LAN-2-LAN API
FOR DOORBIRD AND BIRDGUARD

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OVERVIEW

This document specifies the external API of Bird Home Automation products. The interface provides the functionality for IP communicating with Bird Home Automation products via LAN (Local Area Network), handled by the built-in servers in Bird Home Automation products.

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DOCUMENT HISTORY

Version	Description
0.16	Add information about Digest Authentication. Describe “test” parameter for notification requests. Change example to show HTTPS support at notifications. Update web links at AEC/ANR hint.
0.17	History images are stored in the cloud.
0.18	Added document history. Add DoorBird D21x to compatible devices. Describe permission check and RC 204 for several requests: live video stream, live image, live audio transmit/receive, open door, light on, history image. Remove outdated chapters for notification, monitor and check requests. Add information about the “API operator” permission and where it's necessary. Add chapters for UDP events, favorites, schedules and peripherals. Extend info.cgi chapter (MAC address, device type and relays). Extend description of history.image requests (permission check). Include information about the SIP API. SIP API now handles the “API operator” permission, property “autocall_doorbell_url” is now deprecated.
0.19	Added generic information about the integration scheme. Describe more response codes from favorites.cgi and schedules.cgi.
0.20	Add monitor.cgi chapter.
0.21	Add more examples to “Schedule management” chapter.

COMPATIBLE DEVICES

Device	Hardware version	Firmware version
DoorBird Video Door Station D10x	1.00 and above	000099 and above
DoorBird Video Door Station D20x	1.00 and above	000099 and above
DoorBird Video Door Station D21x	1.00 and above	000108 and above
BirdGuard B10x	1.00 and above	000099 and above

Please check also the Firmware Change Log at http://www.doorbird.com/changelog and check the descriptions of firmware updates.

For reasons of brevity, we use the terms “device” to refer to our “DoorBird Video Door Station” and “BirdGuard” products and “mobile device” to refer to a smartphone or tablet.

GENERAL INFORMATION

PRIVACY STATEMENT

Please observe any relevant country-specific statutory regulations concerning the use of surveillance components and security surveillance applicable at the installation site and within your third-party solution.

LOCATING DEVICES IN YOUR LAN

You can locate devices and obtain its IP address within your LAN using the Apple Bonjour Protocol, see e.g.

- DoorBird App → Settings → Administration → Search
- Online tool http://www.doorbird.com/checkonline
- Apple Bonjour command line tool “dns-sd”, e.g. “dns-sd.exe -B _http._tcp local”. Please see the Apple Bonjour documentation for further information on this topic
- http://en.wikipedia.org/wiki/Bonjour_%28software%29
- http://www.axis.com/de/de/axis-ip-utility/download

CONCURRENT CONNECTIONS

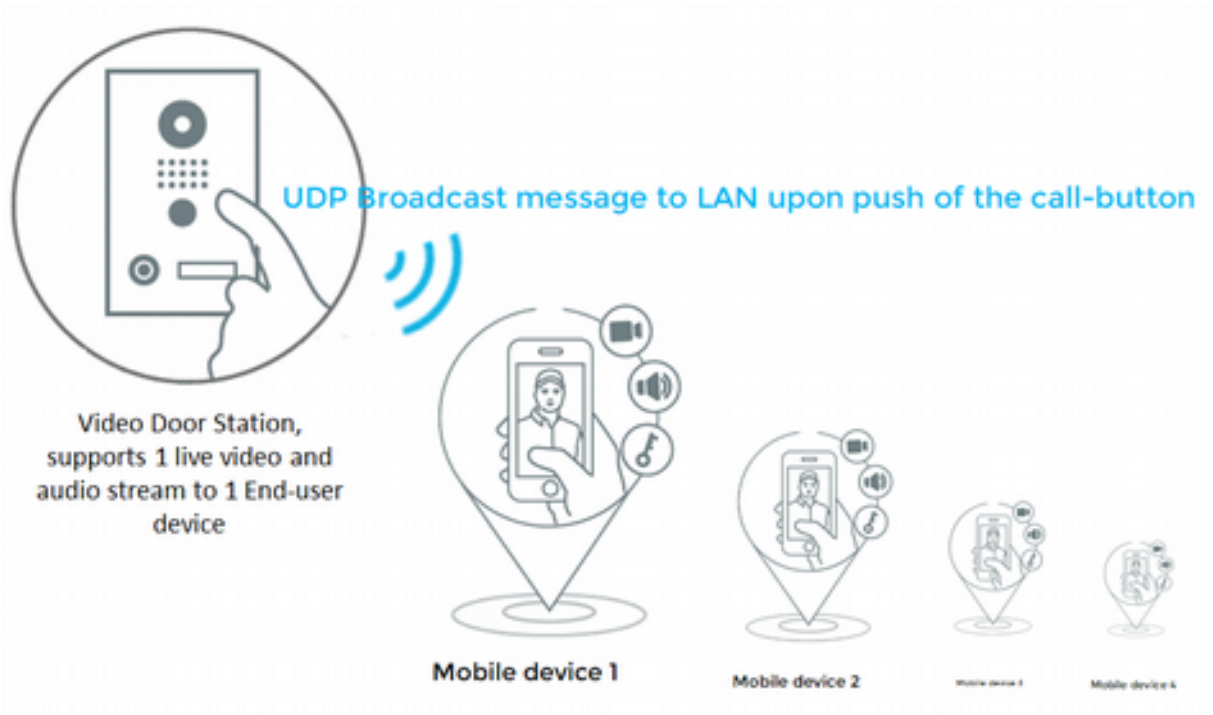
The device handles via this third-party API a maximum of 1 concurrent connection per second for API access.

Please keep in mind that the device is a Video Door Station, which handles in general - like all commercially relevant door stations - only one simultaneous audio/video call for live communication. You get a status code "503" (Busy) if another user already took the call. In that case you can notify the user with a message dialog on your GUI, e.g. "Line busy" and additionally preview one still image (LIVE IMAGE

REQUEST).

