HDANYWHERE

Seamless **Entertainment** Discreet **Technology**

API Changelog

Version	Notes
1.00	First Release.
1.01 (05/04/18)	Addition of Device Type to response /api/data/201/[x]
1.02 (13/04/18)	Amendment of API glossary with revised descriptions of video input, video output, audio input & audio output. Addition of identify API.
1.03 (18/04/18)	Addition of first boot status to /api/data/100
1.04 (23/04/18)	Addition of Zone switching, volume and mute API's
1.05 (30/04/18)	Addition of example responses added, addition data added to responses for /data/100 & /data/101
1.06 (24/07/18)	IR port ID and addressing table for MHUB systems pg. 40
1.07 (01/11/18)	Updated Supported systems table with hostname entry and official name
1.08 (11/12/18)	Added IR port assignment in /data/100 & 101 and added JSON to /irpass/ as body requirement
1.09 (30/01/19)	Changed supported IR data formats, added data/203
1.10 (30/05/19)	ARC, CEC APIs added
1.11 (18/07/19)	Updated responses, added boolean type.
1.12 (24/02/20)	Updated data/100, data/200, data/200/x/, data/203, data/203/x/. Added data/204, control/fixaudio/ and command/rs232pass

API Prologue

Protocol(s)	REST/HTTP/OAuth 2.0
Output	XML/JSON
API Language	English (UK)
Current API Version	2.1 (Contact HDA for older versions)
MHUB-OS Version	8.20+
MHUB-OS FW Version	2.0+
Scope	HDA Cloud (Internet) & MHUB (LAN)

Overview

The HDANYWHERE (HDA) API has been developed to encourage developers to write their own applications for HDA systems. The API seeks to address the following objectives:

1. To reduce the amount of time required to write control and monitoring applications
2. To create a universal API spanning the entire HDA product range (see supported device list)
3. To increase interoperability between HDA systems
4. To grant third-party developers access to advanced IO feature-set

API Basics

Built using REST

The HDA API is built using REST principles and defines a set of functions which developers can use to control MHUB (or any HDA device), access its IO, or report back data. This interaction is performed via the HTTP protocol. Using HTTP and REST means that applications can be made for using any programming language.

Common characteristics

- You access functions or resources by sending a HTTP request to the MHUB API server. The server replies with a response that contains either the data you requested, or the status indicator, or even both.
- All functions or resources are located from the base URL at http://devicehost/api/
- Any call to the API server will return standard HTTP response codes.

HTTP verbs

HTTP verbs are used to manage the state of resources, these are: GET and POST. PUT, and DELETE are not supported.

Naming convention

All interaction between your application and a HDA device is conducted in `lowercase`. Ensure that you do not confuse physical port labelling on the device which appears in uppercase (A, B, C etc) with their programmatic addressable equivalents. For example, to send an API command to MHUB PRO (8x8) output port ***labelled "F"*** you would instruct your application to replace the cap "F" with a lowercase "f".

Type	Standard (if applicable)	Example
ID	lowerCamelCase	inputAudio1
Labels/Array names	lowercase_seperated_with_underscore	start_id
Boolean	n/a	**boolean**
MHUB inputs	n/a	1,2,3,4...
MHUB outputs	n/a	a,b,c,d...
Arrays	n/a	**bold**

Finding MHUB in your network

MHUB systems use multicast DNS (mDNS) to identify themselves on a network to a client. You can find the full mDNS protocol here RFC 6762.

HDANYWHERE products are announced under 2 services. Depending on the year of release it is either *"_http._tcp"* or *"_hda._tcp".* This is described in detail in the section Supported MHUB systems.

To find MHUB on the network you will need to use DNS Service Discovery (DNS-SD) as supported by your operating system. The client will need to make a DNS-SD query to (244.0.0.251) and await a response. HDA recommends that you use the appropriate API on the client device to achieve this. For example, if you are using iOS then you can use the Bonjour API library. If you are using Windows or Linux then the Avahi API is applicable.

Please refer to the Reference Material section for a full list of DNS-SD responses.

Example DNS-SD query / response

If you are searching for MHUB PRO (4x4) 70 (2016) and your MHUB is on the latest version of MHUB-OS and Firmware then your response will match the following:

```
Hostname = [MHUB4K44PRO.local]
Address = [IP Address]
Port = [80]
Txt = ["MHUB PRO (4x4) 70"]
```

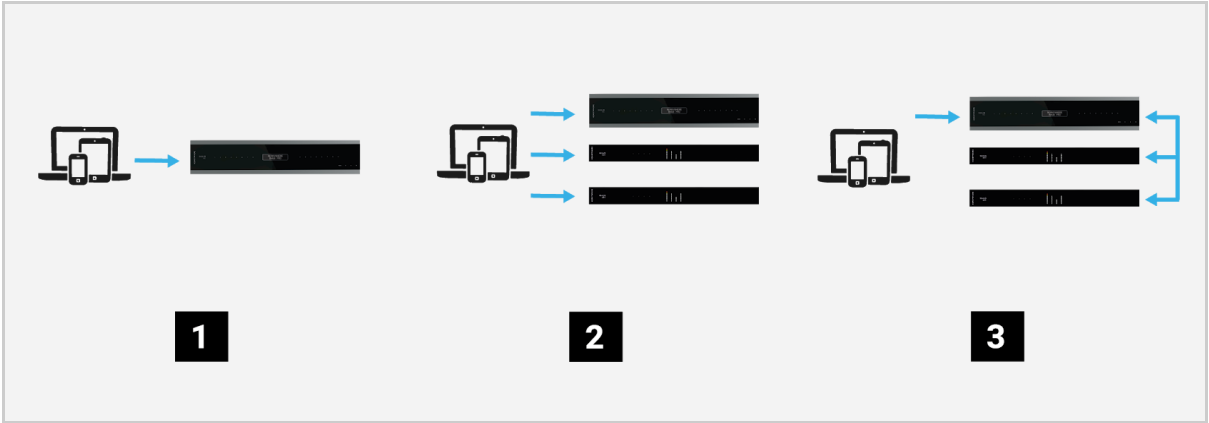
Supported Systems

Official Name	Service	API	Device Type	Release	SKU	Hostname
MHUB U						
MHUB (4x3+1)	_http._tcp	2.0	Video Matrix	2018	1.05.904.012.1	MHUB431U
MHUB (8x6+2)	_http._tcp	2.0	Video Matrix	2018	1.05.904.013.1	MHUB862U
MHUB U (4x1+1)	_hda._tcp	2.1	Video Matrix	2020	1.05.904.023.1	MHUBU41140
MHUB U (4x3+1)	_hda._tcp	2.1	Video Matrix	2019	1.05.904.012.2	MHUBU43140
MHUB U (8x6+2)	_hda._tcp	2.1	Video Matrix	2019	1.05.904.013.2	MHUBU86240
MHUB PRO						
MHUB PRO (4x4) 40	_http._tcp	2.0	Video Matrix	2017	1.05.904.014.1	MHUBPRO4440
MHUB PRO (4x4) 70	_http._tcp	2.0	Video Matrix	2016	1.05.904.008.2	MHUB4K44PRO
MHUB PRO (8x8) 40	_http._tcp	2.0	Video Matrix	2017	1.05.904.015.1	MHUBPRO8840
MHUB PRO (8x8) 70	_http._tcp	2.0	Video Matrix	2016	1.05.904.009.2	MHUB4K88PRO
MHUB PRO 2.0						
MHUB PRO 2.0 (4x4) 40	_hda._tcp	2.1	Hybrid Matrix	2019	1.05.904.021.1	MHUBPRO24440
MHUB PRO 2.0 (8x8) 100	_hda._tcp	2.1	Hybrid Matrix	2019	1.05.904.022.1	MHUBPRO288100
MHUB MAX						
MHUB MAX (4x4)	_http._tcp	2.0	Video Matrix	2017	1.05.904.011.1	MHUBMAX44
MHUB AUDIO						
MHUB AUDIO (6x4)	_http._tcp	2.0	Audio Matrix	2018	1.05.912.001.1	MHUBAUDIO64
ZONE PROCESSOR						
UCONTROL ZONE PROCESSOR 5	_hda._tcp	2.1	Control Processor	2020	1.80.904.002.1	ZP5
UCONTROL ZONE PROCESSOR 1	_hda._tcp	2.1	Control Processor	2020	1.80.904.001.1	ZP1

Table: Supported Systems

Working with multiple MHUB systems

MHUB systems can be stacked up to a maximum of 4 times. Stacks can be created using only Audio Matrix devices (See Table: *Supported MHUB Systems*) or a combination of Audio Matrices and a single Video Matrix. Stacking of multiple Video Matrix systems is not supported using method #3 below however it can be achieved if you opt to communicate with MHUB using method #2.



1. **Standalone**
   Your control application communicates directly with a single MHUB system.

