

# Network IP Camera Application Programming Interface (NIPCA)

Ver. 1.5

## Document History

| Version | Date       | Comment                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0.99a   | 2007-11-09 | Focus on the configuration settings.                                                                                                                                                                                                                                                                                                                                                                             |
| 0.99b   | 2007-11-20 | Add the Valid values. Add RS-485 commands.<br>Refine all document.                                                                                                                                                                                                                                                                                                                                               |
| 0.99c   | 2007-11-21 | Modify HTTP status codes, basic info, datetime DST, motion detection.                                                                                                                                                                                                                                                                                                                                            |
| 0.99d   | 2007-12-14 | 2.3: Modify HTTP status codes description.<br>Add descriptions and examples of parameters and values.<br>3.3.4 3.3.5: Modify flicker, autoexposure for sensor_info.cgi<br>sensor.cgi.<br>3.4.8: Modify upnpav, upnpcp for upnp.cgi.<br>5.1.3: Remove redundant penable, tenable, zenable for ptz_step.cgi.<br>5.1.5: Add p,t,z position for ptz_preset_list.cgi.<br>6.1.2: Add keep_alive for notify_stream.cgi. |
| 0.99e   | 2007-12-26 | Add the 3.5 event handling.                                                                                                                                                                                                                                                                                                                                                                                      |
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| 1.1     | 2008-01-31 | 2.1 Fix the POST Content-Type to application/x-www-form-urlencoded.<br>Add the ACS Stream Header.                                                                                                                                                                                                                                                                                                                |
| 1.2     | 2008-02-21 | 2.1 Fix the POST parameters.                                                                                                                                                                                                                                                                                                                                                                                     |
| 1.3     | 2008-05-26 | 3.5.1 change the definition of macro block size.<br>3.3.4 add hue, autoexposure, autogainctrl<br>3.3.5 add hue, autogainctrl<br>3.6.8 add delaytime                                                                                                                                                                                                                                                              |
| 1.4     | 2008-05-16 | 3.1.1 get basic information: add 'nipca' item<br>3.1.1 add 'videoout' item<br>3.3.4 add 'inputsize' and 'videooutformat' item.<br>3.3.5 add 'color' item.<br>3.5.1 add more actions like cifs_rec, cifs_shot...<br>3.5.4 add more actions and the field prerecord and postrecord.<br>3.5.15, 3.5.16 add keep space item.                                                                                         |

|     |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |            | <p>4.1.7 add get video stream of associated profile<br/>         6.1.1, 6.1.2 add mdv# item<br/>         7.1 change url of rtsp:<br/>         mpeg4 -&gt; mp4<br/>         mjpeg -&gt; jpeg<br/>         add /live# url</p>                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1.5 | 2008-10-17 | <p>3.3.1, 3.3.2 add vprofileformat for video stream cgi 4.1.7<br/>         3.5.3, 3.5.4 add sw_input event<br/>         3.5.3, 3.5.4 change 'actions' and 'action' keyword to be 'handlers' and 'handler'<br/>         5.3 add an software event trigger function<br/>         4.1.5, 4.1.6 revise the part of format description<br/>         5.2.1 unify the speed range to 1-10<br/>         4.1.8 add put audio upstream (two-way audio talk)<br/>         4.1.9 add H.264 streaming cgi url<br/>         Add 7.1.1-7.1.3 to support customized url entry of RTSP live stream.<br/>         3.4.1 add httpeexternalport, rtspport and rtspexternalport.</p> |

