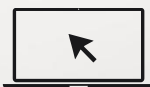


Communication Protocol

License Plate Recognition Central Server

Thank you for choosing our product. Please read the instructions carefully before operation. Follow these instructions to ensure that the product is functioning properly. The images shown in this manual are for illustrative purposes only.



For further details, please visit our Company's website
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About the Manual

This manual introduces the operations of AlprSDK_JNI product.

All figures displayed are for illustration purposes only. Figures in this manual may not be exactly consistent with the actual products.

Document Conventions

Conventions used in this manual are listed below:

GUI Conventions

For Software	
Convention	Description
Bold font	Used to identify software interface names e.g. OK , Confirm , Cancel
>	Multi-level menus are separated by these brackets. For example, File > Create > Folder.
For Device	
Convention	Description
< >	Button or key names for devices. For example, press <OK>
[]	Window names, menu items, data table, and field names are inside square brackets. For example, pop up the [New User] window
/	Multi-level menus are separated by forwarding slashes. For example, [File/Create/Folder].

Symbols

Convention	Description
	This implies about the notice or pays attention to, in the manual
	The general information which helps in performing the operations faster
	The information which is significant
	Care taken to avoid danger or mistakes



The statement or event that warns of something or that serves as a cautionary example.



Revision Record

Reviser	Revised Date	Version	Page	Revision Contents	Effective Date
Carl	2018-9-10	V3.2.1		Draft	
Carl	2018-11-14	V3.2.2		Add black and white list issued Add upload records Add parameters issued	
Carl	2019-11-26	V3.2.3		Add capture, auxiliary input status upload	

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1 Communication Initialization

To check and register the device to the server in order to initiate the communication.

Function

This connection is required for the device to communicate with the server and to share the data.

And this data is compatible with the company Push standards.

1. Request

At first, register the device if it is not registered. And if the device is registered, then download the configuration parameters.

```
GET /iclock/cdata?SN=2602011070363&options=all&DeviceType=park HTTP/1.1
```

```
Host: 192.168.18.188:8080
```

```
User-Agent: iClock Proxy/1.09
```

Connection: starting

```
Accept: application/push
```

```
Accept-Charset: UTF-8
```

```
Accept-Language: zh-CN
```

Remarks:

Message body will be empty, as this request is to establish the communication.

2. Response

If the Device is already registered, Server will respond with the **registry details**, and the **RegistryCode**.

HTTP/1.1 200 OK

Server: C#demo/1.1

Date: Sat, 28 Dec 2013 09:14:04 GMT

Content-Type: application/push;charset=UTF-8

Content-Length: 218

Connection: keep-alive

registry=ok

RegistryCode=RndOT0MUMI

ServerVersion=3.1.1

ServerName=ADMS

PushVersion=3.2.0

ErrorDelay=60

RequestDelay=5

TransTimes=00:00 14:00

TransInterval=1

TransTables=User Transaction

Realtime=1

SessionID=h2kgbpcm2x

1.1 Parameter Description

Attributes	Default	Description
ServerVersion	3.0.1	Server version number
ServerName	ADMS	Server name
PushVersion	3.0.1	PUSH version number supported by the server
PushDataUrl	/iclock/cdata?SN= <SN>	Upload data interface URL
GetRequestUrl	/iclock/getrequest?SN= <SN> >	Request for the device command interface URL on the server.
DeviceCmdUrl	/iclock/devcmd?SN= <SN>	The device returns the interface URL for the result of executing the command
RTStatusUrl	/iclock/rtstate?SN= <SN>	Returns the Live Status of the Interface URL.
RTLogUrl	/iclock/rtlog?SN= <SN>	Interface URL for transmitting live records
BGDataUrl	/iclock/BGData?SN= <SN>	Interface URL for transmitting background validation data
PhotoUrl	/iclock/photo?SN= <SN>	Interface URL for transmitting field photos
ErrorDelay	60	Retry wait time (s) in case of server error
RequestDelay	5	Request for the device command interval on the server in seconds.
TransTimes	["00:00"/"t"14:00"]	Periodically check the time to transfer new data
TransInterval	1	Checks if there is any new data to be transferred (in minutes)
TransTables	["User"/"t"Transaction"]	Checks for the new data and uploads the data sheet
Realtime	1	The identification of new data uploaded in real time.