2. **Manual**
   Using the same principles as method #1 each MHUB is treated as a separate device. Some MHUB features such as Sequences and uControl (which takes advantage of both Video and Audio operations) will not work as inter-communication between MHUB devices is not supported. With this method, your control application will need to manage routing logic to ensure that video or audio or a combination of both is kept in sync throughout the system.

3. **MHUB-OS Stack**
   This method requires prior configuration using HDA's uControl app before it can be enabled. MHUB-OS Stack method will take I/O data from all MHUBs in the stacked arrangement and report back to your application as a single large Audio Matrix or Audio/Video Matrix system. In MHUB-OS Stack each MHUB will be assigned with a rank (Master or Slave) and your application will communicate only with the Master device. MHUB-OS will function as if it was one large Matrix meaning that uControl, Sequences, Voice control, and HDA Cloud operations are supported throughout the entire system scope.

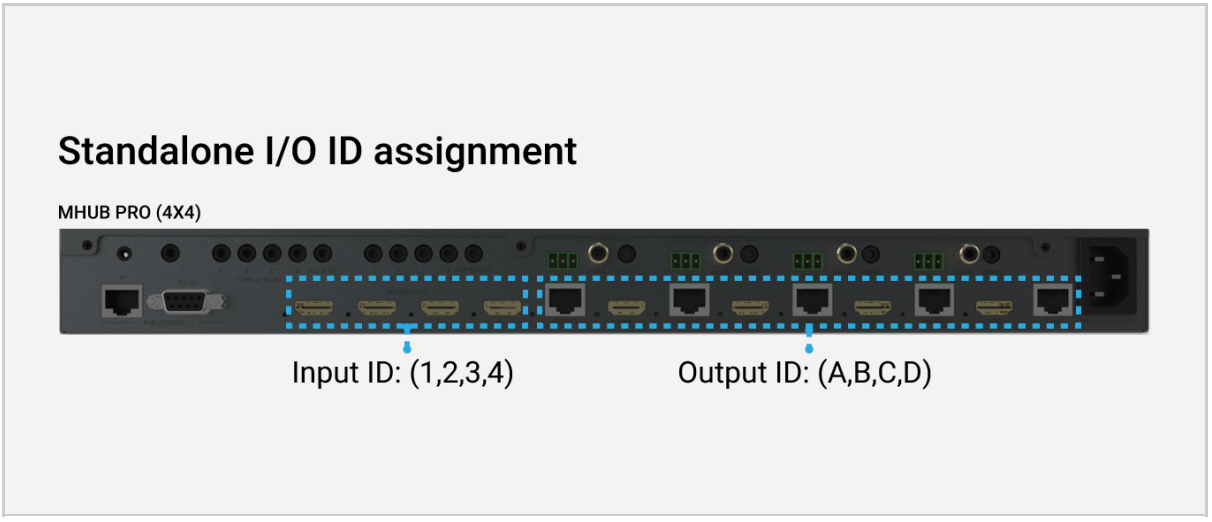
How **MHUB Works**

The basic principles of a matrix

Video and Audio Matrices are capable of routing various types of digital or analogue AV inputs (Apple TV, XBOX One, Sky, TiVo, SONOS etc) to any compatible output (like a TV, projector or speaker) or to multiple outputs simultaneously. HDA is a manufacturer of these devices which it calls MHUB.

Inputs and outputs

All MHUB systems share a common characteristic of having a collection of input ports (referenced using numbers: 1, 2, 3, 4 etc) and a collection of output ports or end-points (referenced using letters: A, B, C, D etc). To illustrate this; the MHUB PRO (4x4) has 4 inputs and 4 outputs and the MHUB (8x6+2) has 8 inputs and 8 outputs in total “6+2”. Signals from an Input can be routed to any Output or combination of Outputs and this switch and split ability is what is defined as a matrix.



Infrared (IR) ports

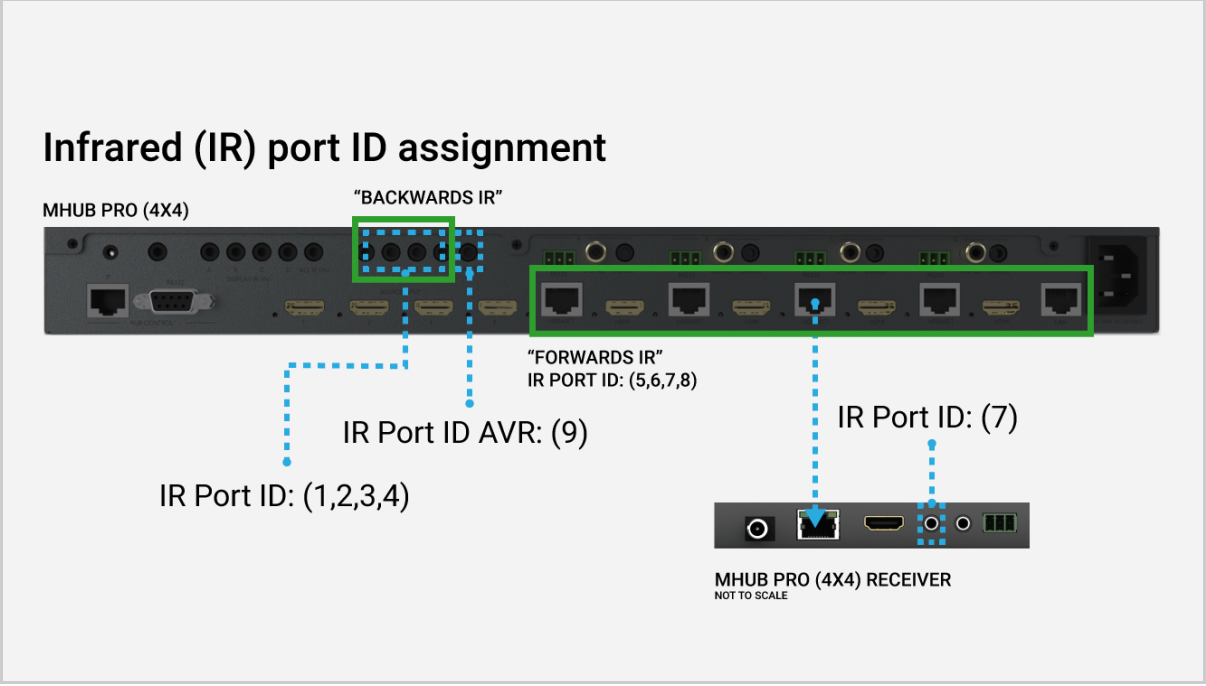
MHUB systems with IR ports can be used to transmit IR commands by directly by sending Pronto IR data to the addressable port ID on MHUB.

Important:
The ID format for IR ports do not follow the same assignment rules for video or audio input/output ports. Instead, IR ports are all referenced using numbers which start from number 1 and increment depending on the number of IR ports declared by MHUB.

MHUB will distinguish within the API whether a collection of IR ports are located on the main chassis of MHUB (Backwards) or if they are found on one of its display receivers (Forwards). If you are using a HDA Zone Processor then this will be identified as a (Remote) IR port.

For example, the MHUB PRO (4x4) in the diagram below has 4 input ports (referenced using numbers: 1, 2, 3, 4 etc) and 4 output ports (referenced using letters: A, B, C, D etc). If you wanted to send an IR command to the output port labelled “D” then you would send it to IR Port ID = 8.