# Contents

|         |                              |    |
|---------|------------------------------|----|
| 1.      | Overview                     | 6  |
| 1.1.    | API versions                 | 6  |
| 1.2.    | Valid values                 | 6  |
| 2.      | HTTP Interface               | 7  |
| 2.1.    | Request messages             | 7  |
| 2.2.    | Response messages            | 8  |
| 2.3.    | Response status codes        | 8  |
| 3.      | Configuration API            | 9  |
| 3.1.    | device information           | 9  |
| 3.1.1.  | get basic information        | 9  |
| 3.1.2.  | get extended information     | 9  |
| 3.1.3.  | quickly verify user          | 9  |
| 3.1.4.  | get camera info              | 10 |
| 3.1.5.  | set camera info              | 10 |
| 3.1.6.  | get system date and time     | 10 |
| 3.1.7.  | set system date and time     | 10 |
| 3.2.    | users and groups             | 11 |
| 3.2.1.  | get users                    | 11 |
| 3.2.2.  | add or modify a user         | 11 |
| 3.2.3.  | delete users                 | 12 |
| 3.2.4.  | get groups                   | 12 |
| 3.2.5.  | add or modify group          | 12 |
| 3.2.6.  | delete a group               | 12 |
| 3.2.7.  | query supported privileges   | 13 |
| 3.3.    | video, sensor, audio         | 14 |
| 3.3.1.  | query stream information     | 14 |
| 3.3.2.  | get video config             | 14 |
| 3.3.3.  | set video config             | 15 |
| 3.3.4.  | sensors information          | 15 |
| 3.3.5.  | get sensors config           | 15 |
| 3.3.6.  | set sensors config           | 16 |
| 3.3.7.  | get audio config             | 16 |
| 3.3.8.  | set audio config             | 16 |
| 3.3.9.  | get microphone               | 16 |
| 3.3.10. | set microphone               | 17 |
| 3.3.11. | get speaker                  | 17 |
| 3.3.12. | set speaker                  | 17 |
| 3.4.    | network                      | 17 |
| 3.4.1.  | get network config           | 17 |
| 3.4.2.  | set network config           | 18 |
| 3.4.3.  | get PPPoE                    | 18 |
| 3.4.4.  | set PPPoE                    | 18 |
| 3.4.5.  | get DDNS providers           | 18 |
| 3.4.6.  | get DDNS settings            | 19 |
| 3.4.7.  | set DDNS                     | 19 |
| 3.4.8.  | get upnp information         | 19 |
| 3.4.9.  | set upnp information         | 19 |
| 3.4.10. | get TCP port number for HTTP | 19 |
| 3.4.11. | set TCP port number for HTTP | 19 |
| 3.4.12. | get system wireless          | 20 |
| 3.4.13. | set system wireless          | 20 |
| 3.5.    | event handling               | 21 |
| 3.5.1.  | get motion detection         | 21 |
| 3.5.2.  | set motion detection         | 21 |

|         |                                                           |    |
|---------|-----------------------------------------------------------|----|
| 3.5.3.  | query event handlers information .....                    | 21 |
| 3.5.4.  | get an event handler .....                                | 22 |
| 3.5.5.  | set event handler .....                                   | 22 |
| 3.5.6.  | delete an event handler .....                             | 23 |
| 3.5.7.  | list schedule profiles .....                              | 23 |
| 3.5.8.  | get schedule profile .....                                | 23 |
| 3.5.9.  | set or add schedule profile .....                         | 23 |
| 3.5.10. | delete a schedule profile .....                           | 24 |
| 3.5.11. | get FTP action .....                                      | 24 |
| 3.5.12. | set FTP action .....                                      | 24 |
| 3.5.13. | get mail action .....                                     | 24 |
| 3.5.14. | set mail action .....                                     | 25 |
| 3.5.15. | get CIFS/SMB action .....                                 | 25 |
| 3.5.16. | set CIFS/SMB action .....                                 | 25 |
| 3.6.    | system tools .....                                        | 26 |
| 3.6.1.  | get digital input/output .....                            | 26 |
| 3.6.2.  | set digital output .....                                  | 26 |
| 3.6.3.  | get LED .....                                             | 26 |
| 3.6.4.  | set LED .....                                             | 26 |
| 3.6.5.  | firmware upgrade .....                                    | 27 |
| 3.6.6.  | reboot the camera .....                                   | 27 |
| 3.6.7.  | reset all configurations to the factory default .....     | 27 |
| 3.6.8.  | get RS-485 settings .....                                 | 28 |
| 3.6.9.  | set RS-485 settings .....                                 | 28 |
| 4.      | Streaming .....                                           | 29 |
| 4.1.1.  | get a JPEG image .....                                    | 29 |
| 4.1.2.  | get motion JPEG video stream .....                        | 29 |
| 4.1.3.  | get the video or audio stream type (Obsolete) .....       | 29 |
| 4.1.4.  | get the video or audio stream session ID (Obsolete) ..... | 30 |
| 4.1.5.  | get MPEG-4 video stream .....                             | 30 |
| 4.1.6.  | get audio stream .....                                    | 30 |
| 4.1.7.  | get profile video stream .....                            | 31 |
| 4.1.8.  | put audio upstream (two-way audio talk) .....             | 31 |
| 4.1.9.  | get H.264 video stream .....                              | 32 |
| 5.      | Camera Control API .....                                  | 34 |
| 5.1.    | Remote control .....                                      | 34 |
| 5.1.1.  | query PTZ information .....                               | 34 |
| 5.1.2.  | get the current PTZ position .....                        | 34 |
| 5.1.3.  | get the PTZ movement size in a step .....                 | 34 |
| 5.1.4.  | set the PTZ movement size in a step .....                 | 34 |
| 5.1.5.  | list all PTZ presets .....                                | 35 |
| 5.1.6.  | add, delete or goto a PTZ preset .....                    | 35 |
| 5.1.7.  | move PTZ absolutely .....                                 | 35 |
| 5.1.8.  | move PTZ relatively .....                                 | 35 |
| 5.2.    | via RS-485 .....                                          | 36 |
| 5.2.1.  | do RS-485 commands .....                                  | 36 |
| 5.3.    | Software input control .....                              | 36 |
| 5.3.1.  | Trigger software input event .....                        | 36 |
| 6.      | Notification API .....                                    | 37 |
| 6.1.1.  | get the notification status .....                         | 37 |
| 6.1.2.  | get the notification stream .....                         | 37 |
| 7.      | RTSP API .....                                            | 38 |
| 7.1.1.  | get URL entry of specified profile .....                  | 38 |
| 7.1.2.  | set video config .....                                    | 38 |
| 7.1.3.  | Get live video .....                                      | 38 |
| 8.      | Appendix .....                                            | 40 |
|         | <i>Multimedia header:</i> .....                           | 42 |