SessionID	23dhsie93023k	It is the PUSH communication's session ID, which is required for the upcoming device requests in order compute the new Token.
TimeoutSec	5	It sets the network timeout to 10 seconds by default if the firmware is not configured.

2 Register

Registration is to obtain the verification code from the server, and the following code is the communication request sent to the server and server responds to the request.

Function:

Automatic registration is convenient for customers for their minimum - security requirements.

1. Request

POST /iclock/registry?SN=2602011070363 HTTP/1.1

Cookie: token=eaa52f71d2c549f9801028a66a732b59

Host: 192.168.18.188:8080

User-Agent: iClock Proxy/1.09

Connection: starting

Accept: application/push

Accept-Charset: UTF-8

Accept-Language: zh-CN

Content-Type: application/push;charset=UTF-8

Content-Language: zh-CN

Content-Length: 720

DeviceType=park,~DeviceName=Alpr,FirmVer=AC Ver 5.7.6.0001 Dec 25

2013,PushVersion=3.2.3,CommType=ethernet,MaxPackageSize=2048000, InOutState=1

2.1 Parameter Description

Set the below input parameters on the request function for the device to get registered on the server.

Field Name	Examples	Description
Uniform Parameter		
DeviceType	Park	It is the device type code, which specifies the main function of the device. The different DeviceType are listed in the below table.
~DeviceName	Alpr	Name of the Device.
FirmVer	5.2.8	Firmware version number of the Device.
PushVersion	3.2.3	PUSH SDK version number of the Device.
CommType	Ethernet	Communication Mode : Ethernet, WiFi, GPRS, 3G etc.
MaxPackageSize	2048000	Maximum packet size for the PUSH communication
Parking lot Parameters		
InOutState	1	Parking Area - Entrance or Exit; 0: Entrance, 1: Exit

2.2 DeviceType

The Code name defined for each **DeviceType** distinguishes the main functions of the device, such as Attendance Machine, Access Control Machine, Consumer Machine, and more.

The following are the types of devices and its associated code's that are currently available.

Device Type	Code	Description
Access Control Device	acc	Access control device for access control

Device Type	Code	Description
Park	park	Parking lot master control device
T&A Device	att	Employees Time and Attendance computing device.
Contactless Payment Device	pos	Contact less Point of Sale Terminal device
Fingerprint Lock	lock	Hotel Lock, Wireless Lock, Smart Lock device
Guard Patrol Device	patrol	A device that checks in at a fixed location and at a specified time.

2. Response

Once the device is registered, the server sends the **OK** response along with the **registry code**.

HTTP/1.1 200 OK

Server: C#demo/1.1

Date: Sat, 28 Dec 2013 10:07:12 GMT

Content-Type: application/push;charset=UTF-8

Content-Length: 23

Connection: keep-alive

registrycode=1Ru8sNR0iw

Remarks:

The server generates a 10-bit random string **RegistryCode**, which is a combination of 26 characters and numbers.



3 Download Configuration Parameters

Function:

To download the communication configuration parameters from the server.

1. Request

Request sent to the server for retrieving the communication configuration parameters from the server.

```
ET /iclock/push?SN=2602011070363 HTTP/1.1
```

```
Cookie: token=ffe2be42b2bf3bfffef73de804c483112,timestamp=2013-12-28-09-44-28
```

```
Host: 192.168.18.188:8080
```

```
User-Agent: iClock Proxy/1.09
```

Connection: starting

```
Accept: application/push
```

```
Accept-Charset: UTF-8
```

```
Accept-Language: zh-CN
```

2. Response

```
HTTP/1.1 200 OK
```

Server: C#demo/1.1

Date: Sat, 28 Dec 2013 10:01:20 GMT

Content-Type: application/push; charset=UTF-8

Content-Length: 182

Connection: keep-alive

ServerVersion=3.1.1

ServerName=ADMS

PushVersion=3.2.0

ErrorDelay=60

RequestDelay=5

TransTimes=00:00 14:00

TransInterval=1

TransTables=User Transaction

Realtime=1

SessionID=d8y8o75hgn

4 Download Cache Command

Function:

To get the cache data from the server.

Cache data refers to the data stored in the queue cache by the server.