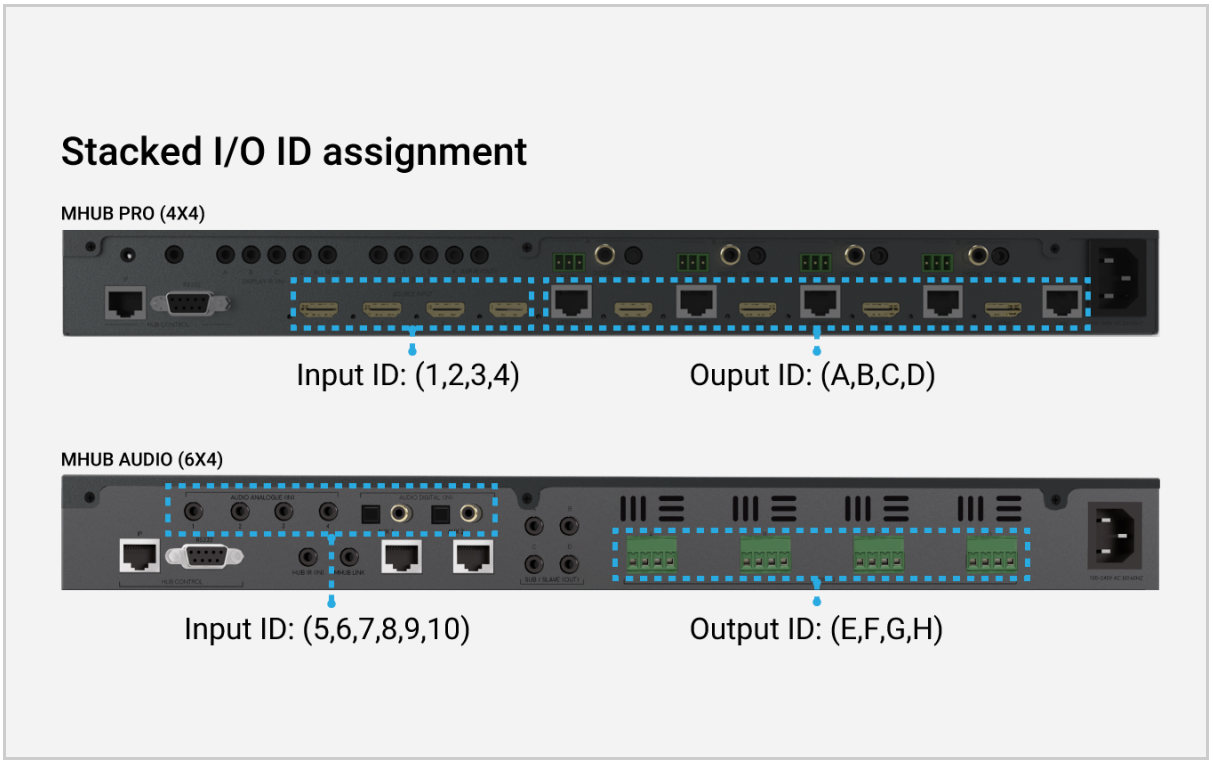
Additionally, AVR ports are declared as separate entities but follow the same numbering rule as above. The AVR port ID will always be ++1 after the final forwards ID port. In the diagram below you will see that the AVR port is marked ID = 9.



Stacking MHUB

It is possible to stack more than one MHUB system together. If you enable MHUB's stacked mode then MHUB-OS will calculate the total number of inputs and outputs and assign addressable references to each of them. For example, if you stacked an MHUB PRO (4x4) with an MHUB AUDIO (6x4) then you would be able to reference each port as one large MHUB system as follows:

- **Inputs = 10**
  MHUB PRO (**4**x4) - Referenced: (1,2,3,4)
  MHUB AUDIO (**6**x4) - Referenced: (5,6,7,8,9,10)
- **Outputs = 8**
  MHUB PRO (4x**4**) - Referenced: a,b,c,d
  MHUB AUDIO (6x**4**) - Referenced: e,f,g,h

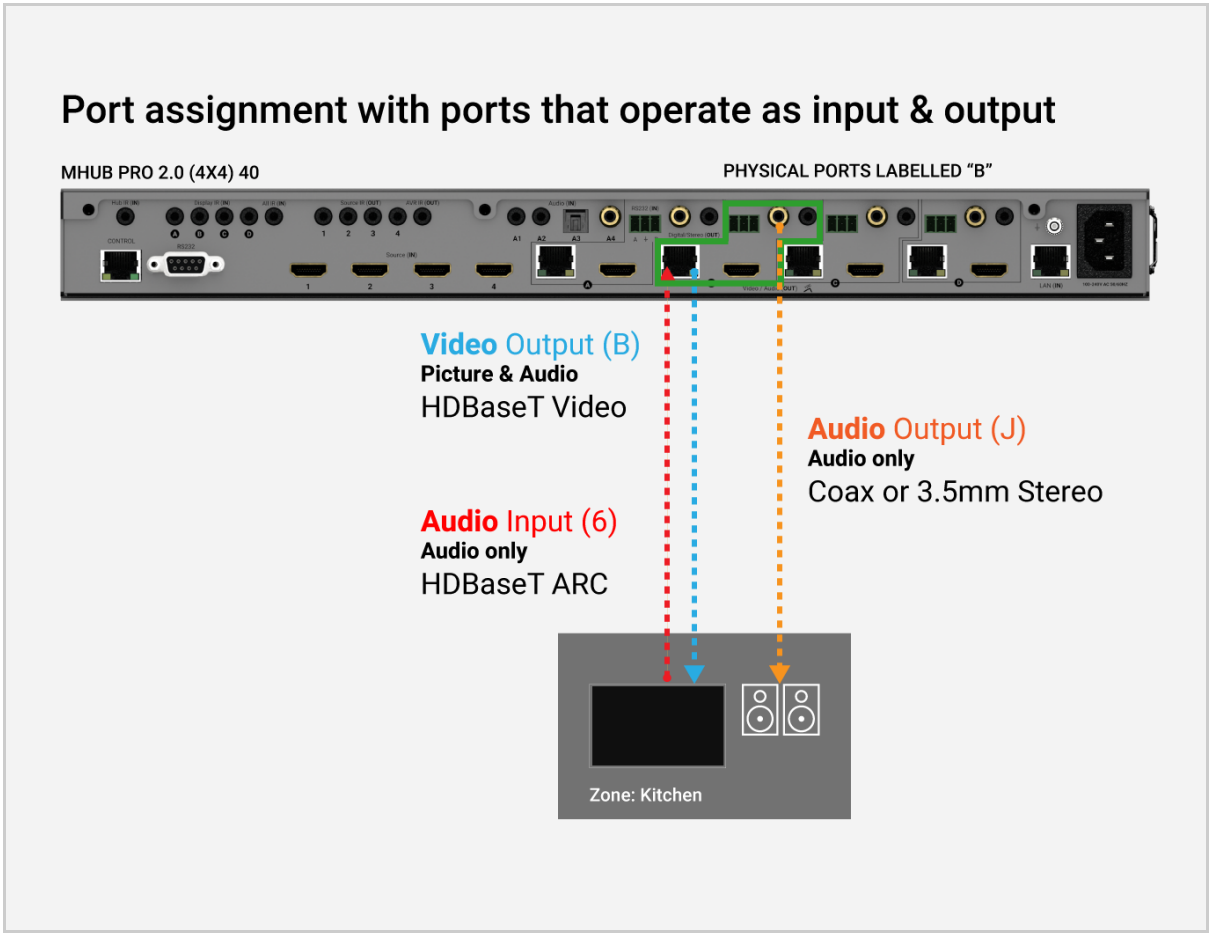


Inputs and outputs on hybrid systems

Hybrid MHUB systems like MHUB PRO 2.0 contain features like Audio Return Channel (ARC) which allows a video output (video: picture + audio) to act as an audio input also. Referring to physical port labelling on the device itself will not assist you in helping identify the port ID.

Instead, port assignment and function follows the same nomenclature and method outlined in section “Stacking MHUB”. Consequently, there will be more IDs reported in API feedback than there are physical ports on the device itself.