INTEGRATION SCHEME

The following is a professional integration scheme and process flow. You should realize your integration like this.



The mobile devices (e.g. smartphone, tablet, smart-home panel) listen for UDP Broadcast messages within the LAN from the door station. If a valid UDP Broadcast message (valid: fits to the call-button number) is received from the door station by the mobile devices, then the mobile devices play a "ding-dong" notification sound and offer the End-user the possibility to take the call upon user-interaction by e.g. pressing a button on the mobile devices.

The mobile devices MUST NOT fetch the video and audio stream automatically upon receipt of a valid UDP Broadcast message, because a Video Door Station is a security device and not powered by an 8 GHz Octa-Core CPU with 32 GB RAM and thus is not capable to handle many concurrent streams.

A Video Door Station (traditional and nowadays) is designed to have an active video and audio call with only one mobile device simultaneously (1:1, not 1:n) ! The connection to the first mobile device is automatically interrupted if another (additional) mobile devices picks the call. Please do not try to lower the end-user experience by realizing simultaneous video and audio calls with several mobile devices. A Video

Door Station does not support this.

When the End-user makes user-interaction (by e.g. pressing a button on the mobile device) then the mobile device tries to fetch a video and audio stream from the Video Door Station. If it fails because the Video Door Station is busy because another mobile is already fetching the video and audio stream then the End-user should be notified with e.g. "Line is busy, someone is already speaking" by the mobile device.

URL SCHEME

You can use the URL Scheme “DoorBird” to start the DoorBird App for iOS using a third party iOS App. You can use the URL Scheme “DoorBird” to start the DoorBird App for Android using a third party Android App.

HTTP INTERFACE DESCRIPTION

AUTHENTICATION

Please use Basic or Digest authentication as defined in RFC 2617 for each HTTP request. Use the same credentials as you are using to add a device to the DoorBird App.

Alternatively to authentication as defined in RFC 2617 you can you can use the plain-text HTTP parameters "http-user" and "http-password" to authenticate (more insecure because of plain-text, but some third-party home automation platforms support only HTTP parameters), e.g. "http://<device-ip>/bha-api/video.cgi?http-user=xxxxxx0001&http-password=xxxxxxx".

AVAILABLE PERMISSIONS

Users can have several permissions, which can be managed in the Administration area of the DoorBird App.

- **Watch always**: User can see live view and control the door/s at any time, even if there is no ring event
- **History**: User can access the history (e.g. Cloud-Recording)
- **Motion**: User can obtain motion notifications and access the motion history (e.g. Cloud-Recording)
- **API-Operator**: User can change settings through the Open API (www.doorbird.com/api) e.g. schedules and notifications and e.g. initiate an

active SIP call (“makecall”) sing API command. You should only enable the “API-Operator” permission for users which are used on central Home Automation Servers, you should NOT enable “API-Operator” permission for users which are configured in Home Automation panels or Apps of end-users because then this user could change global settings for other users.

DEMONSTRATION

You may browse to http://<device-ip>/bha-api/view.html with a web browser to see a demonstration of the API in a standard webpage.

LIVE VIDEO REQUEST

Returns a multipart JPEG live video stream with the default resolution and compression as defined in the system configuration. When MJPG video is requested, the server returns a continuous flow of JPEG files. The content type is "multipart/x-mixed-replace" and each image ends with a boundary string <boundary>. The returned image and HTTP data is equal to the request for a live image request. An average of up to 8 fps can be provided using this third-party API, depending on the network speed and load factor of the device.

When the request is correct, but the requesting user has no permission to view the live stream at the moment, the request is answered with a return code 204. This usually happens for users without “watch-always” permission when there was no ring event in the past 5 minutes.

Please note, that the video connection can get interrupted at any time, when the official DoorBird App requests the stream. It has precedence over users of the LAN-API.

Method: GET

Required permission: valid user, “watch always” or ring event in the past 5 minutes for the requesting user

Syntax:

```
http://<device-ip>/bha-api/video.cgi
```

Example Request:

```
http://<device-ip>/bha-api/video.cgi
```

Return:

```
HTTP/1.0 200 OK\r\n
Content-Type: multipart/x-mixed-replace;boundary=<boundary>\r\n
\r\n
<boundary>\r\n
<image section>\r\n
<boundary>\r\n
<image section>\r\n
:
:
```

where the proposed <*boundary*> is “my-boundary” and the returned <*image section*> field is

```
Content-Type: image/jpeg\r\n
Content-Length: <image size>\r\n
\r\n
<JPEG image data>
```

Example: Requested Multipart JPEG image.

LIVE IMAGE REQUEST

Returns a JPEG file with the default resolution and compression as defined in the system configuration. The content type is "image/jpeg".

When the request is correct, but the requesting user has no permission to view the live image at the moment, the request is answered with return code 204. This usually happens for users without “watch-always” permission when there was no ring event in the past 5 minutes.

Method: GET

Required permission: valid user, “watch always” or ring event in the past 5 minutes for the requesting user

Syntax:

```
http://<device-ip>/bha-api/image.cgi
```

Example Request:

```
http://<device-ip>/bha-api/image.cgi
```

Return:

```
HTTP/1.0 200 OK\r\n
Content-Type: image/jpeg\r\n
Content-Length: <image size>\r\n
\r\n
<JPEG image data>\r\n
```

OPEN DOOR

Energize the door opener/ alarm output relay of the device. Returns JSON.

We assume, that the API user watches the live image in order to open the door or trigger relays. So, when the request is correct, but the requesting user has no permission to view the live image at the moment, the request is answered with return code 204. This usually happens for users without “watch-always” permission when there was no ring event in the past 5 minutes.