1. Request

Request sent to download the cache data from the server.

```
GET /iclock/getrequest?SN=2602011070363 HTTP/1.1
```

```
Cookie: token=51ac250e5c7cd97bcb2a8e3703b1f5c7
```

```
Host: 192.168.18.188:8080
```

```
User-Agent: iClock Proxy/1.09
```

Connection: starting

```
Accept: application/push
```

```
Accept-Charset: UTF-8
```

```
Accept-Language: zh-CN
```

2. Response

If the device does not contain any data in the server cache queue, the server responds **OK** else it returns the **Cache data**.

HTTP/1.1 200 OK

Server: C#demo/1.1

Date: Sat, 28 Dec 2013 10:48:49 GMT

Content-Type: application/push;charset=UTF-8

Content-Length: 84

Connection: keep-alive

C:1:CONTROL DEVICE

```
{"Auth":{"Username":"admin","Password":"123456"},"Cmd":"OpenGate","Data":""}
```

Package data format:

C:1:CONTROL DEVICE

```
{"Auth":{"Username":"admin","Password":"123456"},"Cmd":"OpenGate","Data":""}
```

Remarks:

Send the cache data in the following format: **C:\${CmdID}: Specific data.**

4.1 Remote Control Gate Command

C:1:CONTROL DEVICE

```
{"Auth":{"Username":"admin","Password":"123456"},"Cmd":"OpenGate","Data":""}
```

This "OpenGate" syntax need to be verified

4.2 Remote Control Led/Voice Command

C:1:CONTROL DEVICE

```
{"Auth":{"Username":"admin","Password":"123456"},"Cmd":"CtrLedVoice","Data":"base64<org>"}
```

Remarks:

"<org>" is the voice display board protocol data, which requires software to encapsulate the protocol and assemble the data.

4.2.1 Remote Control Voice Command

C:1:CONTROL DEVICE

```
{"Auth":{"Username":"admin","Password":"123456"},"Cmd":"CtrlVoice","Data":"base64<voice list>"}
```

For example:

CONTROL DEVICE

```
{"Auth":{"Username":"admin","Password":"123456"},"Cmd":"CtrlVoice","Data":"YgA="}
```

Remarks:

"<voice list>" – For Voice List, refer to the description of the voice segment list given in the "AlprSDK interface.pdf" appendix where two voice segments account for two bytes.

4.2.2 Remote Control Led Command

C:1:CONTROL DEVICE

```
{"Auth":{"Username":"admin","Password":"123456"},"Cmd":"CtrlLed","Data":{"FirstLineColor":"<color value>","FirstLineCenter":1,"FirstLineData":"<led content>","SecondLineColor":"<color value>","SecondLineCenter":1,"SecondLineData":"<led content>","ThirdLineColor":"<color value>","ThirdLineCenter":1,"ThirdLineData":"<led content>","FourthLineColor":"<color value>","FourthLineCenter":1,"FourthLineData":"<led content>"}}
```

Example

C:1:CONTROL DEVICE

```
{"Auth":{"Username":"admin","Password":"123456"},"Cmd":"CtrlLed","Data":{"FirstLineColor":"red","FirstLineCenter":1,"FirstLineData":"YB12345 Welcome","SecondLineColor":"green","SecondLineCenter":1,"SecondLineData":"xxx","ThirdLineColor":"","ThirdLineCenter":1,"ThirdLineData":"","FourthLineColor":"","FourthLineCenter":1,"FourthLineData":""}}
```

Remarks

This function controls even the display color, alignment, display content and more.

Color value: Supports red, green only.

Led content:

Currently the domestics only supports gb2312 standard characters, which needs to be unified into the issued utf-8 code, such as "Welcome to Guangdong B12345".

Utf-8 code is used uniformly. and Egyptian license plate with @ [like @+ license plate].

Note:

The above indicates the encoding format supported by the display screen.

If the encoding format is incorrect, the display screen will display distorted codes.

4.3 Remote Control LCD Command

C:1:CONTROL DEVICE <TBD>

Remarks:

This function is temporarily unavailable.