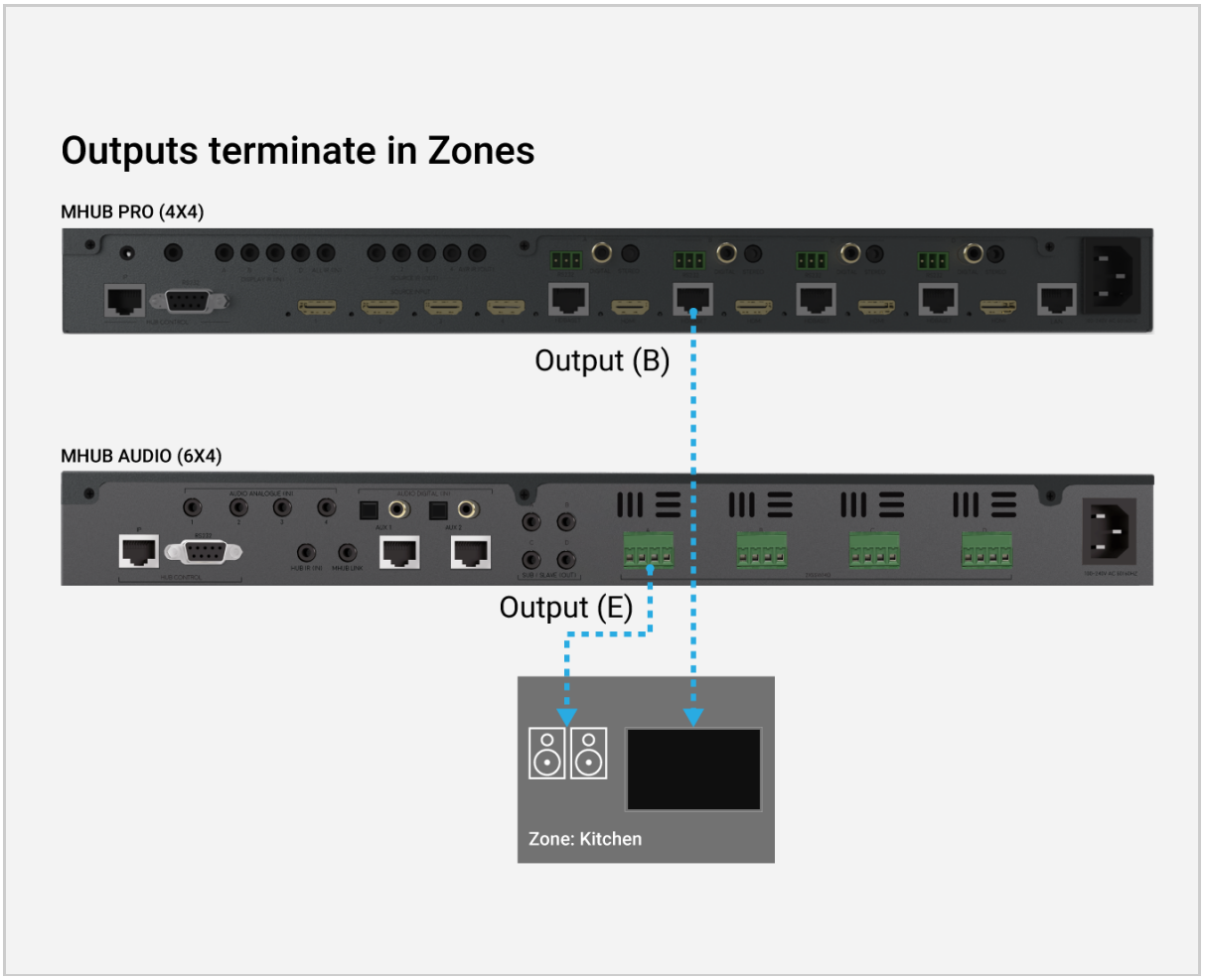
To illustrate this, in the diagram below, there is a MHUB PRO 2.0 (4x4) 40 system setup with a zone called “Kitchen”. Inside that zone, there are outputs or end-points which remain referenced with letters (B). Assigning output B to Kitchen will gain command over the display and content routed to it. However, if that display is also ARC enabled, then MHUB can pull the audio from the display. This is treated as an input, so is indexed by numbers and is specifically referenced by ID (6). In this scenario it is possible to route, for example, a blu-ray (input 1) to output B - this will show the blu-ray on the kitchen display. If that display is ARC enabled then a further instruction can be sent to MHUB, this time to pull the audio as an input into MHUB and routed to the kitchen speakers, output J. From a user point of view all these instructions are happening in the kitchen (output B) but programmatically, each input or output needs to be uniquely identifiable.



Zones

Zones are virtual constructs which define a physical space for MHUB end-points to terminate.

A Zone can include a maximum of 1 video matrix output and a maximum of 4 audio matrix outputs. For example, you can create a zone called “Kitchen” and assign 1 video and 1 audio output to it. A Zone must contain at least 1 output from an MHUB for it to be addressable for control. Note: outputs can not be shared or split to more than 1 Zone.



Zone quantity is defined by calculating the sum-total of all referenceable outputs on an MHUB system, standalone or stacked. Using the MHUB PRO (4x4) and MHUB AUDIO (6x4) example would indicate that that system can support a maximum of 8 zones.

Control

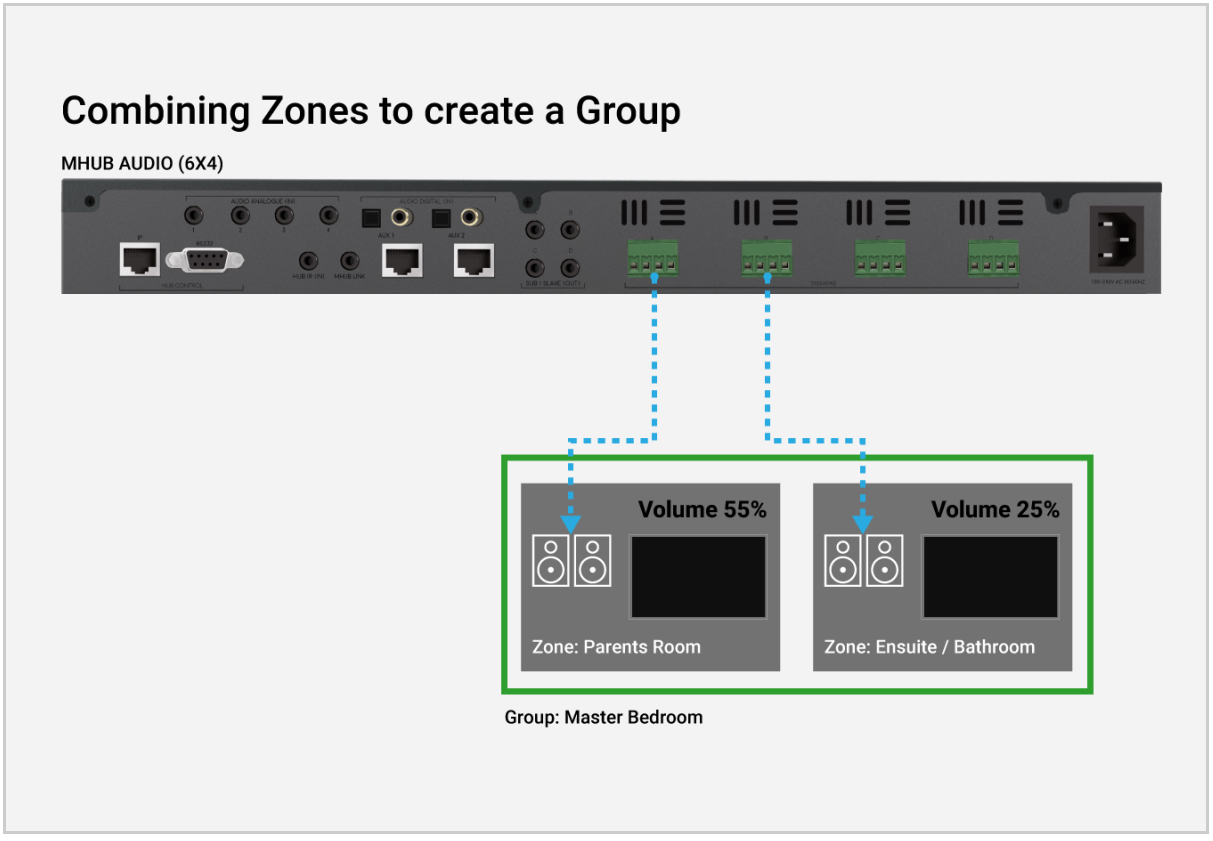
MHUB system control is achieved by giving your application a *Zone focus.* For most control API commands you will need the end user to identify which Zone they want to control before MHUB can respond correctly.

Grouping

Zones which contain outputs from MHUB AUDIO systems can be grouped together allowing for audio adjustment over one or more Zones. Operations such as volume adjustment and muting can be applied by sending a single group API rather than targeting individual Zones.

Groups can support a maximum of 4 Zones. Grouped volume is reported by taking the average volume value in each Zone and adjusting this value will change the volume state uniformly in each Zone. Using the example in *Combining Zones to create a Group* you can see that Zones “Parents Room” and “Ensuite / Bathroom” are currently reporting volume states of 55% and 25% respectively. MHUB will average this value and report to your application that the Group volume is 40%. Adjusting the Group volume by incrementing the value +10 will set the Group volume at 50% and the Zones “Parents Room” and “Ensuite / Bathroom” become 65% and 35%.

If a Zone belongs to a Group it is still possible to change the individual Zone audio state. To do this you would instruct your application to target the Zone directly via the appropriate API.



API **Resources**

API breakdown

Control and reporting functions can be arranged into the following categories:

- **Critical**
  Universally supported control functions for HDA systems to perform basic critical operations such as turning devices on/off or rebooting video/audio/OS processors.
- **Data**
  A collection of resources designed to feedback the operational state of devices or to obtain configurational data so that you may control it.
- **Operation**
  General control functions and resources for everyday use and operation. These include operations like switching inputs, adjusting volume or executing Sequences.
- **IO**
  Use these resources to create advanced applications using device IO to control 3rd party hardware are connected to a HDA system.

API response format / request structure

All functions or resources are located from the base URL at: http://devicehost/api/. Every API call will respond with a standardised header which details the current API version and whether any error was logged during execution.

API response format

All APIs will always start with a header:

```
"header": {
       "version": "2.1"
}
```

Followed by:

```
"data": {
        [API RESPONSE]
}
```

Example - to query if MHUB is on or off:

Some attributes within this document are highlighted in **bold.** Their definitions can be found in the Reference Material section at the end of this document. Data arrays are indicated in **bold.** Boolean responses are in **Green.**

```
{
    "header": {
        "version": "2.1"
    },
    "data": {
        "power": true
    }
}
```

Example - Error response

```
{
    "header": {
        "version": "2.1"
    },
    "error": {
        "code": "1"
    }
}
```

Quick steps for Standalone connection to any MHUB system.