Method: GET

Required permission: valid user, “watch always” or ring event in the past 5 minutes for the requesting user

Syntax:

```
http://<device-ip>/bha-api/open-door.cgi?<parameter>=<value>
```

<parameter>=<value>	Values	Description
r=<string>	1|2| <doorcontrollerID>@<relay>	optional: relay to trigger, e.g. physical relay number or relay on an paired IP I/O DoorController. You can get the paired devices by calling info.cgi (see info.cgi chapter here in this document. If the parameter is ommitted, physical relay 1 gets triggered.

Example Requests:

```
http://<device-ip>/bha-api/open-door.cgi
http://<device-ip>/bha-api/open-door.cgi?r=1
http://<device-ip>/bha-api/open-door.cgi?r=gggaaa@1
```

LIGHT ON

Energize the light relay of the device. Returns JSON.

We assume, that the API user watches the live image in order to activate the light. So, when the request is correct, but the requesting user has no permission to view the live image at the moment, the request is answered with return code 204. This usually happens for users without “watch-always” permission when there was no ring event in the past 5 minutes.

Method: GET

Required permission: valid user, “watch always” or ring event in the past 5 minutes for the requesting user

Syntax:

```
http://<device-ip>/bha-api/light-on.cgi
```

Example Request:

```
http://<deviceip>/bha-api/light-on.cgi
```

HISTORY IMAGE REQUEST

Returns a JPEG history image with the default resolution and compression as defined in the system configuration. The history images are stored in the cloud.

If the authentication of the requesting user is ok, but he has no permission for this history, the request is answered with response code 204. This can be either the general “history” permission or the more specific “motion” permission.

Method: GET

Required permission: valid user, history permission, motion permission to access images from motion events

Syntax:

```
http://<device-ip>/bha-api/history.cgi?<parameter>=<value>
```

<parameter>=<value>	Values	Description
index=<int>	1..50	Index of the history images, where 1 is the latest history image
event=<string>	doorbell| motionsensor	Event type (optional), default is the ring history for DoorBird devices and the input trigger history for BirdGuard devices. The API automatically requests images from the history of the requesting user (doorbell number or keycode which got assigned in the administration settings).

Example Request:

```
http://<deviceip>/bha-api/history.cgi?index=1
http://<deviceip>/bha-api/history.cgi?index=22
http://<deviceip>/bha-api/history.cgi?
event=motionsensor&index=5
```

Return:

```
HTTP/1.0 200 OK\r\n
Content-Type: image/jpeg\r\n
Content-Length: <image size>\r\n
\r\n
<JPEG image data>\r\n
```

MONITOR REQUEST

Returns the state of motionsensor and doorbell as a continuous multipart stream. Trigger information about rfid and keypad events coming soon. There are up to 8

concurrent Streams allowed. When all streams are busy returns HTTP code 509.

Method: GET

Required permission: valid user

Syntax:

http://<device-ip>/bha-api/monitor.cgi?ring=doorbell[,motionsensor]

<parameter>=<value>	Values	Description
ring=<string>	doorbell| motionsensor	Event type to monitor. **Note**: rfid and keypad events coming soon

Example Request:

http://<device-ip>/bha-api/monitor.cgi?ring=doorbell,motionsensor

Example Return:

```
HTTP/1.1 200 OK\r\n
Content-Type: multipart/x-mixed-replace; boundary=--ioboundary\r\n
\r\n
--ioboundary\r\n
Content-Type: text/plain\r\n
\r\n
doorbell:H\r\n
\r\n
--ioboundary\r\n
Content-Type: text/plain\r\n
\r\n
motionsensor:L\r\n
\r\n
..
--ioboundary\r\n
Content-Type: text/plain\r\n
\r\n
doorbell:L\r\n
\r\n
--ioboundary\r\n
Content-Type: text/plain\r\n
\r\n
motionsensor:L\r\n
\r\n
```

HTTP status codes:
200 – OK
400 – Parameter missing or invalid
401 – Authentication required

LIVE AUDIO RECEIVE AND TRANSMIT – General information

- Audio can be received and transmitted via our HTTP interface or SIP interface.
- AEC/ANR: The transmitting user device (e.g. Home Automation tablet) MUST do the echo and noise reduction on its own (AEC, ANR). The DoorBird Video Door Station has a high-end hardware- and software-based echo canceller built-in, but due to natural physical circumstances you have to do echo cancellation on both sides, user device and door station. Our native Apps use high-end self-learning AEC and ANR algorithms. Our AEC and ANR algorithms in our native Apps are one of our core technologies and thus not available for any third party. You must develop an AEC / ANR on your own or use the native AEC / ANR of the operating system, see e.g.

  https://developer.apple.com/library/content/documentation/MusicAudio/Conceptual/AudioUnitHostingGuide_iOS/UsingSpecificAudioUnits/UsingSpecificAudioUnits.html and

  https://developer.android.com/reference/android/media/audiofx/AcousticEchoCanceler.html for information about acoustic echo cancellation.
- Codec: When using this API audio MUST be G.711 µ-law (sampling rate 8000 Hz).
- Wireshark: When using Wireshark for packet inspection during development, audio transmission might not be shown in the “http” Filter, please chose a different filter.

LIVE AUDIO RECEIVE

Use this method to obtain real-time audio (G.711 µ-law) from the device.

When the request is correct, but the requesting user has no permission to view the live stream at the moment, the request is answered with a return code 204. This usually happens for users without “watch-always” permission when there was no ring event in the past 5 minutes.

Please note, that the audio connection can get interrupted at any time, when the official DoorBird App requests the stream. It has precedence over users of the LAN-API.

Method: GET

Required permission: valid user, “watch always” or ring event in the past 5 minutes for the requesting user

Syntax:

```
http://<device-ip>/bha-api/audio-receive.cgi
```

Example Request:

```
http://<device-ip>/bha-api/audio-receive.cgi
```


Return:

```
HTTP/1.0 200 OK\r\n
<AUDIO DATA>
<AUDIO DATA>
<AUDIO DATA>
...
```

LIVE AUDIO TRANSMIT

Transmit audio (G.711 µ-law) from your mobile device (e.g. Home Automation tablet) to the device. Only one consumer can transmit audio (talk) at the same time. The second consumer will be rejected.