4.4 Synchronous Server Time

C:1:CONTROL DEVICE

```
{"Auth":{"Username":"admin","Password":"123456"},"Cmd":"SyncTime","Data":""}
```

The device receives the command and initiates the request:

GET /iclock/rtdata?SN=3383154200002&type=time HTTP/1.1

Cookie: token=af65a75608cf5b80fbb3b48f0b4df95a

Host: 192.168.213.17:8088

.....

Return:

HTTP/1.1 200 OK

Server: Apache-Coyote/1.1

Content-Type: text/plain;charset=UTF-8

Content-Length: 33

Date: Wed, 11 Jan 2017 01:30:03 GMT

DateTime=583050990,ServerTZ=+0800

4.4.1 Parameter Description:

Parameter	Description
DateTime	The value is Greenwich time and the DateTime is converted to seconds using the [Appendix 2] method
ServerTZ	The time zone of the server (the device and the server may not be in the same time zone)

4.5 Add Cars to Blacklist, Whitelist, and Fixedlist

Add Cars to Blacklist entry

```
C:5:DATA UPDATE blacklist {"Data":[{"car_number":"AG5FT69","start_time":"2017-09-15","end_time":"2018-12-15"}]}
```

Add Cars to Whitelist entry

```
C:5:DATA UPDATE whitelist {"Data":[{"car_number":"AG5FT68","start_time":"2017-09-15","end_time":"2018-12-15"}]}
```

Add Cars to Fixedlist entry

```
C:5:DATA UPDATE fixedlist {"Data":[{"car_number":"AG5FT66","start_time":"2017-09-15","end_time":"2018-12-15"}]}
```

Remarks:

The license plate number is in utf-8 code, which is compatible with the following format.

```
C:5:DATA UPDATE Table name car_number=AG5FT69/tstart_time=2017-09-15/tend_time=2018-12-15
```

4.6 Remove Cars from Blacklist, Whitelist and Fixedlist

Remove Cars from Blacklist entry

```
C:5:DATA DELETE blacklist {"Data":{"car_number":"AG5FT69"}}
```

Remove Cars from Whitelist entry

```
C:5:DATA DELETE whitelist {"Data":{"car_number":"AG5FT68"}}
```

Remove Cars from Fixedlist entry

```
C:5:DATA DELETE fixedlist {"Data":{"car_number":"AG5FT66"}}
```

Deleting all the entries from the table

```
C:5:DATA DELETE Table name *
```

Remarks:

The license plate number is in utf-8 code, which is compatible with the following format.

```
C:5:DATA DELETE Table name car_number=AG5FT69
```

4.7 Distributed Parameter

```
C:11:SET OPTIONS {"OfflineAutoOpenGate":1}
```

Parameter	Description
-----------	-------------

Offline Auto Open Gate	Automatically verifies and opens the gate in offline, for the white listed vehicles and the fixed vehicles.
------------------------	---

4.8 Remote Manual Capture

Currently, not available in the Mainstream Firmware

C:1:CONTROL DEVICE

```
{"Auth":{"Username":"admin","Password":"123456"},"Cmd":"ManualCapture","Data":""}
```

5 Upload Real-time License Plate Information

Function:

Uploads the real-time license plate information.

Remarks:

Real-time license plate information is pushed asynchronously.

1. Request

Virtual table name: **lpr_rtdata**

Request posted to the server with the below Real Time License Plate data.

```
POST /iclock/cdata?SN=2602011070363&table=lpr_rtdata HTTP/1.1
```

```
Host: 192.168.18.188:8080
```

```
User-Agent: iClock Proxy/1.09
```

Connection: starting

```
Accept: application/push
```

```
Accept-Charset: UTF-8
```

```
Accept-Language: zh-CN
```

```
Content-Type: application/push;charset=UTF-8
```

Content-Language: zh-CN

Content-Length: 98

```
{  
  
  "Seqno":101  
  
  "Time":"20180719135258778",  
  
  "ProcessTime":584,  
  
  "PlateNum":3,  
  
  "Plates":[{"LicensePlate":"AG5FT69","LetterCount":7,"Confidence":0,"Left":964,"Right":1180,"Top":795,  
    "Bottom":852,"PlateColor":50,"DoublePlate":0,"Direction":0,"CountryCode":0}, {"LicensePlate":"AYYPR0  
1","LetterCount":7,"Confidence":0,"Left":972,"Right":1187,"Top":717,"Bottom":775,"PlateColor":30,"Do  
ublePlate":0,"Direction":0,"CountryCode":0}, {"LicensePlate":"APZXD8S","LetterCount":7,"Confidence":  
0,"Left":972,"Right":1190,"Top":641,"Bottom":699,"PlateColor":30,"DoublePlate":0,"Direction":0,"Coun  
tryCode":0}],  
  
  "PlatesPhoto":"base64(binary)"  
}
```