The following example shows which API's need to be called to configure a standalone device. We are going to assume the first boot process has been completed. For this example we will use a MHUB PRO 2.0 (4x4) 40.

- A DNS scan is run on the network. The following MHUB hardware is discovered:

    - `Hostname = [MHUBPRO24440.local]`
    - `Address = [192.168.1.1]`
    - `Port = [80]`
    - `Txt = ["HDANYWHERE MHUB PRO 2.0 (4x4) 40"]`

- Then request */api/data/100*.
  When called this API will return basic system information regarding the MHUB and will detail what input and output ports are available on the system along with their respective port IDs and user defined labels. This response will also inform you if the MHUB has been setup in a stack, or has an accessory device attached to it or is operating in standalone mode.
- You now need to ascertain what port IDs appear where. To do this you need to request */api/data/102*
  This API will respond with all outputs or inputs that terminate or start in a zone along with a user defined zone label.
- Finally, to request the switch or operational state of the MHUB you would request */api/data/200*
  This will provide state information for all zones so that your interface is populated with up-to-date data.

Your application will now hold data for all input and output quantities, their addressable IDs, where they terminate or start, their user defined labels and an up-to-date state value so that your interface can be drawn accurately to represent what is going on inside MHUB.

Critical

/api/reboot/1/
Full reboot / Power Cycle

Performs a full reboot / power cycle of all hardware components within MHUB

This request has a fixed execution time of 30,000ms (30 seconds) to ensure that communication with MHUB is available after reboot is complete. The reboot command is processed as soon as it is received and 30 seconds later the system is automatically brought back online.

GET request:

http://devicehost/api/reboot/1/

Response

```
"data": {
          "Description": "Performing full reboot."
   }
```

/api/reboot/2/
Reboot MHUB-OS

Performs a software reboot of MHUB-OS but maintaining video/audio function active

GET request:

http://devicehost/api/reboot/2/

Response

```
"data": {
          "Description": "Rebooting MOS."
   }
```

/api/power/0/
Standby ON

Put MHUB into a low power (standby) state - turn off

This command is not universally supported on every system. Please refer to the API Appendix for system support.

GET request:

http://devicehost/api/power/0/

Response

```
"data": {
          "power": "Powering off MHUB."
   }
```

/api/power/1/
Standby OFF (Turn On)

Take MHUB out of its low power (standby) state - turn on

GET request:

http://devicehost/api/power/1/

Response

```
"data": {
          "power": "Powering on MHUB."
   }
```

/api/identify/
Identify

Sets Power/front panel LEDs flashing to devices can be identified.

MHUB AUDIO - HDANYWHERE and AUDIO logo flashing so MHUB can be identified
ZP5/ZP1 - Power LED flashes

GET request:

http://devicehost/api/identify/

Response

```
"data": {
           "identify": true
   }
```

Data

/api/data/0/
MHUB Power State

Find out if MHUB is on or off

GET request:

http://devicehost/api/data/0/

True = MHUB is on
False = MHUB is off

Response

```
"data": {
          "Power": boolean
   }
```

/api/data/100/
System Information: Standalone

Request input, output IDs and labels for all I/O ports in a standalone system

Returns basic system information including identifiable data, serial number, IO connectivity, software versions and stack status.

GET request:

http://devicehost/api/data/100/

Response:

```
{
        "data": {
                "io_data": {
                        "input_video": video input,
                        "output_video": video output,
                        "output_video_mirror": video output mirror,
                        "input_audio": audio input,
                        "output_audio": audio output,
                        "output_audio_mirror": audio output mirror},
                "ir": {
                        "backwards": {
                                "draw": boolean,
                                "start_id": "start id",
                                "ports": "ports"},
                        "forwards": {
                                "draw": boolean,
                                "start_id": "start id",
                                "Ports": "ports"},
                        "avr": {
                                "draw": boolean,
                                "start_id": "start id",
                                "Ports": "ports"}},
                "cec": {
                    "output": [{
                       "type": "type"
                       "draw": boolean,
                       "start_id": "start id",
                       "ports": "ports"
                    },
                    {
                       "type": "type"
                       "draw": boolean,
                       "start_id": "start id",
                       "ports": "ports"}],
                    "input": {}
                },
                "rs232": {
                    "output": [{
                       "type": "type",
                       "draw": boolean,
                       "start_id": "start id",
```

```
                                "ports": "ports"
                                },
                                {
                                "type": "type",
                                "draw": boolean,
                                "start_id": "start id",
                                "ports": "ports"
                                }]},
                "mhub": {
                        "first_boot": boolean,
                        "ip_address": "ip address",
                        "mhub_firmware": mhub firmware,
                        "mhub-os_firmware": mhub-os firmware,
                        "mhub-os_version": mhub-os version,
                        "api": api,
                        "mhub_official_name": "mhub official name",
                        "unit_id": "unit id",
                        "mhub_name": "mhub name",
                        "serial_number": "serial number"
                        },
                "stack": {
                        "stack_status": boolean,
                        "stack_rank": "stack rank",
                        "stack_master": stack master
                }
}}}}}
```

If /api/data/101/
System Information: Stacked Mode

Request input, output IDs and labels for all I/O ports in a stacked system

Pairs physical ports on MHUB systems running in stacked mode with their virtual/addressable IDs. This API is only required when running MHUB in MHUB-OS Stacked mode (see page 7).

GET request:

http://devicehost/api/data/101/

Response:

```
"data": {
        "stacked_io": {
                "stack_input_video": stack video input,
                "stack_output_video": stack video output,
                "stack_output_video_mirror": stack video output mirror,
                "stack_input_audio": stack audio input,
                "stack_output_audio": stack audio output,
                "stack_output_audio_mirror": stack audio output mirror
        },
        "mapping": {
                "input": {
                        "unit_id": "unit id",
                        "input_id": "input id"
                },
                "output": {
                        "unit_id": "unit id",
                        "output_id": "output id"
                },
                "split_input": {
                        "inputs": ["zone id", "zone id"],
                        "type": "",
                        "shared": ""
                },
                "stack_unit_info": [{
                        "unit_id": "unit id",
                        "mhub_name": "mhub name",
                        "serial_number": "serial number",
                        "ip_address": "ip address",
                        "stack_rank": "stack rank"
                }]
        }
}
```

/api/data/102/
MHUB Zones

Request output and inputs assigned to zones

Returns information about which MHUB outputs or inputs, such as display ARC, are assigned to each zone.

GET request:

http://devicehost/api/data/102/

Response:

```
{
        "data": [{
                "zone_id": "zone id",
                "zone_label": "zone label",
                "outputs": [{
                        "unit_id": "unit id",
                        "output_id": "output id"
                       "arc_input”: "arc input id"
                }]
}
```

/api/data/103/
MHUB Groups

Request group information

Returns information about which zones are assigned to each group, volume and mute state.

GET request:

http://devicehost/api/data/103/

True = mute is on
False = mute is off

Response:

```
{               "groups": [{
                        "group_id": "group id",
                        "group_label": "group label",
                        "zones": ["zone id", "zone id"],
                        "group_volume": "mhub audio group volume",
                        "group_mute": boolean
                }]
}
```

/api/data/200/
Status - Single system

Requests System state (standalone).

Request current routing, volume and audio states for all zones.
(Please note that volume and mute information will relate to MHUB AUDIO levels only)

GET request:

http://devicehost/api/data/200/

True = mute is on
False = mute is off

Response:

```
{
"data": {
       "zones": [{
              "zone_id": "zone id",
              "state": [{
                     "output_id": "output id",
                     "input_id": "input id",
                     "disp_audio_id": "display audio input id",
                     "volume": "zone audio volume",
                     "mute": boolean,
                     "arc": boolean,
                     "display_power": "display power"
              },
              {
                     "output_id": "output id",
                     "input_id": "input id",
                     "disp_audio_id": "display audio input id",
                     "volume": "zone audio volume",
                     "mute": "boolean",
                     "arc": boolean,
                     "display_power": "display power"
                        }],
                  }]
}
}
```

/api/data/200/[zid]
MHUB Zone Status - Single MHUB

Requests MHUB Zone state (standalone).

Request current routing information for all zones.
(Please note that volume and mute information will relate to MHUB AUDIO levels only)

GET request:

http://devicehost/api/data/200/[zid]

True = mute is enabled
False = mute is disabled

Arguments:

[zid] = zone id (*z1, z2, z3…*)

Response:

```
"data": {
       "zone": {
              "zone_id": "zone id",
              "video_input": "input id",
              "audio_input": "audio input id",
              "disp_audio_id": "display audio input id"
              "volume": zone audio volume,
              "mute": boolean,
              "arc": boolean,
              "display_power": "display power"
       }}
```

/api/data/201/
MHUB uControl Pack summary

MHUB ports with uControl Packs installed

Request which MHUB IO ports have uControl device control packs installed.