# 1. Overview

Network IP Camera Access Application Programming Interface (NIPCA-API) is a HTTP-based API for the networks IP camera products. Users can write program easily by calling this API to access all functionalities provided by our IP cameras including: configuration, multimedia streaming data and the control facilities.

Except Streaming, the other groups of API use the same format in transporting HTTP-based message. We will describe the command HTTP request format in the next chapter.

As for the Streaming API, the output format of streaming API depends on different IP camera model. Here we only provide a general entry point to let the IP camera outputting streaming via a permanent HTTP connection.

We also provide the RTSP interface for our IP camera.

## 1.1. API versions

Though we provide a common API for all IP camera models, it may not apply to some old models which were produced before the first version of this API being published. We may also publish the further version of this API in the future. So there may be some difference between different versions of API. However, all our products shall provide the API version information with every firmware version of each model.

## 1.2. Valid values

The following valid values are used in this document:

| Values                               | Description                                                                                                                               |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| An integer                           | Any number between -2147483647 ( $-2^{31}-1$ ) and 2147483647 ( $2^{31}-1$ ).                                                             |
| m ... n                              | Any number between number m and number n.                                                                                                 |
| #                                    | A number equals or greater than 0                                                                                                         |
| A string                             | Any string encoded by UTF-8                                                                                                               |
| An IP address                        | A string limited to contain an IP address of the format xxx.xxx.xxx.xxx, where xxx is a number between 0 to 255.<br>Example: 192.168.0.90 |
| A MAC Address                        | A string limited to contain a MAC address of the format xx:xx:xx:xx:xx:xx, where xx is a hexadecimal value.<br>Example: 00:40:8c:cd:00:00 |
| A time                               | A string limited to contain a time of the format hh:mm:ss.<br>Example: 23:01:14                                                           |
| A date                               | A string limited to contain a date of the format yyyy-mm-dd.<br>Example: 2004-02-16                                                       |
| <value 1>, <value 2>, <value 3>, ... | Enumeration, only the given values are valid.                                                                                             |
| < <i>italic string</i> >             | Every italic strings inside brackets including the brackets should be replaced by proper values.                                          |

## 2. HTTP Interface

---

An HTTP-based protocol always includes two kinds of message, request and response. IP camera prepares a service to wait and accept TCP connection request with a specified port and to process the requests message from a user defined application. In this chapter, we will describe the common format of comprising all the different request and response messages. Although our camera also can support HTTP/1.0, we recommend that a request compliant with HTTP/1.1 may encounter fewer problems. You may also refer to the RFC 2616 HTTP/1.1.