5.1 Parameter Description:

Parameter	Description
-----------	-------------

Seqno	Package number
Time	Recognition time
ProcessTime	Algorithm identification time (milliseconds)
PlateNum	The license plate number
Plates	License plate information (utf-8 code is used for license plate number)
PlatesPhoto	The license plate images

6 Upload IO Port Status

Currently, Mainstream Firmware has not released this feature

Function:

Upload Input/output port status to the server.

Remarks:

Currently only two auxiliary inputs are supported.

1. Request

Virtual table name: **lpr_iostate**

POST /iclock/cdata?SN=2602011070363&table=lpr_iostate HTTP/1.1

Host: 192.168.18.188:8080

User-Agent: iClock Proxy/1.09

Connection: starting

Accept: application/push

Accept-Charset: UTF-8

Accept-Language: zh-CN

Content-Type: application/push; charset=UTF-8

Content-Language: zh-CN

Content-Length: 98

```
{
  "Seqno":101
  "Time":"20180719135258778",
  "AuxInputNum":4,
  "AuxInputs":[{"ID":1, "Status":0}, {"ID":2, "Status":0}, {"ID":3, "Status":0}, {"ID":4, "Status":0}],
}
```

6.1 Parameter Description:

Parameter	Description
Seqno	Package number
Time	Recognition time
AuxInputNum	Auxiliary input quantity
AuxInputs	Auxiliary input state

InputPosition	ID	Status	Description
AuxInput 1	1	1: Have Input; 0: No Input	
AuxInput 2	2	1: Have Input; 0: No Input	
Open to limit IO	3	1: Have Input; 0: No Input	When the Open to limit IO and Close to limit IO is 0, it indicates that the camera has not connected to the barrier
Close to limit IO	4	1: Have Input; 0: No Input	

			gate.
--	--	--	-------

GateStatus	
Switch	3: Open to limit; 0: Close to limit; 255: No status
Running	Reserve

7 Upload Live Events

Currently, Mainstream Firmware has not released this feature.

Function:

Upload device live events to the server.

Remarks:

Real-time upload when online; Free time after the Internet automatically uploaded.

1. Request

```
POST /iclock/cdata?SN=2602011070363&table=rtlog HTTP/1.1
```

```
Host: 192.168.18.188:8080
```

```
User-Agent: iClock Proxy/1.09
```

Connection: starting

```
Accept: application/push
```

```
Accept-Charset: UTF-8
```

```
Accept-Language: zh-CN
```

```
Content-Type: application/push;charset=UTF-8
```

```
Content-Language: zh-CN
```

```
Content-Length: 98
```

```
{  
  
  "id":123456,  
  
  "time":"2018-11-14 14:59:18",  
  
  "car_number":"AG5FT69",  
  
  "card_no":327568,  
  
  "inout_state":0,  
  
  "event_addr":"192.168.107.186",  
  
  "event_type":101,  
  
  "photo_path":"20181113104939155-00-w386-t284-AG5FT69.jpg",  
  
  "is_leave":0,  
  
  "is_upload_flag":4,  
  
  "in_id":312,  
  
  "in_addr":"192.168.107.185",  
  
  "photo_data":"base64(binary)"  
}
```

7.1 Parameter Description

Field	Implication
Id	Record id
time	Current time
car_number	License plate number of the vehicle
card_no	Wiegand card number
inout_state	Incoming and outgoing status: 0-represents incoming, 1-represents outgoing
event_addr	The IP address at which the event occurs
event_type	Event code, see Appendix 1
photo_path	Photo path
is_leave	Is the vehicle available (for temporary vehicle charges)
is_upload_flag	Event status indicator (for temporary vehicle charges)
in_id	In the case of an exit record, the entry id number (for temporary vehicle charges) is known by this field.
in_addr	If it is an exit record, the entry IP will be known (for temporary vehicle charges) through this field.
push_upload_flag	Push upload success flag, 1: uploaded, 0: not uploaded
photo_data	Image data

8 Upload Real-time License Plate Information and Return Control Command

Currently, Mainstream Firmware has not released this feature.