GET request:

http://devicehost/api/data/201/

True = IR pack installed
False = IR pack not installed

Response:

```
"data": {
                "unit_id": "V1",
                "input": [{
                        "id": "1",
                        "irpack": boolean
                },
                {
                        "id": "2",
                        "irpack": boolean
                },
                {
                        "id": "3",
                        "irpack": boolean
                },
                {
                        "id": "4",
                        "irpack": boolean
                }],
                "output": [{
                        "id": "a",boolean
                },
                {
                        "id": "b",
                        "irpack": boolean
                },
                {
                        "id": "c",
                        "irpack": boolean
                },
                {
                        "id": "d",
                        "irpack": boolean
                }],
                "avr": boolean
        }
```

/api/data/201/[x]
uControl

Request uControl button ID and labels

Returns extended information on a specified uControl device control pack.

GET request:

http://devicehost/api/data/201/[x]

Arguments:

[x] = IR port

Response:

```
"data": {
        "name": "ucontrol pack name",
        "type": "ucontrol device type",
        "version": "ucontrol pack version",
        "irpack_id": "ucontrol pack id",
        "ucontrol_pack_method": "ucontrol pack method",
        "ir_pack": [{
                "repeat": boolean,
                "command_id": "command id",
                "label": "label"
                    }
        }]
}
```

/api/data/202/
Sequences

Request Sequence data

Returns basic information on sequences currently stored in the MHUB.

GET request:

http://devicehost/api/data/202/

Response:

```
"data": {
       "sequences": sequence data
}
```

/api/data/203/
MHUB Status - Stacked MHUB

Requests MHUB state (stacked).

Request current routing information for all zones in a stacked MHUB setup.
(Please note that volume and mute information will relate to MHUB AUDIO levels only)

GET request:

http://devicehost/api/data/203/

True = mute is on
False = mute is off

Response:

```
{
"data": {
        "zones": [{
                "zone_id": "zone id",
                "state": [{
                        "output_id": "output id",
                        "input_id": "input id",
                        "volume": "zone audio volume",
                        "mute": boolean,
                        "arc": boolean,
                        "display_power": "display power"

                },
                {
                        "output_id": "output id",
                        "input_id": "input id",
                        "volume": "zone audio volume",
                        "mute": boolean,
                        "arc": boolean
                        "display_power": "display power"
}],

        }]
}
}
```

/api/data/203/[zid]
MHUB Zone Status - Stacked MHUB

Requests MHUB Zone state (standalone).

Request current routing information for all zones.
(Please note that volume and mute information will relate to MHUB AUDIO levels only)

GET request:

http://devicehost/api/data/203/[zid]

True = mute is on
False = mute is off

Arguments:

[zid] = zone id (*z1, z2, z3…*)

Response:

```
"data": {
       "zone": {
              "zone_id": "zone id",
              "video_input": "input id",
              "audio_input": "audio input id",
              "volume": zone audio volume,
              "mute": boolean,
              "arc": boolean,
              "display_power": "display power"
       }}
```

Operation

/api/control/switch/
Switching

Perform source switch

Switch the input source for any output on MHUB.

GET request:

http://devicehost/api/control/switch/[ox]/[iy]/

Arguments:
[ox] = output (*a,b,c…..*)
[iy] = input (*1,2,3…..*)

Response:

```
"data": {
        "output_id": "output id",
        "input_id": input id
}
```

/api/control/switch/zone/
Zone Switching (MHUB AUDIO only)

Perform source switch (MHUB AUDIO only)

Switch the audio input source for any zone with MHUB AUDIO outputs. This is possible with MHUB AUDIO only as that device supports the inclusion of multiple outputs in a single zone.

GET request:

http://devicehost/api/control/switch/zone/[zid]/[iy]/

Arguments:
[zid] = zone id (*z1, z2, z3…..*)
[iy] = input (*1,2,3…..*)

Response:

```
"data": {
        "zone_id": "zone id",
        "input_id": input id
}
```

/api/control/fixaudio/
Source audio extraction

Disables audio matrixing and fixes source audio to predefined audio outputs

Pairs the source audio with the audio outputs. Source 1 output via Audio output A, Source 2 output via Audio output B.

GET request:

http://devicehost/api/control/fixaudio/[ax]/

Arguments:
[ax] = true (*enable audiomatch*)
false (*disable audiomatch*)

Response:

```
"data": {
       audiomatch": "true" or "false"
}
```

/api/control/volume/
Set Output Volume

Set volume

Change the volume for any given output on MHUB.

GET request:

http://devicehost/api/control/volume/[ox]/[vy]/

Arguments:

[ox] = output (*a,b,c…..*)
[iy] = volume (*1-100*)

Response:

```
"data": {
        "output_id": "output id",
        "volume": "output audio volume"
}
```

/api/control/volume/zone/
Set Zone Volume (MHUB AUDIO only)

Set Zone Volume (AUDIO only)

Change the volume for any given zone with MHUB AUDIO outputs.

GET request:

http://devicehost/api/control/volume/zone/[zid]/[x]

[zid] = zone (*z1, z2, z3 ….*)
[x] = Volume (*0-100*)

Response:

```
"data": {
                "zone_id": "zone id",
                "volume": zone audio volume,
}
```

/api/control/arc/
Audio Return Channel (ARC)

Audio Return Channel (ARC)

ARC can only be routed to MHUB if the mode is enabled - before - the input is switched to. This is to avoid the display's internal speaker from delivering no audio when ARC is not needed.

GET request:

http://devicehost/api/control/arc/[ox]/[ty]/[ax]/

True = ARC is enabled
False = ARC is disabled

Arguments:

[ox] = output *(a,b,c)*
[ty] = type (0-HDMI, 1-HDBaseT)
[ax] = ARC state (*true=ARC On , false=ARC Off (audio)*)

Response:

```
"data": {
        "output_id": "output id"
        "type": "type",
        "arc": boolean
}
```

/api/control/mute/
Mute

Mute

Mute the audio for any given output on MHUB.

GET request:

http://devicehost/api/control/mute/[ox]/[mx]/

True = mute is enabled
False = mute is disabled

Arguments:

[ox] = output *(a,b,c…..)*

Response:

```
"data": {
        "output_id": "output id",
        "mute": boolean
}
```

/api/control/mute/zone/
Mute Zone (MHUB AUDIO only)

Mute Zone (MHUB AUDIO only)

Mute the audio for any given zone with MHUB AUDIO outputs.

GET request:

http://devicehost/api/control/mute/zone/[zid]/[mx]/

True = mute is enabled
False = mute is disabled

Arguments:

[zid] = zone *(z1, z2 ,z3…..)*

Response:

```
"data": {
        "zone_id": "zone id",
        "mute": boolean
}
```

/api/control/group/create/
Creating a Group

Create a group

Group a maximum of four zones together for shared volume control.

GET request:

http://devicehost/api/control/group/create/[groupLabel]/

Arguments:

[groupLabel] = label for group (string)

Response:

```
"data": {
        "group_created": {
                "group_id": "group id",
                "label": "group label"
        }
}
```

/api/control/group/delete/
Deleting a Group

Delete group

Delete the selected group and remove all assigned zones.

GET request:

http://devicehost/api/control/group/delete/[gid]/

Arguments:

[gid] = ID for group

Response:

```
"data": {
        "group_deleted": {
                "group_id": "group id",
                "label": "group label"
        }
}
```

/api/control/group/[add/delete]/
Adding or removing a Zone from Group

Add or remove zones from a group

Add or remove multiple zones to/from a group.

POST request:

http://devicehost/api/control/group/[gid]/[op]

POST body example:

```
{
      "zones": ["zone id", "zone id"]
}
```

Arguments:

[gid] = ID for group
[op] = ‘add’ or ‘delete’

Response::

```
"data": {
       "group": {
              "group_id": "group id",
              "label": "group label"
       },
       "zones": {
              "added": {
                     "zone_id": "zone id",
                     "label": "zone label"
              },
              "removed": {
                "zone_id": "zone id",
                     "label": "zone label"
       }
}
```

/api/control/group/volume/set/
Changing the volume in a Group

Adjust group audio volume

Changes the audio volume on MHUB AUDIO outputs within the group.

GET request:

http://devicehost/api/control/group/volume/set/[gid]/[vs]/

Arguments:

[gid] = ID for group
[vs] = volume (*1-100*)

Response

```
"data": {
        "group": {
                "group_id": "group id",
                "label": "group label"
        },
        "group_volume": "mhub audio group volume"
}
```

/api/control/mutegroup/
Muting the audio in a Group

Changing the mute state in a group

Sets the mute state for MHUB AUDIO outputs within the group.

GET request:

http://devicehost/api/control/mutegroup/[gid]/[ox]/

True = mute is enabled
False = mute is disabled

Arguments:

[gid] = ID for group
[ox] = mute state (*true=muted(no audio), false=unmuted(audio)*)

Response

```
"data": {
        "group": {
                "group_id": "group id",
                "label": "group label"
        },
        "group_mute": boolean
}
```

/api/control/sequence/
Execute Sequence

Executing a Sequence

GET request:

http://devicehost/api/control/sequence/[sid]/

Arguments:

[sid] = Sequence ID

Response

```
"data": {
        "sequence_executed": {
                "id": "sequence id",
                "label": "sequence label"
        }
}
```

IO

/api/command/ir/
Execute uControl Command (IR)

Executing a uControl command

Sends an IR command stored within the uControl device control pack.

GET request:

http://devicehost/api/command/ir/[io]/[cy]

Arguments:

[io] = IR port ID (*1,2,3*)
[cy] = IR command ID

Response

```
"data": {
        "execute": true
        }
}
```

/api/command/irpass/
IR Passthrough

Send an IR hex code

Sends an IR Pronto hex string from the selected IR port.

You can find details on the Pronto IR protocol here
http://files.remotecentral.com/pronto/14-1/index.html
http://www.hifi-remote.com/wiki/index.php?title=Working_With_Pronto_Hex

POST request:

http://devicehost/api/command/irpass/[io]/

POST body examples:

Data must be passed to MHUB using JSON. Pronto IR data included within the object can be in any of the following formats below.

- 0000,006b… (4 digit comma separated)
- 0000 006b… (4 digit space separated)

```
{"irdata":"0000,0072,0000,0016,0062,0022,000f,0012,000f,0012,000f,0022,000f,0022,00
20,0012,000f,0012,000f,0012,000f,0012,000f,0012,0020,0021,0020,0011,000f,0012,000f,
0022,000f,0012,0020,0011,000f,0022,000f,0012,0020,0011,000f,0022,000f,0012,000f,119
2"}
```

Arguments:

[io] = IR port ID (*1,2,3*)

Response

```
"data": {
        "execute": true
        }
}
```

/api/command/cec/
Execute uControl Command (CEC)

Execute a CEC command from MHUB using HDA's predefined uControl CEC library.

Consumer Electronics Control (CEC) is a feature of HDMI designed to allow predefined/and or supported control commands to be delivered over a HDMI connection via MHUB. This API works in a similar way to the uControl (IR) API, "Execute uControl Command" where parameters command ID and target port is required to send a command.

Note
CEC is not standardised across all manufacturers. Whilst the protocol is implemented in a standard way, implementation, naming and command support are not. The uControl CEC library uses standard command definitions and HDANYWHERE can not guarantee that any may work.

POST request:

http://devicehost/api/command/cec/[io]/[ty]/[cy]/

Arguments:

[io] = Port ID (a,b,c)
[ty] = CEC command Type (0=HDMI output, 1=HDBT output)
[cy] = CEC command ID

Response

```
"data": {
        "execute": true
        }
}
```

/api/command/cecpass/
CEC Passthrough

Pass any CEC command through MHUB

Send a custom CEC command for execution at display or source ends via MHUB. You will need to have a good understanding of CEC syntax, addressing and device support before using this API for best results.

You can create CEC commands here:
http://www.cec-o-matic.com/

POST request:

http://devicehost/api/command/cecpass/[io]/[ty]/

POST body examples:

Data must be passed to MHUB using JSON and must appear in the following format:

- 10 00 EF (2 digit empty space " " separated)

The example below will instruct MHUB to request from a display indicated by [io] that it switches to HDMI Input 1.

```
{
    "logicaladdress": "EF",
    "command": "82",
    "arguments": "10 00"
}
```

Arguments:

[io] = Port ID (*a,b,c*)
[ty] = CEC - Command Type (0=HDMI output, 1=HDBT output)
[cid] = CEC Logical Address (*1-15*)
[cec] = CEC Command
[arg] = CEC Arguments

Response

```
"data": {
        "execute": true
        }
}
```

/api/command/rs232config/
RS232 port configuration

Confiigure the RS232 port.

Configure the baud, data length and parity for each RS232 port

POST request:

http://devicehost/api/command/rs232config/[pt]/
Arguments:

[pt] = port (1-8 on the mhub, 9-16 on the HDBT receivers, 17 all ports)

Data must be passed to MHUB using JSON and must appear in the following format:

- baud rate (**1**-115200, **2**-57600, **3**-56000, **4**-38400, **5**-19200, **6**-14400, **7**-9600, **8**-4800)
- data length (**1**-8, **2**-7, **3**-6, **4**-5)
- parity (**1**-none, **2**-odd, **3**-even)

POST body example to set port to 115200, 8bit, no parity:

```
{"rs232config": {
        "baud": "1",
        "data": "1",
        "parity": "1"
        }
}
```

Response

```
"data": {
         "baud": "115200",
         "data": "8",
         "parity": "none"
         }
}
```

/api/command/rs232pass/
RS232 Passthrough

Pass any RS232 command through MHUB

Send a RS232 command for execution at display or source ends via MHUB.

Port settings are configured on the device.

POST request:

http://devicehost/api/command/rs232pass/[io]/[ty]/

POST body examples:

Data must be passed to MHUB using JSON and must appear in the following format:

- ASCII Example - *pwon!*
- HEX Example - *a55b0110ff*

```
{"rs232data": "A5B50110FF"}
```

Arguments:

[io] = Port ID (*1,2,3..*)
[ty] = Type (*0=ASCII, 1=hexadecimal*)

Response

```
"data": {
        "execute": true
        }
}
```

HDA Cloud **References**

Development of this feature set has been paused.

Do you have any features that you would like to see made accessible from the Internet? If so, please email Stuart Knight (s.knight@hdanywhere.com) and tell us about it.

Reference **Material**

DNS-SD responses

Name	Hostname	Port	Description
MHUB U			
MHUB (4x3+1)	MHUB431U.local	80	MHUB (4x3+1)
MHUB (8x6+2)	MHUB862U.local	80	MHUB (8x6+2)
MHUB U (4x1+1)	MHUBU41140.local	80	MHUB U (4x1+1)
MHUB U (4x3+1)	MHUBU43140.local	80	MHUB U (4x3+1)
MHUB U (8x6+2)	MHUBU86240.local	80	MHUB U (8x6+2)
MHUB PRO			
MHUB PRO (4x4) 40	MHUBPRO4440.local	80	MHUB PRO (4x4) 40
MHUB PRO (4x4) 70	MHUB4K44PRO.local	80	MHUB PRO (4x4) 70
MHUB PRO (8x8) 40	MHUBPRO8840.local	80	MHUB PRO (8x8) 40
MHUB PRO (8x8) 70	MHUB4K88PRO.local	80	MHUB PRO (8x8) 70
MHUB PRO 2.0			
MHUB PRO 2.0 (4x4) 40	MHUBPRO24440.local	80	MHUB PRO 2.0 (4x4) 40
MHUB PRO 2.0 (8x8) 100	MHUBPRO288100.local	80	MHUB PRO 2.0 (8x8) 100
MHUB MAX			
MHUB MAX (4x4)	MHUBMAX44.local	80	MHUB MAX (4x4)
MHUB AUDIO			
MHUB AUDIO (6x4)	MHUBAUDIO64.local	80	MHUB AUDIO (6x4)
ZONE PROCESSOR			
UCONTROL ZONE PROCESSOR 5	ZP5.local	80	UCONTROL ZONE PROCESSOR 5
UCONTROL ZONE PROCESSOR 1	ZP1.local	80	UCONTROL ZONE PROCESSOR 1

Table: DNS-SD responses

IR port mapping

Name	Source	Display	AVR	Global	SKU	Code
MHUB (4x3+1)	4 (1-4)	3 (6-8)	9	-	1.05.904.012.1	MHUB431U
MHUB (8x6+2)	8 (1-8)	6 (11-16)	17	-	1.05.904.013.1	MHUB862U
MHUB U (4x1+1)	4 (1-4)	3 (5-7)	-	2 (8-9)	1.05.904.023.1	MHUBU41140
MHUB U (4x3+1)	4 (1-4)	3 (6-8)	9	-	1.05.904.012.2	MHUBU43140
MHUB U (8x6+2)	8 (1-8)	6 (11-16)	17	-	1.05.904.013.2	MHUBU86240
MHUB PRO (4x4) 40	4 (1-4)	4 (5-8)	9	-	1.05.904.014.1	MHUBPRO4440
MHUB PRO (4x4) 70	4 (1-4)	4 (5-8)	9	-	1.05.904.008.2	MHUB4KPRO44
MHUB PRO (8x8) 40	8 (1-8)	8 (9-16)	17	-	1.05.904.015.1	MHUBPRO8840
MHUB PRO (8x8) 70	8 (1-8)	8 (9-16)	17	-	1.05.904.009.2	MHUB4KPRO88
MHUB PRO 2.0 (4x4) 40	4 (1-4)	4 (5-8)	9	-	1.05.904.021.1	MHUBPRO24440
MHUB PRO 2.0 (8x8) 100	8 (1-8)	8 (9-16)	17	-	1.05.904.022.1	MHUBPRO288100
MHUB MAX (4x4)	-	-	-	-	1.05.904.011.1	MHUBMAX44
MHUB AUDIO (6x4)	-	-	-	-	1.05.912.001.1	MHUBAUDIO64
UCONTROL ZONE PROCESSOR (5)	-	-	-	5 (1-5)	1.80.904.002.1	ZP5
UCONTROL ZONE PROCESSOR (1)	-	-	-	1	1.80.904.001.1	ZP1

Table: IR port mapping

API glossary

uControl uses button IDs for common remote control functions. The following table details remote control buttons with corresponding uControl command IDs. These can be passed into MHUB for execution.