### 2.1. Request messages

To query information of IP camera, use the syntax

```
GET http://<camera name>/<CGI-URL>?<parameter>=<value> HTTP/1.1<CRLF>
Authorization: Basic <basic-cookie><CRLF>
Host: <camera ip-adress><CRLF>
<CRLF>
```

where,

<CGI-URL> is a URL of a CGI. For example, get basic information is “/common/info.cgi”.

Authorization is optional for some CGIs.

<basic-cookie> is the base64 encoding of userid:password.

<CRLF> is Carriage Return and Line Feed (\r\n).

To set values in the IP camera, you may use HTTP GET method, the syntax is

```
GET http://<camera name>/<CGI-URL>
?<parameter>=<value>[&<parameter>=<value>...] HTTP/1.1<CRLF>
Authorization: Basic <basic-cookie><CRLF>
Host: <camera ip-adress><CRLF>
<CRLF>
```

or HTTP method POST, the syntax is

```
POST http://<camera name>/<CGI-URL> HTTP/1.1<CRLF>
Authorization: Basic <basic-cookie><CRLF>
Host: <camera ip-adress><CRLF>
Content-Type: application/x-www-form-urlencoded<CRLF>
Content-Length: <body length><CRLF>
<CRLF>
<parameter>=<value>[&<parameter>=<value>]
```

where,

<body length> is the length of the entity body.

<parameter> will be described in the following chapters. Valid characters only include alphabets([A-Za-z]), digits([0-9]) and underline(\_). There is no such restriction for <value>. The content part of the post message should be encoded with “url-encoding” function.

## 2.2. Response messages

While IP Camera receives request message from user, it will do the related action then output result as response message:

```
HTTP/1.1 <HTTP code> <HTTP text><CRLF>
```

```
Content-Type: text/plain<CRLF>
```

```
Content-Length: <body length><CRLF>
```

```
<CRLF>
```

```
<parameter>=<values><CRLF>
```

```
...
```

## 2.3. Response status codes

The API status codes are defined here.

*Table 1: HTTP status codes*

| <b>HTTP code</b> | <b>HTTP text</b>    | <b>Description</b>                                                                                |
|------------------|---------------------|---------------------------------------------------------------------------------------------------|
| 200              | OK                  | The request has succeeded, but an application error may occur, please refer to each CGI response. |
| 400              | Bad Request         | You used invalid or unsupported parameters or values for this IP camera.                          |
| 401              | Unauthorized        | The request requires user authentication or the authorization was refused.                        |
| 404              | Not Found           | This API is not supported for this IP camera.                                                     |
| 500              | Internal Error      | The IP camera encountered an internal error or the API can not get the correct status.            |
| 503              | Service Unavailable | The IP camera is unable to handle the request due to temporary overload.                          |



## 3. Configuration API

The CGIs under /config can only be accessed by administrators.

### 3.1. device information

#### 3.1.1. get basic information

request:

GET /common/info.cgi

No authentication required.

response:

| Name     | Value         | Description                                                                                             |
|----------|---------------|---------------------------------------------------------------------------------------------------------|
| model    | A string      | model name                                                                                              |
| version  | A string      | version number of firmware                                                                              |
| build    | A string      | firmware build number                                                                                   |
| nipca    | A string      | version number of NIPCA supported (e.g. 1.2, 1.4)                                                       |
| name     | A string      | camera name                                                                                             |
| location | A string      | camera location                                                                                         |
| macaddr  | A MAC address | the MAC address                                                                                         |
| ipaddr   | An IP address | IP address                                                                                              |
| netmask  | An IP address | Subnet mask                                                                                             |
| gateway  | An IP address | Default router/gateway used for connecting devices attached to different networks and networks segment. |
| wireless | yes, no       | Only displayed if has wireless                                                                          |
| ptz      | P, T, Z       | Only show supported Pan or Tilt or Zoom.<br>For example, ptz=P,T                                        |
| inputs   | #             | The number of inputs                                                                                    |
| outputs  | #             | The number of outputs                                                                                   |
| speaker  | yes, no       | Only displayed if the IP camera has speaker.                                                            |
| videoout | yes, no       | Only displayed if the IP camera has video out connector.                                                |

#### 3.1.2. get extended information

To identify each different camera model.

request:

GET /config/info\_ex.cgi

response:

| Name    | Value    | Description   |
|---------|----------|---------------|
| exid    | A string | extended RDID |
| oemid   | A string | OEMID         |
| boardid | A string | Board ID      |

#### 3.1.3. quickly verify user

request:

GET /users/verify.cgi

response:

| Name  | Value    | Description                                                                  |
|-------|----------|------------------------------------------------------------------------------|
| group | A string | the group name of the specified user in the HTTP Authorization header field. |

When the authorization fails, it will return HTTP/1.0 401 Unauthorized

### 3.1.4. get camera info

request:

GET /config/camera\_info.cgi

response:

| Name     | Value    | Description     |
|----------|----------|-----------------|
| name     | A string | camera name     |
| location | A string | camera location |

### 3.1.5. set camera info

request:

GET/POST /config/camera\_info.cgi

parameters:

see the above table.

response:

see the above table.

### 3.1.6. get system date and time

request:

GET /config/datetime.cgi

response:

| Name       | Value                | Description                                                                                                                                  |
|------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| method     | 0, 1                 | 0: disable ntpd<br>1: enable ntpd                                                                                                            |
| timeserver | A host or IP address | NTP time server host name or IP address.                                                                                                     |
| timezone   | #                    | time zone ID, see Table <a href="#">Time zone</a>                                                                                            |
| date       | A date               | yyyy-mm-dd                                                                                                                                   |
| time       | A time               | hh:mm:ss                                                                                                                                     |
| dstenable  | no, yes              | disable or enable the DST (Daylight Saving Time)                                                                                             |
| dstauto    | no, yes              | set DST automatically                                                                                                                        |
| offset     | A time               | The amount of time the clock should be turned back/forward (hh:mm), due to DST.                                                              |
| starttime  |                      | The time when DST should be enabled in the format m.w.d/hh:mm:ss day d (0 ... 6) of week w (1 ... 5) of month m (1 ... 12). d=0 is a Sunday. |
| stoptime   |                      | Stop time when DST should be disabled in the same format as above.                                                                           |

### 3.1.7. set system date and time

request:

GET/POST /config/datetime.cgi

parameters:

| Name   | Value   | Description                                                                     |
|--------|---------|---------------------------------------------------------------------------------|
| method | 0, 1, 2 | 0: disable ntpd<br>1: enable ntpd<br>2: manual setting, requires date and time. |

|            |                      |                                                                                                                                              |
|------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| timeserver | A host or IP address | NTP time server host name or IP address.                                                                                                     |
| timezone   | 1 ... 83             | time zone ID, see Table <a href="#">Time zone</a>                                                                                            |
| date       | A date               | yyyy-mm-dd                                                                                                                                   |
| time       | A time               | hh:mm:ss                                                                                                                                     |
| dstenable  | no, yes              | disable or enable the DST (Daylight Saving Time)                                                                                             |
| dstauto    | no, yes              | set DST automatically                                                                                                                        |
| offset     | A time               | The amount of time the clock should be turned back/forward (hh:mm), due to DST.                                                              |
| starttime  |                      | The time when DST should be enabled in the format m.w.d/hh:mm:ss day d (0 ... 6) of week w (1 ... 5) of month m (1 ... 12). d=0 is a Sunday. |
| stoptime   |                      | Stop time when DST should be disabled in the same format as above.                                                                           |

response:  
see the 3.1.6 table.

## 3.2. users and groups

### 3.2.1. get users

request:  
GET /config/user\_list.cgi

parameters:

none or

name=<username>

response:  
if no request parameter

| Name              | Value               | Description                                                                 |
|-------------------|---------------------|-----------------------------------------------------------------------------|
| users             | #                   | The total number of users.                                                  |
| <username><br>... | <group name><br>... | For example, admin=admingrp<br>It will display all user names line by line. |

if request parameter is name

| Name     | Value    | Description                           |
|----------|----------|---------------------------------------|
| password | A string | base64 encoded password               |
| group    | A string | the group which this user belongs to. |

### 3.2.2. add or modify a user

request:  
GET/POST /config/user\_mod.cgi

parameters:

| Name     | Value    | Description                           |
|----------|----------|---------------------------------------|
| name     | A string | user name                             |
| password | A string | base64 encoded password               |
| group    | A string | the group which this user belongs to. |

response:  
see the above table.

### 3.2.3. delete users

request:

GET/POST /config/user\_del.cgi

parameters:

name =<username1>,<username2>, ...

You can delete many users at once.

response:

name=<username1>,<username2>, ...