When the request is correct, but the requesting user has no permission to view the live stream at the moment, the request is answered with a return code 204. This usually happens for users without “watch-always” permission when there was no ring event in the past 5 minutes.

Please note, that the audio connection can get interrupted at any time, when the official DoorBird App requests the stream. It has precedence over users of the LAN-API.

Method: POST

Required permission: valid user, “watch always” or ring event in the past 5 minutes for the requesting user

Syntax:

```
http://<device-ip>/bha-api/audio-transmit.cgi
```

Example 1: Singlepart audio data transmit with G.711 µ-law (authorization omitted).

```
POST /bha-api/audio-transmit.cgi HTTP/1.0\r\n
Content-Type: audio/basic\r\n
Content-Length: 9999999\r\n
Connection: Keep-Alive\r\n
Cache-Control: no-cache\r\n
\r\n
<AUDIO DATA>
<AUDIO DATA>
<AUDIO DATA>
...
```

Example 2: Multipart audio data transmit with G.711 µ-law (authorization omitted).

INFO REQUEST

Get some version information from the device in JSON format. Starting with firmware 000108, the relays configuration is included in the JSON output. It includes both, physical relays and paired DoorBird IP I/O Door Controllers.

Method: GET

Required permission: valid user

Syntax:

```
http://<device-ip>/bha-api/info.cgi
```

Example Request:

```
http://<deviceip>/bha-api/info.cgi
```

Example Return 1: DoorBird D101 with outdated firmware

```
{
  "BHA": {
    "RETURNCODE": "1",
    "VERSION": [{
      "FIRMWARE": "000096",
      "BUILD_NUMBER": "41865"
    }]
  }
}
```

Example Return 2: DoorBird D21x with paired DoorBird IP I/O DoorController

```
{
  "BHA": {
    "RETURNCODE": "1",
    "VERSION": [{
      "FIRMWARE": "000109",
      "BUILD_NUMBER": "15120529",
      "PRIMARY_MAC_ADDR": "1CCAE3700000",
      "RELAYS": ["1", "2", "gggaaa@1", "gggaaa@2"],
      "DEVICE-TYPE": "DoorBird D101"
    }]
  }
}
```

FAVORITE MANAGEMENT

In order to react on events and execute actions on the DoorBird device, this API features favorites and schedules. Favorites are basic configuration units that can be used in schedules, e.g. an HTTP(S)-URL for notifications or SIP numbers. Favorites can be seen as address book entries. If you want to use an HTTP favorite for different events (e.g. smart home server), it is advised to save it's twice and handle the event type in the URL.

The user needs the “API operator” permission in order to access favorites.cgi.

Firmware 000110 or higher is required on your DoorBird/BirdGuard in order to access favorites and schedules.

LIST FAVORITES

List all currently configured favorites as JSON.

Method: GET

Required permission: valid user, API operator permission

Syntax:

```
http://<device-ip>/bha-api/favorites.cgi
```

Example Request:

```
http://<device-ip>/bha-api/favorites.cgi
```

Return:

```
HTTP/1.0 200 OK\r\n
\r\n
{
  "sip":{
    "0":{
      "title":"Concierge",
      "value":"1234@sip.example.com"
    }
  },
  "http":{
    "1":{
      "title":"MyServer",
      "value":"http://10.0.0.1/foo/notify"
    },
    "5":{
      "title":"ServerX",
      "value":"https://login:password@192.168.1.100?
action=notify"
    }
  }
}
```

ADD OR CHANGE FAVORITE

Add a new favorite or change an existing favorite. If you add a new favorite, it's id is available as response header value for key “favoriteid”.

Method: GET

Required permission: valid user, API operator permission

Syntax:

```
http://<device-ip>/bha-api/favorites.cgi?
action=save&<parameter>=<value>
```

<parameter>=<value>	Values	Description
action=<string>	save	Fixed parameter for saving favorites
type=<string>	sip|http	Type of the favorite; ATTENTION: it's not allowed to switch this type when saving an existing favorite!
title=<string>	name / title	Name or short description of the favorite
value=<string>	URL / address	URL of the favorite, including protocol and user credentials, if necessary (see example above). This can be an HTTP(S) URL or an SIP target.
id=<int>	optional: id of the favorite	Specify the ID of the favorite to change; omit, if saving a new favorite

Example Requests: add HTTP favorite, change SIP favorite

```
http://<device-ip>/bha-api/favorites.cgi?
action=save&type=http&title=RingServ&value=https://172.17.1.5/
notify/ring

http://<device-ip>/bha-api/favorites.cgi?
action=save&type=sip&title=Johns
%20Phone&value=101@sip.domain.local&id=2
```

Return:

```
HTTP/1.0 200 OK\r\n
\r\n
```

HTTP status codes:
200 – OK
400 – Parameter missing or invalid
401 – Authentication required
500 – Internal error
507 – Size limit exceeded (too many or to large favorites)

DELETE FAVORITE

Remove an favorite from the DoorBird device. If the favorite is actively used in a schedule configuration, the schedule entry will also be removed.

Method: GET

Required permission: valid user, API operator permission

Syntax:

```
http://<device-ip>/bha-api/favorites.cgi?
action=remove&<parameter>=<value>
```

<parameter>=<value>	Values	Description
action=<string>	remove	Fixed parameter for deleting favorites
type=<string>	sip|http	Type of the favorite
id=<int>	ID of the favorite	The ID of the favorite to delete

Example Request:

```
http://<device-ip>/bha-api/favorites.cgi?
action=remove&type=sip&id=2
```

Return:

```
HTTP/1.0 200 OK\r\n
\r\n
```

HTTP status codes:
200 – OK
400 – Parameter missing or invalid
401 – Authentication required
500 – Internal error

SCHEDULE MANAGEMENT

With schedule entries one can configure the actions, that a DoorBird device executes at certain events. It is possible to setup the input event (e.g. ring, motion), the output event (e.g. HTTP notification, SIP call) and the time window, where this rule is active.