Label	Description	Data Type
api	Indicates API version	Integer (8 bit)
arc input id	If ARC is enabled it input id will be shown here	Integer (8 bit)
audio input	Data array detailing information relating to audio input	Array[id, type, unit id, draw (Boolean), label, label editable, start label, start label prefix, start label suffix, startid, ports]
audio input id	MHUB-OS identifier for audio input(s)	Integer (8 bit)
audio output	Data array detailing information relating to audio output	Array[id, port pair, type, unit id, draw (Boolean), label, label editable, start label prefix, start label suffix, startid, ports]
audio output mirror	Data array detailing information relating to audio output mirror	Array[id, port pair, type, unit id, mirror, draw (Boolean), label, label editable, start label, start label prefix, start label suffix, startid, ports]
cec code	CEC hex string	String (32 characters)
command id	Numerical code used to identify different control commands	Integer (8 bit)
command type	Indicates if command is sent to HDMI output ot HDBT	String (32 characters)
display audio input id	MHUB-OS identifier for audio input(s) which can be routed to displays via ARC	Integer (8 bit)
display power	Indicates the current power state of a display. will return true/false/unknown	String (32 characters)
first boot	Boolean value that shows if first boot has been completed	Boolean (true/false)
group id	MHUB-OS identifier for group(s)	String (3 characters) (g1,g2.....g10)
group label	The user defined label for a collection of zones (e.g. Downstairs, Upstairs)	String (32 characters)
id	Array identifier used to separate input/output types	String (32 characters)
input id	MHUB-OS identifier for input(s)	Integer (8 bit)
input label	The user defined label for inputs (start points) onboard MHUB (e.g. Bluray, Denon AVR, Sonos, Apple TV)	String (32 characters)
ip address	MHUB-OS current IP address	String (32 characters)
ir	Data detailing information relating to the IR ports	backwards(draw, start id, ports), forwards(draw, start id, ports), avr(draw, start id, ports)
ir port	Identifier for Infrared (IR) port addressing (endpoints)	Integer (8 bit)
label	Text label used for control commands	String (32 characters)
label editable	Boolean value that shows if label is user modifiable	Boolean (true/false)
mhub audio group volume	Indicates an average volume level of MHUB AUDIO outputs (endpoints) combined in to a group	Integer (8 bit)
mhub firmware	Indicates MHUB firmware version	Decimal (double)
mhub name	The user defined name for MHUB (e.g. Joe's Mhub)	String (32 characters)

mhub official name	The official HDANYWHERE given name for MHUB	String (32 characters)
mhub-os firmware	Indicates MHUB-OS firmware version	Decimal (double)
mhub-os version	Indicates MHUB-OS version	Decimal (double)
output audio volume	Indicates output volume level	Integer (8 bit)
output id	MHUB-OS identifier for output(s)	String (3 Characters) (a,b,c...)
output label	The user defined label for outputs (endpoints) onboard MHUB (e.g. LG, KEF Soundbar, Sony Projector)	String (32 characters)
ports	The number of IR ports in each group	Integer (8 bit)
power	Indicates if the MHUB device is in an operational (on or off) state. This feature is not supported across all MHUB devices. Please contact HDANYWHERE for further information.	Boolean (true=ON, false=OFF)
sequence data	Data array detailing user defined Sequences including button labels, voice utterance triggers and sequence descriptions	array [sequence id, sequence name, sequence description, sequence voice label]
serial number	The official HDANYWHERE serial number for MHUB	String (32 characters)
stack audio input	Data array detailing information relating to video inputs in a stack.	Array[total stack audio input, id, unit id, type, draw, start id, labels]
stack audio output	Data array detailing information relating to video inputs in a stack.	Array[total stack audio output, id, unit id, type, draw, start id, labels]
stack audio output mirror	Data array detailing information relating to video inputs in a stack.	Array[total stack audio output mirror, id, unit id, type, mirror, draw, start id, labels]
stack input video	Data array detailing information relating to video inputs in a stack.	Array[total stack video input, id, unit id, type, draw, start id, labels]
stack master	Indicates which MHUB device is designated as Master within a stacked system arrangement	mhub name, serial number, ip address
stack rank	Indicates MHUB-OS's understanding of stack hierarchy for each device connected to MHUB in a stacked system arrangement	Master, Slave, Control Device, Accessory
stack video output	Data array detailing information relating to video outputs in a stack.	Array[total stack video output, id, unit id, type, draw, start id, labels]
stack video output mirror	Data array detailing information relating to video outputs in a stack.	Array[total stack video output mirror, id, unit id, type, mirror, draw, start id, labels]
start id	First identifier for Infrared (IR) port addressing (endpoints) on group	Integer (8 bit)
start label	User visible port id	String (32 characters)
type	Describes type of port	String (32 characters)
total stack zone qty	The sum of [total stack video output] + [total stack audio output] provides the maximum addressable number of zones which a stacked MHUB system will support	Integer (8 bit)
ucontrol device type	Indicates what device category is within given uControl Pack	String (32 characters)
ucontrol pack command	Data array detailing supported remote control functions, their MHUB-OS identifiers and labels	Array [code id, code label, repeat (Boolean)]
ucontrol pack draw	Data array detailing default HDANYWHERE button location and placement	Array [ui type, device size, code id, location]
ucontrol pack id	MHUB-OS identifier for uControl Pack(s)	Integer (16 bit)
ucontrol pack method	Indicates what control protocol is used within given uControl Pack	String (32 characters)

		(CEC, IR, IP)
ucontrol pack name	The official HDANYWHERE given name for uControl Pack	String (32 characters)
ucontrol pack version	Indicates uControl Pack version	Integer (8 bit)
unit id	MHUB-OS identifier for MHUB systems in a standalone or stacked arrangement	Standalone Video "V1", Standalone Audio "A1", Stacked Master "M1", Slave MHUB Devices "S1"
video input	Data array detailing information relating to video input	Array[id, type, unit id, draw, label, label editable, start label, start label prefix, start label suffix, startid, ports, labels]
video output	Data array detailing information relating to video output	Array[id, type, unit id, draw (Boolean), label, label editable, start label, start label prefix, start label suffix, startid, ports]
video output mirror	Data array detailing information relating to video output mirror	Array[id, type, unit id, mirror, draw (Boolean), label, label editable, start label, start label prefix, start label suffix, startid, ports]
zone audio volume	Indicates the volume level of a zone	Integer (8 bit)
zone id	MHUB-OS identifier for zone(s)	String (3 Characters) (z1, z2,...z99)
zone label	The user defined label for addressable areas which includes one or more endpoints (e.g. Kitchen, Bedroom, Bar Area)	String (32 characters)

uControl command IDs

uControl uses button IDs for common remote control functions. The following table details remote control buttons with corresponding uControl command IDs. These can be passed in to MHUB for execution in section “MHUB IO”.

ID	Command	IR	CEC
0	0		
1	1		
2	2		
3	3		
4	4		
5	5		
6	6		
7	7		
8	8		
9	9		
10	Channel Up		
11	Channel Down		
12	Play		
13	Pause		
14	Play / Pause (Toggle)		
15	Stop		
16	Forward		
17	Skip Forward		
18	Rewind		
19	Skip Backward		
20	Record		
21	Up		
22	Down		
23	Left		
24	Right		
25	Select / Enter / OK		
26	Back / Return / Cancel		
27	Menu		
28	Home		
29	TV Guide		
30	Red		

31	Green		
32	Yellow		
33	Blue		
34	Volume Up		
35	Volume Down		
36	Mute (Toggle)		
37	Info		
38	Power (Toggle)		
39	Power Off (Explicit)		
40	Subtitles		
41	Source		
42	Eject		
43	Audio		
44	3D		
45	Top Menu		
46	Pop-up Menu		
47	Aspect Ratio		
48	Help		
49	Power On (Explicit)		
50	No / Thumbs Down		
51	Yes / Thumbs Up		
52	Page Up		
53	Page Down		
54	Search		
55	Exit		
56	Catch Up		
57	Playlist		
58	Box Office		
59	DSTV		