### 3.2.4. get groups

request:

GET /config/group\_list.cgi

parameters:

none or

name=<groupname>

response:

if no request parameter

| Name               | Value               | Description                                                                                 |
|--------------------|---------------------|---------------------------------------------------------------------------------------------|
| groups             |                     | The total number of groups.                                                                 |
| <groupname><br>... | <user1>, ...<br>... | for example, admingrp=admin,root<br>It will display all group names and users line by line. |

if request parameter is name

| Name      | Value                                        | Description                                |
|-----------|----------------------------------------------|--------------------------------------------|
| user      | <user1>, ...                                 | the user names                             |
| privilege | ptz, outputs, speaker, mic, video,<br>notify | the permissions list which this group has. |

### 3.2.5. add or modify group

request:

GET/POST /config/group\_mod.cgi

parameters:

| Name      | Value                                        | Description                                |
|-----------|----------------------------------------------|--------------------------------------------|
| name      | A string                                     | the group name                             |
| user      | <user1>, ...                                 | the user names                             |
| privilege | ptz, outputs, speaker, mic, video,<br>notify | the permissions list which this group has. |

response:

see the above table.

### 3.2.6. delete a group

You can only delete a group which has no users belong to it.

request:

GET/POST /config/group\_del.cgi

parameters:

name=<groupname>

response:  
name=<groupname>

### 3.2.7. query supported privileges

request:  
GET/POST /config/privilege\_info.cgi

response:

| Name      | Value                                        | Description            |
|-----------|----------------------------------------------|------------------------|
| privilege | ptz, outputs, speaker, mic, video,<br>notify | available permissions. |

## 3.3. video, sensor, audio

### 3.3.1. query stream information

You can get supported parameter values for your IP camera. Some parameters are optional and not displayed if not supported in your IP camera.

request:

```
GET /config/stream_info.cgi
```

response:

| Name           | Value                | Description                                                                                           |
|----------------|----------------------|-------------------------------------------------------------------------------------------------------|
| videos         | MPEG4, MJPEG, H264   | available video codecs list. for example, videos=MPEG4,MJPEG                                          |
| audios         | PCM, ADPCM, AMR, AAC | available audio codecs list. for example, audios=PCM                                                  |
| resolutions    | <width>x<height>,... | available video resolutions list. for example, resolutions=640x480,320x240                            |
| vbitrates      | b1, b2, b3, ...      | available bitrates (kbps) list for example, vbitrates=600,800,1000                                    |
| goplengths     |                      | (optional) available GOP lengths list                                                                 |
| framerates     |                      | available frame rates list                                                                            |
| qualities      |                      | available MJPEG qualities list, only used if has MJPEG.                                               |
| asamplerates   |                      | audio sample rates (kHz) list                                                                         |
| abitrates      |                      | audio bitrates (kbps) list                                                                            |
| micvol         |                      | avaiable mic volume range from v1 to v2. for example, micvol=0...100                                  |
| speakervol     |                      | speaker volume range                                                                                  |
| vprofileformat | Ver#                 | Use this value to indicate whether camera support /video/video.cgi or not. Please also refer to 4.1.7 |
| vprofilenum    | #                    | The total number of avaiable video streams.                                                           |
| vprofile#      | <codec name>         | video profile # (# is a number from 1 to the count of profiles)                                       |
| vprofileurl#   |                      | the URL for video profile #                                                                           |
| aprofilenum    | #                    | The total number of avaiable audio streams.                                                           |
| aprofile#      | <codec name>         | audio profile # (# is a number from 1 to the count of profiles)                                       |
| aprofileurl#   |                      | the URL for audio profile #                                                                           |

### 3.3.2. get video config

request:

```
GET /config/video.cgi
```

parameters:

```
profileid=<video profile number>
```

response:

| Name           | Value            | Description                                                                                           |
|----------------|------------------|-------------------------------------------------------------------------------------------------------|
| vprofileformat | Ver#             | Use this value to indicate whether camera support /video/video.cgi or not. Please also refer to 4.1.7 |
| profileid      | #                | profile number (# is a number from 1 to the count of profiles)                                        |
| resolution     | <width>x<height> | resolution                                                                                            |
| bitrate        | An integer       | in kbit/s                                                                                             |
| codec          | MPEG4, MJPEG     | a video codec                                                                                         |

































