The API handles 3 different schedule types: “once” (one time event), “from-to” and “weekdays” (recurring time ranges on a weekly base).

“Once” is rather self explanatory, the schedule gets invalid after a single use. You can enable it again, so you don't have to configure it again.

“From-to” can be used for all distinct – not recurring - time ranges. Time unit are seconds since 1.1.1970 and the timezone is UTC.

Seconds are used as unit for time information in “weekdays” setup. Starting point is Sunday 0:00 o'clock. Maximum time value for weekly events is 604800 (7 days * 24 hours * 60 minutes * 60 seconds). The 24 hours of a day are divided into 48 time slices of 30 minutes (1800 seconds) length each. It is important, that all time schedules are multiples of 1800 seconds.

There can be only one schedule entry for each output type, time slot and event slot. Example: just one HTTP trigger for ring events at 8 o'clock. But an SIP call at the same time is possible. If more events are needed, one needs to implement event-multiplexing. Exceptions are relays, where more can be triggered for the same event.

The user needs the “API operator” permission in order to access schedules.cgi.

Firmware 000110 or higher is required on your DoorBird/BirdGuard in order to access favorites and schedules.

Hint: entries from the old “notification.cgi” configuration get migrated to schedule entries.

LIST SCHEDULES

List all currently configured schedules settings as JSON.

Method: GET

Required permission: valid user, API operator permission

Syntax:

```
http://<device-ip>/bha-api/schedule.cgi
```

Attributes of the schedule JSON object:

JSON attributes	Values	Description
input	doorbell|motion|rfid|input	The input event type, e.g. doorbell or motion
param	<doorbell-number>|<>|	Parameter value for the input, e.g.

	<transponder-id>|<input-number>	doorbell number, RFID transponder id, input
output	JSON array	JSON array of output action configurations

Attributes of the JSON object for an “output” configuration:

JSON attributes	Values	Description
event	notify|sip|relay|http	The action to execute. e.g. issue HTTP notification or trigger a relay Type “notify” is used to trigger push notifications and cloud recordings
param	<>|<sip-favorite-id>|<relay-number>|<http-favorite-id>	Parameter for the configured event, e.g. favorite id (for sip or http) or relay number for relay events
schedule	once|from-to|weekdays	Schedule configuration, e.g. trigger just once, trigger for a certain time range, trigger on weekday base

Example Request:

```
http://<device-ip>/bha-api/schedule.cgi
```

Return:

```
HTTP/1.0 200 OK\r\n
\r\n
[
{
  "input":"doorbell",                    <!-- example for doorbell events -->
  "param":"1",                           <!-- doorbell number 1 -->
  "output":[
    {
      "event":"http",
      "param":"1",                       <!-- trigger http favorite #1 -->
      "schedule":{
        "weekdays":[
          {
            "from":"122400",             <!-- each Monday 10:00 - 18:00 UTC -->
            "to":"151200"
          }
        ]
      }
    }
  ]
},
{
  "input":"motion",                      <!-- example for motion events -->
  "param":"",                            <!-- no param for motion input -->
  "output":[
    {
      "event":"relay",
      "param":"2",                       <!-- trigger relay #2 -->
```

```
      "schedule":{
        "from-to":[
          {
            "from":"1509526800",          <!-- 1.11.2017 10:00 UTC -->
            "to":"1509555600"             <!-- 1.11.2017 18:00 UTC -->
          },
          {
            "from":"1509613200",          <!-- 2.11.2017 10:00 UTC -->
            "to":"1509642000"             <!-- 2.11.2017 18:00 UTC -->
          }
        ]
      }
    }
  ]
},
{
  "input":"input",                        <!-- example for relay input events -->
  "param":"1",                            <!-- input relay number 1 -->
  "output":[
    {
      "event":"sip",
      "param":"4",                        <!-- call sip favorite #4 -->
      "schedule":{
        "once":{
          "valid":"1"                     <!-- this one time event is valid -->
        }
      }
    }
  ]
}
]
```

HTTP status codes:
200 – OK
204 – No data for the requested input (if parameter “input” is available at the request)
401 – Authentication required

ADD OR UPDATE SCHEDULE ENTRY

Add or update an schedule setting by sending the configuration as JSON object. One request for each input type (e.g. ”motion” or “doorbell #6789”) is required.

Method: POST

Required permission: valid user, API operator permission

Syntax:

```
http://<device-ip>/bha-api/schedule.cgi
```

Example Request:

```
http://<device-ip>/bha-api/schedule.cgi
```

Example JSON content for doorbell events:

```
{
      "input": "doorbell",
      "param": "1",              <!-- configuration for doorbell #1 -->
      "output": [{
```

```
                "event": "notify",  <!-- send notifications (push, history) -->
                "param": "",
                "enabled": "1",
                "schedule": {
                        "weekdays": [{
                                "to": "82799",
                                "from": "82800"
                        }]
                }
        }, {
                "event": "http",
                "param": "3",               <!-- trigger http favorite #3 -->
                "enabled": "1",
                "schedule": {
                        "weekdays": [{      <!--always trigger -->
                                "to": "82799",
                                "from": "82800"
                        }]
                }
        }]
}
```

Example JSON content for motion events:

```
{
        "input": "motion",
        "param": "",
        "output": [{
                "event": "notify",
                "param": "",
                "enabled": "1",
                "schedule": {
                        "weekdays": [{      <!--always trigger -->
                                "to": "82799",
                                "from": "82800"
                        }]
                }
        }, {
                "event": "relay",
                "param": "1",
                "enabled": "1",
                "schedule": {               <!--always trigger -->
                        "weekdays": [{
                                "to": "82799",
                                "from": "82800"
                        }]
                },
        }]
}
```

Return:

```
HTTP/1.0 200 OK\r\n
\r\n
```

HTTP status codes:
200 – OK
400 – Any of: invalid JSON format; Content-Length header missing; Content-Length header does not match real content size; content size too large
401 – Authentication required
500 – internal error
507 – Size limit exceeded (too many or to large schedules

DELETE SCHEDULE ENTRY

Delete an schedule entry.

