicates the personnel group of multi-card verifycation.
Pin authorization table	userauthorize	Pin, AuthorizeTimezoneId, AuthorizeDoorId	AuthorizeDoorId is authorized by the door: 1: Only LOCK1； 2: Only LOCK2； 3: LOCK1 and LOCK2； 4: Only LOCK3； 5: LOCK1 and LOCK3；

Table Name	TableName	Field	Remarks
			6: LOCK2 and LOCK3； 7: LOCK1, LOCK2 and LOCK3； 8: Only LOCK4； 9: LOCK1 and LOCK4； 10: LOCK2 and LOCK4； 11: LOCK1, LOCK2 and LOCK4； 12: LOCK3 and LOCK4； 13: LOCK1, LOCK3 and LOCK4； 14: LOCK2, LOCK3 and LOCK4； 15: LOCK1, LOCK2, LOCK3 and LOCK4
Holiday table	holiday	Holiday, HolidayType, Loop	The **HolidayType** value can be **1**, **2**, and **3**. **Loop** value: **1** (loop by year), **2** (not loop by year)
Time zone table	timezone	TimezoneId, SunTime1, SunTime2, SunTime3, MonTime1, MonTime2, MonTime3, TueTime1, TueTime2, TueTime3, WedTime1, WedTime2, WedTime3, ThuTime1, ThuTime2, ThuTime3, FriTime1, FriTime2, FriTime3, SatTime1, SatTime2, SatTime3, Hol1Time1, Hol1Time2, Hol1Time3, Hol2Time1, Hol2Time2, Hol2Time3, Hol3Time1, Hol3Time2, Hol3Time3	The Time format is as follows: (hour*100 + minute)<<16+(hour*100 + minute) For example: MonTime1 be setted 8:30 to 12:30, so the value is **MonTime1=54396110**: 8:30 → 8*100+30 → 33E (Hex) 12:30 → 12*100+30 → 4CE (Hex) 033E04CE → **54396110** (Decimal)
Access control record table	transaction	Cardno, Pin, Verified, DoorID, EventType, InOutState, Time_second	The **Verified** mode can be as follows: 1:Only finger 3: Only password 4: Only card 11: Card and password 16: Others **Time_second** should be specified in a correct format: YYYY-MM-DD hh:mm:ss The **EventType** value can be as follows: 0: Open the door by punch normally 1: Punch in the normal-open time segment (including the normal-open time segment and the door-opening time segment configured through first-card normal open) 2: First-card normal open by punch 3: Multi-card opening 4: Open the door by the emergency password

Table Name	TableName	Field	Remarks
			5: Open the door in the normal-open time segment 6: Trigger the linkage event 7: Remote control event for communication (open/close the door and output the extensions remotely) 20: The punch interval is extremely short 21: Punch in a non-effective time segment 22: Illegal time zone 23: Illegal access 24: Anti-passback 25: Fail to interlock 26: Authenticate by multiple cards 27: The card is not registered 28: The opening state times out 29: The card has expired 101: Open the door by the duress password 102: Open the door accidentally 200: The door has been opened 201: The door has been closed 202: Open the door by a button upon leaving 220: The auxiliary input point is off 221: The auxiliary input point is short-circuited
First-card door-opening table	firstcard	Pin, DoorID, TimezoneID	
Multi-card opening table	multicard	Index, DoorId, Group1, Group2, Group3, Group4, Group5	Group 1 to Group 5 are the numbers of the multi-card opening groups
Linkage control I/O table (When the trigger condition is detected and immediately start the other events) For example: Open the door 1 is detected (trigger conditions), the immediate	inoutfun	Index, EventType, InAddr, OutType, OutAddr, OutTime, Reserved	For details about the **EvenType** value, see the access control record table. When the **EventType** value is **220** (the auxiliary input point is off) or **221** (the auxiliary input point is short-circuited), the input point is the auxiliary input. When the **EventType** value is not **220** or **221**, the input point is a door. The input point **InAddr** is a door: 0: Any door 1: Door 1 2: Door 2 3: Door 3 4: Door 4 The input point **InAddr** is the auxiliary input: 0: Any auxiliary input 1: Auxiliary input 1

Table Name	TableName	Field	Remarks
alarm, open the video surveillance, close the door 2, door 3, door 4, etc. (other events)			2: Auxiliary input 2 3: Auxiliary input 3 4: Auxiliary input 4 When the **OutType** value is **0**, the output point **OutAddr** indicates a lock: 1: Lock 1 2: Lock 2 3: Lock 3 4: Lock 4 When the **OutType** value is **1**, the output point **OutAddr** indicates the auxiliary output: 1: Auxiliary output 1 2: Auxiliary output 2 3: Auxiliary output 3 4: Auxiliary output 4 5: Auxiliary output 5 6: Auxiliary output 6
templatev10 table	templatev10	Size、UID、PIN、FingerID、Valid、Template、Resverd、EndTag	

Note: The fields in the table are case-sensitive.