Function:

Upload real-time license plate information and return control command.

Remarks:

Real-time license plate information is pushed asynchronously to the server.

1. Request

Virtual table name: **lpr_rtdata_return_ctrl**

```
POST /iclock/cdata?SN=2602011070363&table=lpr_rtdata_return_ctrl HTTP/1.1
```

```
Host: 192.168.18.188:8080
```

```
User-Agent: iClock Proxy/1.09
```

Connection: starting

```
Accept: application/push
```

```
Accept-Charset: UTF-8
```

```
Accept-Language: zh-CN
```

```
Content-Type: application/push;charset=UTF-8
```

Content-Language: zh-CN

Content-Length: 98

```
{  
  
  "Seqno":101  
  
  "Time":"20180719135258778",  
  
  "ProcessTime":584,  
  
  "PlateNum":3,  
  
  "Plates":[{"LicensePlate":"G5FT69","LetterCount":7,"Confidence":0,"Left":964,"Right":1180,"Top":795,"  
Bottom":852,"PlateColor":50,"DoublePlate":0,"Direction":0,"CountryCode":0},{"LicensePlate":"YYPR01",  
"LetterCount":7,"Confidence":0,"Left":972,"Right":1187,"Top":717,"Bottom":775,"PlateColor":30,"DoublePlate":0,"Direction":0,"CountryCode":0},  
{"LicensePlate":"PZXD8S","LetterCount":7,"Confidence":0,"Left":972,"Right":1190,"Top":641,"Bottom":699,"PlateColor":30,"DoublePlate":0,"Direction":0,"CountryCode":0}],  
  
  "PlatesPhoto":"base64(binary)"  
}
```

Return:

CONTROL DEVICE {"Auth":{"Username":"admin","Password":"123456"},"Cmd":"OpenGate","Data":""}/t

CONTROL DEVICE

```
{"Auth":{"Username":"admin","Password":"123456"},"Cmd":"CtrlVoice","Data":"base64<voice list>"}/t
```

CONTROL DEVICE

```
{"Auth":{"Username":"admin","Password":"123456"},"Cmd":"CtrlLed","Data":{"FirstLineColor":"<color value>","FirstLineCenter":1,"FirstLineData":"<led content>","SecondLineColor":"<color value>","SecondLineCenter":1,"SecondLineData":"<led content>","ThirdLineColor":"<color value>","ThirdLineCenter":1,"ThirdLineData":"<led content>","FourthLineColor":"<color value>","FourthLineCenter":1,"FourthLineData":"<led content>"}}}
```

8.1 Parameter Description:

Parameter	Description
Seqno	Package number
Time	Recognition time
ProcessTime	Algorithm identification time (milliseconds)
PlateNum	The license plate number
Plates	License plate information (utf-8 code for license plate number)
PlatesPhoto	The license plate images
Return command reference	1.4.2 remote control led/ voice command

Follow-up planning: Subscribe to release data function, subscribe to upload event record, subscribe to upload license plate recognition result, and the subscription requires password verification.

Appendix

Appendix 1

Event Code	Description
Note: Events start at 100	
101	Whitelist release events
102	Blacklist rejection event
103	Temporary vehicle release event
104	Temporary vehicle rejection event
105	White list transfer temporary car incident
107	Temporary vehicle does not match entry record event
108	Minimum charges for temporary vehicles
109	Fixed vehicle release event
110	Fixed vehicle to temporary vehicle event
111	Fixed vehicle expiration event

Appendix 2

ZKTeco algorithm: The algorithm that converts years, months, days, hours, minutes and seconds into seconds.

```
unsigned int OldEncodeTime(int year, int mon, int day, int hour, int min, int sec)
{
    unsigned int tt;

    tt = ((year - 2000) * 12 * 31 + ((mon - 1) * 31) + day - 1) * (24 * 60 * 60)
    +(hour * 60 + min) * 60 + sec;

    return tt;
}
```

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