Method: GET

Required permission: valid user, API operator permission

Syntax:

```
http://<device-ip>/bha-api/schedule.cgi?
action=remove&<parameter>=<value>
```

<parameter>=<value>	Values	Description
action=<string>	remove	Fixed parameter for deleting a schedule entry
input=<string>doorbell|motion|rfid|input	doorbell|motion|rfid|input	The input event type, e.g. doorbell or motion
param=<string>	<doorbell-number>|<>|<transponder-id>|<input-number>	The ID of the schedule entry to delete, e.g. doorbell number, RFID transponder id, input

Example Request:

```
http://<device-ip>/bha-api/schedule.cgi?
action=remove&input=motion&param=xxx
```

Return:

```
HTTP/1.0 200 OK\r\n
\r\n
```

HTTP status codes:
200 – OK
401 – Authentication required
500 – internal error

EVENT MONITORING (UDP BROADCASTS)

After an event occurred, the DoorBird sends multiple identical UDP-Broadcasts on the ports 6524 and 35344 for every user and every connected device. You can split the package in two sections. The first one contains information about the package, the second part about encryption with payload. Please notice, we are also sending

keep alive broadcasts every 7 seconds on this two ports, these packets are not relevant for the decryption of event broadcasts, you can skip them.

To decode these UDP packets in version 1, the algorithms Argon2i and ChaCha20 must be supported. Both are included in the well-known Sodium crypto library (libsodium).

First Part:

Fieldname	Length in Bytes	Datatype	Explanation
IDENT	3	Byte	To identify this kind of package the first three bytes contains a identifier. IDENT[0] = 0xDE IDENT[1] = 0xAD IDENT[2] = 0xBE
VERSION	1	Byte	The VERSION Flag allows us to distinguish between different encryptions and package types. Right now we support the following ones: 0x01 – ChaCha20-Poly1305 with Argon2i (currently the only supported version)

Second Part for a package in VERSION 0x01:

Fieldname	Length in Bytes	Datatype	Explanation
OPSLIMIT	4	Long	Used for password stretching with Argon2i.
MEMLIMIT	4	Long	Used for password stretching with Argon2i.
SALT	16	Byte	Used for password stretching with Argon2i.
NONCE	8	Byte	Used for encryption with ChaCha20-Poly1305
CIPHERTEXT	34*	Byte	With ChaCha20-Poly1305 encrypted text which contains informations about the Event.

*The encrypted CIPHERTEXT contains 16 byte with random values, these bytes are no longer present after decryption.

The CIPHERTEXT after decryption:

Fieldname	Length in Bytes	Datatype	Explanation
INTERCOM_ID	6	String	The first 6 digits of the user name. You can ignore all packets, where this doesn't match your DoorBird user).
EVENT	8	String	Contains the doorbell or „motion“ to detect which event was triggered. Padded with spaces.
TIMESTAMP	4	Long	A Unix timestamp, long.

Used Algorithms:

Version	Name	Function
0x01	Argon2i	Key derivation
0x01	ChaCha20-Poly1305	Authenticated Encryption

Step by step example:

Your DoorBird-User: `foobar0001`
Password from foobar0001: `QzT3jeK3JY`

Step 1: You capture the following packet via UDP:

```
0xDE 0xAD 0xBE 0x01 0x00 0x00 0x00 0x04 0x00 0x00 0x20 0x00 0x77 0x35 0x36 0xDC
0xC3 0x0E 0x2E 0x84 0x7E 0x0E 0x75 0x29 0xE2 0x34 0x60 0xCF 0xE3 0xFF 0xCC 0x52
0x3F 0x37 0xB2 0xF2 0xDC 0x1A 0x71 0x80 0xF2 0x9B 0x2E 0xA0 0x27 0xA9 0x82 0x41
0x9C 0xCE 0x45 0x9D 0x27 0x45 0x2E 0x42 0x14 0xBE 0x9C 0x74 0xE9 0x33 0x3A 0x21
0xDB 0x10 0x78 0xB9 0xF6 0x7B
```

Step 2: Split it up:

Field	Content
IDENT	0xDE 0xAD 0xBE
VERSION	0x01
OPSLIMIT	0x00 0x00 0x00 0x04
MEMLIMIT	0x00 0x00 0x20 0x00
SALT	0x77 0x35 0x36 0xDC 0xC3 0x0E 0x2E 0x84 0x7E 0x0E 0x75 0x29 0xE2 0x34 0x60 0xCF
NONCE	0xE3 0xFF 0xCC 0x52 0x3F 0x37 0xB2 0xF2
CIPHERTEXT	0xDC 0x1A 0x71 0x80 0xF2 0x9B 0x2E 0xA0 0x27 0xA9 0x82 0x41 0x9C 0xCE 0x45 0x9D 0x27 0x45 0x2E 0x42 0x14 0xBE 0x9C 0x74 0xE9 0x33 0x3A 0x21 0xDB 0x10 0x78 0xB9 0xF6 0x7B

Step 3: Generate stretched password.