5.5 Attached Table 5: Description of Error Codes in the Returned Values

Error Code	Description
-1	The command is not sent successfully
-2	The command has no response
-3	The buffer is not enough
-4	The decompression fails
-5	The length of the read data is not correct
-6	The length of the decompressed data is not consistent with the expected length
-7	The command is repeated
-8	The connection is not authorized
-9	Data error: The CRC result is failure
-10	Data error: PullSDK cannot resolve the data
-11	Data parameter error
-12	The command is not executed correctly
-13	Command error: This command is not available
-14	The communication password is not correct
-15	Fail to write the file
-16	Fail to read the file
-17	The file does not exist

Error Code	Description
-99	Unknown error
-100	The table structure does not exist
-101	In the table structure, the **Condition** field does not exit
-102	The total number of fields is not consistent
-103	The sequence of fields is not consistent
-104	Real-time event data error
-105	Data errors occur during data resolution.
-106	Data overflow: The delivered data is more than 4 MB in length
-107	Fail to get the table structure
-108	Invalid options
-201	LoadLibrary failure
-202	Fail to invoke the interface
-203	Communication initialization fails
-301	Requested TCP/IP version error
-302	Incorrect version number
-303	Fail to get the protocol type
-304	Invalid SOCKET
-305	SOCKET error
-306	HOST error

5.6 Attached Table 5: Description of Event Types and Code

Code	Event Types	Description
0	Normal Punch Open	In [Card Only] verification mode, the person has open door permission punch the card and triggers this normal event of open the door.
1	Punch during Normal Open Time Zone	At the normally open period (set to normally open period of a single door or the door open period after the first card normally open), or through the remote normal open operation, the person has open door permission punch the effective card at the opened door to trigger this normal events.
2	First Card Normal Open (Punch Card)	In [Card Only] verification mode, the person has first card normally open permission, punch card at the setting first card normally open period but the

		door is not opened, and trigger the normal event.
3	Multi-Card Open (Punching Card)	In [Card Only] verification mode, multi-card combination can be used to open the door. After the last piece of card verified, the system trigger this normal event.
4	Emergency Password Open	The password (also known as the super password) set for the current door can be used for door open. It will trigger this normal event after the emergency password verified.
5	Open during Normal Open Time Zone	If the current door is set a normally open period, the door will open automatically after the setting start time, and trigger this normal event.
6	Linkage Event Triggered	After the system linkage configuration take effect, trigger this normal event.
7	Cancel Alarm	When the user cancel the alarm of the corresponding door, and the operation is success, trigger this normal event.
8	Remote Opening	When the user opens a door from remote and the operation is successful, it will trigger this normal event.
9	Remote Closing	When the user close a door from remote and the operation is successful, it will trigger this normal event.
10	Disable Intraday Normal Open Time Zone	In door normal open state, punch the effective card for five times near to the card reader (must be the same user), or select [Disable Intraday Normal

		Open Time Zone] in remote closing operation, and trigger this normal event.
11	Enable Intraday Normal Open Time Zone	If the intraday door normal open time zone is disabled, punch the effective card for five times near to the card reader (must be the same user), or select [Enable Intraday Normal Open Time Zone] in remote opening operation, and trigger this normal event.
12	Open Auxiliary Output	In linkage action setting, if the user select Auxiliary Output for Output Point Address, select Open for Action Type, it will trigger this normal event when the linkage setting is take effect.
13	Close Auxiliary Output	In linkage action setting, if the user select Auxiliary Output for Output Point Address, select Open for Action Type, it will trigger this normal event when the linkage setting is take effect. And if the user closes the opened auxiliary output through the [Close Auxiliary Output] operation in [Door Setting], trigger this normal event too.
14	Press Fingerprint Open	In [Fingerprint Only] verification mode, the person has the open permission, p press the fingerprint at the valid time period, and the door is opened, and triggers the normal event.
15	Multi-Card Open (Press Fingerprint)	In [Fingerprint Only] or [Card plus Fingerprint] verification mode, the person has the open permission, press the fingerprint at the valid time period, and the door is opened, and triggers the normal event.

16	Press Fingerprint during Normal Open Time Zone	At the normally open period (set to normally open period of a single door or the door open period after the first card normally open), or through the remote normal open operation, the person has open door permission press the effective fingerprint at the opened door to trigger this normal events.
17	Card plus Fingerprint Open:	In [Card plus Fingerprint] verification mode, the person has the open permission, punch the card and press the fingerprint at the valid time period, and the door is opened, and triggers the normal event.
18	First Card Normal Open (Press Fingerprint)	In [Fingerprint Only] or [Card plus Fingerprint] verification mode, the person has first card normally open permission, press the fingerprint at the setting first card normally open period but the door is not opened, and triggers the normal event.
19	First Card Normal Open (Card plus Fingerprint)	In [Card plus Fingerprint] verification mode, the person has first card normally open permission, punch the card and press the fingerprint at the setting first card normally open period but the door is not opened, and triggers the normal event.
20	Too Short Punch Interval	When the interval between two card punching is less than the set time interval, trigger this abnormal event.
21	Door Inactive Time Zone (Punch Card)	In [Card Only] verification mode, the user has the door open permission, punch card but not at the door effective period of time, and trigger this abnormal event.
22	Illegal Time Zone	The user with the permission of opening the current door, punches the card during the invalid time zone, and triggers this abnormal event.

23	Access Denied	The registered card without the access permission of the current door, punch to open the door, triggers this abnormal event.
24	Anti-Passback	When the anti-pass back setting of the system takes effect, triggers this abnormal event.
25	Interlock	When the interlocking rules of the system take effect, trigger this abnormal event.
26	Multi-Card Authentication (Punching Card)	Use multi-card combination to open the door, the card verification before the last one (whether verified or not), trigger this normal event
27	Unregistered Card	Refers to the current card is not registered in the system, trigger this abnormal event.
28	Opening Timeout:	The door sensor detect that it is expired the delay time after opened, if not close the door, trigger this abnormal event
29	Card Expired	The person with the door access permission, punch card to open the door after the effective time of the access control, can not be verified and will trigger this abnormal event.
30	Password Error	Use card plus password, duress password or emergency password to open the door, trigger this event if the password is wrong.
31	Too Short Fingerprint Pressing Interval	When the interval between two card punching is less than the set time interval, trigger this abnormal event.
32	Multi-Card Authentication (Press Fingerprint)	In [Fingerprint Only] or [Card plus Fingerprint]

		verification mode, use multi-card combination to open the door, the fingerprint verification before the last one (whether verified or not), trigger this normal event.
33	Fingerprint Expired	The person with the door access permission, press fingerprint to open the door after the effective time of the access control, can not be verified and will trigger this abnormal event.
34	Unregistered Fingerprint	Refers to the current fingerprint is not registered or it is registered but not synchronized with the system, trigger this abnormal event.
35	Door Inactive Time Zone (Press Fingerprint)	The user has the door open permission, press the fingerprint but not at the door effective period of time, and trigger this abnormal event.
36	Door Inactive Time Zone (Exit Button)	The user has the door open permission, punch card but not at the access effective period of time, and trigger this abnormal event.
37	Failed to Close during Normal Open Time Zone	The current door is in normal open state, but the user can not close the door through [Remote Closing] operation, and trigger this abnormal event.
101	Duress Password Open	Use the duress password of current door verified and triggered alarm event.
102	Opened Accidentally	Except all the normal events (normal events such as user with door open permission to punch card and open the door, password open door, open the door at normally open period, remote door open, the linkage triggered door open), the door sensor detect the door is opened, that is the door is unexpectedly opened.

103	Duress Fingerprint Open	Use the duress fingerprint of current door verified and triggered alarm event.
200	Door Opened Correctly	When the door sensor detects that the door has been properly opened, triggering this normal event.
201	Door Closed Correctly	When the door sensor detects that the door has been properly closed, triggering this normal event.
202	Exit button Open	User press the exit button to open the door within the door valid time zone, and trigger this normal event.
203	Multi-Card Open (Card plus Fingerprint)	In [Card plus Fingerprint] verification mode, multi-card combination can be used to open the door. After the last card plus fingerprint verified, the system trigger this normal event.
204	Normal Open Time Zone Over	After the setting normal open time zone, the door will close automatically. The normal open time zone include the normal open time zone in door setting and the selected normal open time zone in first card setting.
205	Remote Normal Opening	Set the door state to normal open in the remote opening operation, and trigger this normal event.
206	Device Start	When the device start triggers this normal event and this event can not display on the real-time monitor, but you can check it in the event report.
220	Auxiliary Input Disconnected	When the auxiliary input point disconnected, trigger this normal event.

221	Auxiliary Input Shorted	When the auxiliary input point short circuit, trigger this normal event.