To achieve this take the first 5 chars of your password („QzT3j“), use the OPSLIMIT with value 4 and the MEMLIMIT with value 8192 and stretch it with Argon2i, the result of stretching:

```
0x47 0xB8 0xA5 0xBC 0xDD 0xDA 0x29 0xEB 0x4C 0x0F 0xF6 0x78 0x46 0x41 0xE7 0x2F 0x7B
0x9C 0x45 0xD5 0x46 0x1A 0x60 0x71 0x2C 0x68 0x1F 0x05 0x23 0x9B 0xCC 0xA2
```

Step 4: Decrypt CIPHERTEXT with ChaCha20-Poly1305, use the stretched password and NONCE, output should be this:

```
0x66 0x6F 0x6F 0x62 0x61 0x72 0x31 0x30 0x32 0x20 0x20 0x20 0x20 0x20 0x5A 0x12 0xE4
0x13
```

Step 5: Split the output up:

Field	Byte Value	Value
INTERCOM_ID	0x66 0x6F 0x6F 0x62 0x61 0x72	„foobar“ Starting 6 chars from the user name. Skip the packet, if this doesn't match your DoorBird user).
EVENT	0x31 0x30 0x32 0x20 0x20 0x20 0x20 0x20	„102 “ (doorbell number from an D2102 or D2103 in this example, padded with spaces)

TIMESTAMP	0x5A 0x12 0xE4 0x13	1511187475 or readable for humans: Monday, 20. November 2017 14:17:55 UTC

EXAMPLE SOURCE CODE

The following c-code shows the decoding part using libsodium method calls. It uses a few internal structs, methods and macros, but these are self explanatory.

Password stretching:

```
unsigned char* stretchPasswordArgon(const char *password, unsigned char *salt, unsigned* oplimit, unsigned*
memlimit) {
  if (sodium_is_zero(salt, CRYPTO_SALT_BYTES) && random_bytes(salt, CRYPTO_SALT_BYTES)) {
    return NULL;
  }
  unsigned char* key = malloc(CRYPTO_ARGON_OUT_SIZE);
  if (!*oplimit) {
    *oplimit = crypto_pwhash_argon2i_OPSLIMIT_INTERACTIVE;
  }
  if (!*memlimit) {
    *memlimit = crypto_pwhash_MEMLIMIT_MIN;
  }
  if (crypto_pwhash(key, CRYPTO_ARGON_OUT_SIZE, password, str_len(password), salt, *oplimit, *memlimit,
crypto_pwhash_ALG_DEFAULT)) {
    LOGGING("Argon2 Failed");
    *oplimit = 0;
    *memlimit = 0;
    CLEAN(key);
    return NULL;
  }
  return key;
}
```

Decryption:

```
NotifyBroadcastCiphertext decryptBroadcastNotification(const NotifyBroadcast* notification, const
StretchedPassword* password) {
  NotifyBroadcastCiphertext decrypted = {{0},{0},0};
  if(crypto_aead_chacha20poly1305_decrypt((unsigned char*)&decrypted, NULL, NULL, notification->ciphertext,
sizeof(notification->ciphertext), NULL, 0, notification->nonce, password->key)!=0){
    LOGGING("crypto_aead_chacha20poly1305_decrypt() failed");
  }
  return decrypted;
}
```

RTSP INTERFACE DESCRIPTION

LIVE VIDEO REQUEST

Returns a MPEG4 H.264 live video stream with the default resolution and compression as defined in the system configuration. Uses RTSP on 554 and the RTSP-over-HTTP protocol on port 8557 of DoorBird and BirdGuard devices. An average of up to 12 fps can be provided using this third-party API, depending on the network speed and load factor of the device. Requires standard RTSP authentication (no parameter authentication supported as we support for HTTP).

When the request is correct, but the requesting user has no permission to view the live stream at the moment, the request is answered with a return code 204. This usually happens for users without “watch-always” permission when there was no ring event in the past 5 minutes.

Please note, that the RTSP connection can get interrupted at any time, when the official DoorBird App requests the stream. It has precedence over users of the LAN-API.

Method: GET

Required permission: valid user, “watch always” or ring event in the past 5 minutes for the requesting user

Syntax:

```
rtsp://<device-ip>:<device-rtsp-port>/mpeg/media.amp
```

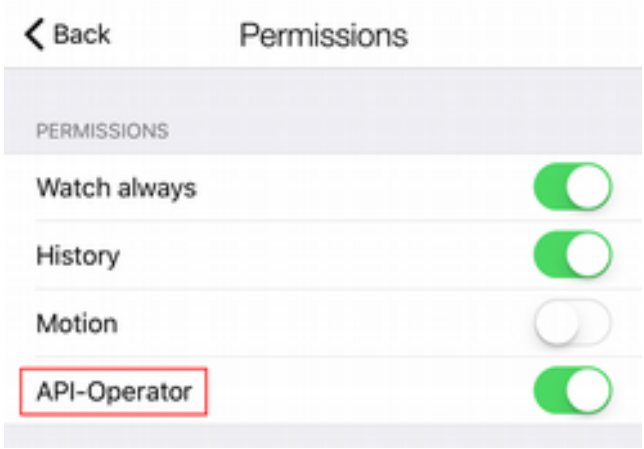
Example Request:

```
rtsp://<device-ip>:8557/mpeg/media.amp
rtsp://<device-ip>/mpeg/media.amp
```

Session Initiated Protocol (SIP)

SIP
This method is to configure and use the SIP service which is built into the device. The SIP service is in early stage of development, please note the following:

- The SIP registration will be stored permanently in the device. Every hardware restart will force the SIP service to restart / register again
- You must use a username/password combination with the “API operator” permission (DoorBird App → Administration → User → Edit → Permissions). This makes sure that no other user (a non SIP relevant user) can modify the SIP settings.



- Each SIP call terminates 180 seconds after it was initiated, for security reason (auto-hangup).
- The SIP service will not initiate the call automatically when someone pushes the doorbell button, you have to listen to the notifications of the device (see document: LAN API) and initiate the call with the "makecall" action of "sip.cgi"
- The device supports only one simultaneous SIP call
- If DTMF Support is enabled the telephone (recipient of the SIP call) can trigger the door open relay by pressing the pincode for relay.
- Making / establishing the call takes sometimes a few seconds, the SIP handshake needs some synchronization, this is comparable to a standard SIP softphone or hardphone.
- We do a lot of debugging. If something is not working, please wait 5-7 seconds. If this doesn’t solve the issue, please restart the device and let us know what environment you are using (network, SIP Proxy, calling device etc.)
- Don’t penetrate the device with many concurrent SIP requests, please wait min 3 seconds between each SIP request
- Please note that you need an Acoustic Echo Canceller (AEC) on the client-side as well as an Acoustic Noise Canceller (ANC). This ensures high quality

audio calls
- The device will close any ongoing SIP connection, if there is an listen/talk request from the official DoorBird App.
- From device version 000099 on, peer-2-peer (P2P) SIP calls are supported. After enabling the SIP functionality with “enable=1”, the device is ready to receive SIP calls on port 5060. To issue outgoing calls from the device, call “action=makecall” or configure automatic calls on ring events using parameter “autocall_doorbell_url”.

SIP Registration

Register to a SIP Proxy. This is not necessary, if you are using peer-2-peer calls.

Method: GET
Required permission: valid user, “API operator” permission

Syntax:

```
http://<device-ip>/bha-api/sip.cgi?
action=registration&user=<user>&password=<password>&url=<url>
```

<parameter>=<value>	Description
user=<String>	Authentication user for the SIP Proxy
password=<String>	Authentication password for the SIP Proxy
url=<String>	IP/Hostname of the SIP Proxy

Example "registration" Request:

```
http://<deviceip>/bha-api/sip.cgi?
action=registration&user=foo&password=bar&url=192.168.123.22
```

Returns:

- 200 if everything is okay.
- 401 on authentication failure (user name/password from Basic Authentication wrong or no “API operator” permission)

SIP Make Call

Manually initiate the SIP call. This can either be an peer-2-peer call or a “normal” SIP call using the configured PBX / SIP proxy.

Method: GET
Required permission: valid user, “API operator” permission

Syntax:

```
http://<device-ip>/bha-api/sip.cgi?action=makecall&url=<url>
```

<parameter>=<value>	Description
url=<String>	SIP URL to call

Example "makecall" Request:

```
http://<deviceip>/bha-api/sip.cgi?
action=makecall&url=sip:108@192.168.123.22
```

Returns:

- 200 if everything is ok
- 400 if there is something wrong, e.g. parameter missing
- 401 on authentication failure (user name/password from Basic Authentication wrong or no “API operator” permission)
- 503 if the call does not work, e.g. line busy

SIP Hangup

Hangup the SIP call. If there is currently no ongoing call, this CGI returns “200 OK” too.

Method: GET

Syntax:

```
http://<device-ip>/bha-api/sip.cgi?action=hangup
```

Returns:

- 200 if everything is ok
- 401 on authentication failure (user name/password from Basic Authentication wrong or no “API operator” permission)

SIP Settings (CGI)

Configure several SIP related settings.

Important note on the `autocall_doorbell_url` setting: this feature is deprecated here and will be removed in the future. It got replaced by schedule.cgi (together with favorites.cgi), because of the possibility to use schedules (e.g. call a different number at night). Currently all changes to autocall_doorbell_url get migrated into appropriate favorite and schedule entries in order to stay compatible with existing 3rd party drivers.

Method: GET
Required permission: valid user, “API operator” permission

Syntax:

```
http://<device-ip>/bha-api/sip.cgi?action=settings&<parameter>=<value>
```

<parameter>=<value>	Values	Description
enable=<Integer>	0..1	Enable or disable SIP registration after reboot of the device, default: 0
mic_volume=<Integer>	1..100	Set the microphone volume, default: 33
spk_volume=<Integer>	1..100	Set the speaker volume, default: 70
dtmf=<Integer>	0..1	Enable or disable DTMF support, default: 0

autocall_doorbell_url=<String>	URL or "none"	**DEPRECATED: use schedule.cgi** SIP URL to automatically call upon doorbell event. By the second doorbell event hangs the previous call. Set to "none" to disable this automatic call. Default: "none"
relay1_passcode=<Integer>	0..99999999	Pincode for triggering the door open relay
incoming_call_enable=<Int>	0..1	Enable or disable incoming calls, default:0
incoming_call_user=<String>	SIP user	Allowed SIP user which will be authenticated for DoorBird. E.g. “sip:10.0.0.1:5060“ or “sip:user@10.0.0.2:5060“.
anc=<Integer>	0..1	Enable or disable acoustic noise cancellation, default: 1

Example "settings" Request:

```
http://<deviceip>/bha-api/sip.cgi?
action=settings&autocall_doorbell_url=sip:108@192.168.123.22
```

Returns:

- 200 if everything is okay
- 401 on authentication failure (user name/password from Basic Authentication wrong or no “API operator” permission)

SIP Status

You can query the current SIP status by calling the following URL.

Method: GET
Required permission: valid user, “API operator” permission

Syntax:

```
http://<device-ip>/bha-api/sip.cgi?action=status
```

Returns:

- JSON, where ‘"LASTERRORCODE": "200"’ means that the SIP client is successfully registered. The attribute LASTERRORCODE contains the most recent SIP status code and "LASTERRORTEXT" the most recent SIP error text.
- 200 if everything is okay
- 401 on authentication failure (user name/password from Basic Authentication wrong or no “API operator” permission)

SIP Settings Reset

Resets all SIP related settings except the license, e. g. SIP proxy settings (action=registration) and SIP settings (action=settings). Hangs up any ongoing call.

Method: GET
Required permission: valid user, “API operator” permission

Syntax:

```
http://<device-ip>/bha-api/sip.cgi?action=reset
```

Returns:

- JSON, where ‘LASTERRORCODE": "200"’ means that the SIP client is successfully registered. The LASTERRORCODE returns the most recent SIP status code and “LASTERRORTEXT” the most recent SIP error text.
- 200 if everything is okay
- 401 on authentication failure (user name/password from Basic Authentication wrong or no “API operator” permission)

SIP Settings (DoorBird App)

The DoorBird App supports setting SIP properties directly at the Administration section. Log into your DoorBird with the Administration credentials (e.g. QR code), scroll down to “Expert Settings” where you can find the “SIP Settings”.

Example SIP settings at the DoorBird App: