

TRIPLE AUDIO
Engineering & Broadcast



**Smart
Control**
Broadcast connected.

Manual
V2.2

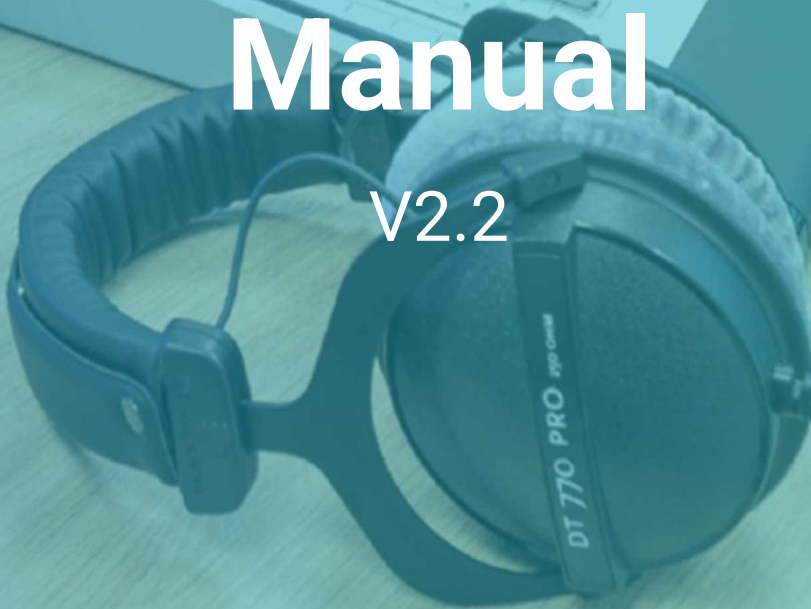
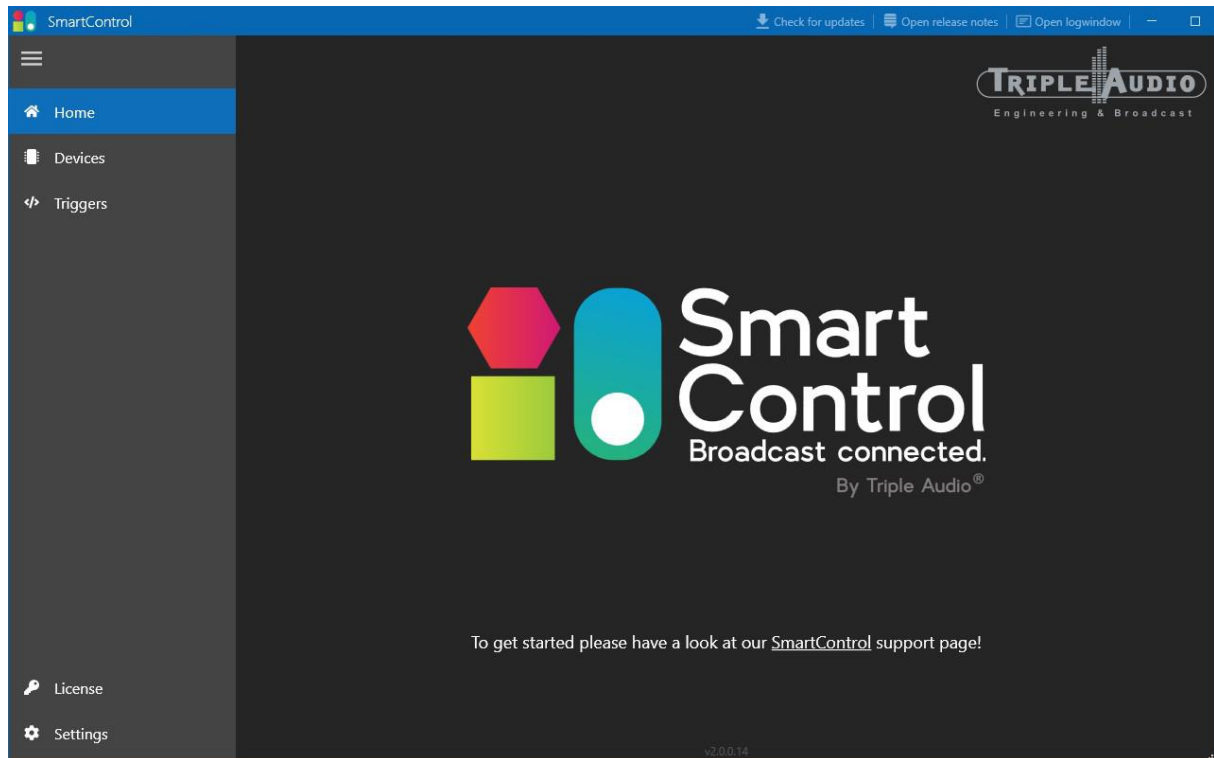


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Introduction



SmartControl is the connecting factor in the growing diversity of control protocols. In a world where we want to connect more and more things to each other, the need for smart integrations keeps growing. SmartControl offers this in a simple way.

SmartControl is an application that runs on a server in the network and actively handles the various protocols, so that real-time events can be generated.

Links between parameters from different (or the same) control protocols are configured in triggers, based on the "If This Then That" principle.

The basic license allows you to have five active triggers. Expanding is easy with an upgrade license.

Supported protocols:

- Livewire Routing Protocol (LWRP)
- Philips Hue basic & entertainment
- DHD Global Logics
- Triple Audio SmartLed
- Livewire Control Protocol (LWCP)*
- Ember+*
- DMX (Artnet)*
- OSC*
- Blackmagic Router Control Protocol*
- Triple Audio Chronoflex*
- REST API*

* Coming soon. Want to know more? Get in touch with us.

Installation

Download

You can download SmartControl from the Triple Audio website, or download the software directly from:

<https://shop.tripleaudio.nl/smartcontrol>

The browser you open the link with will ask whether you want to open the installer directly; confirm this. Windows may show a message that the publisher of the software is not recognized. To install SmartControl anyway, click "More info" in that window and then click the "Run anyway" button at the bottom.

If the system was supplied by Triple Audio, you will not get this message and SmartControl is installed automatically.

Activating a license or using the demo

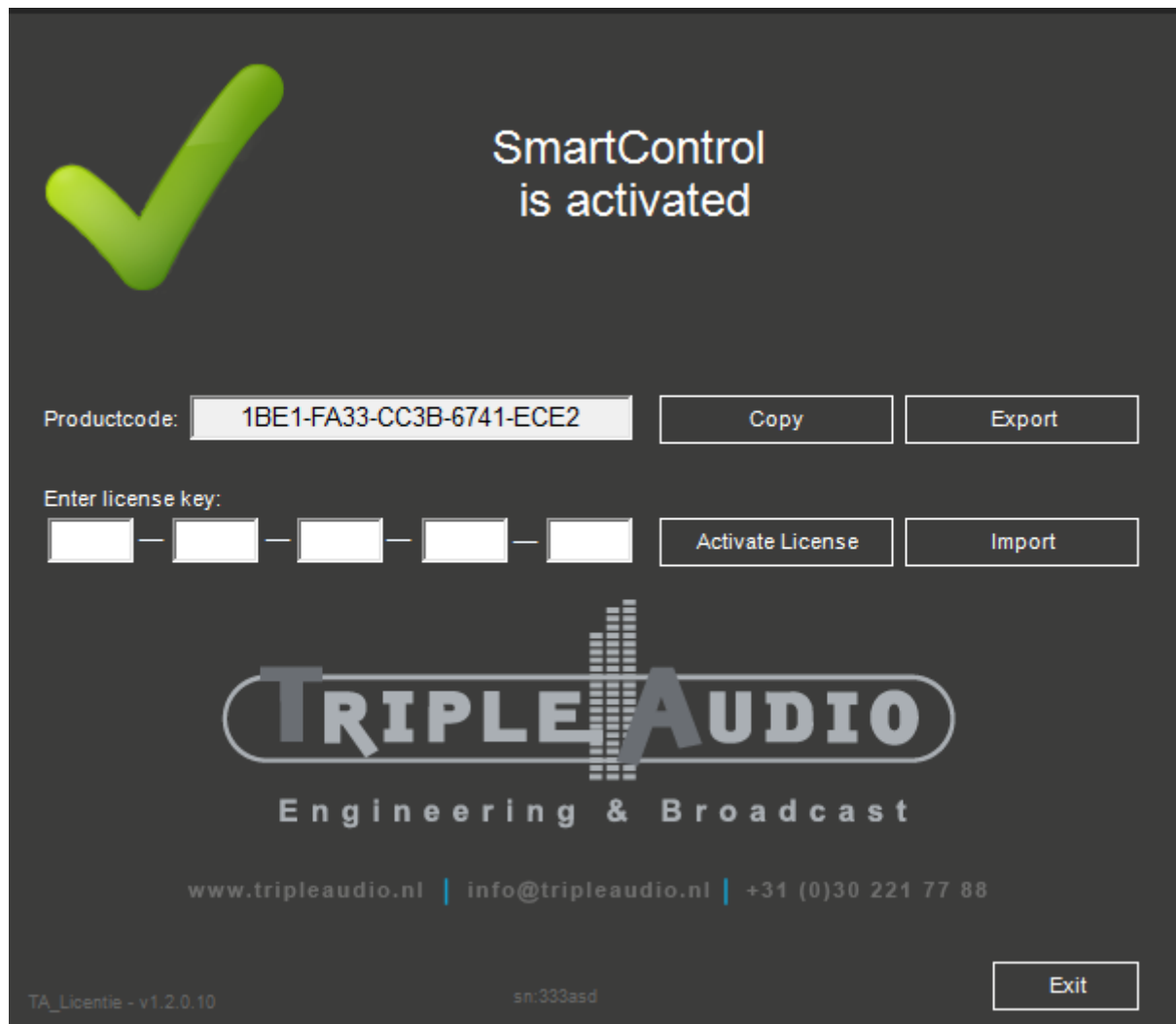
After installation, SmartControl starts immediately. You will then see the following window.



Activation

If you own a license for SmartControl, you first need to activate it. The activation is tied to the computer. Using the product code from the activation window, Triple Audio can generate a valid license key.

Send the product code to your contact person at Triple Audio. They will send back a license code, which you enter in the activation window. Then click “Activate License”. A window opens asking for a serial number. Your contact person will send this serial number along with the license code. Then click “OK” and you will see that SmartControl has been activated.

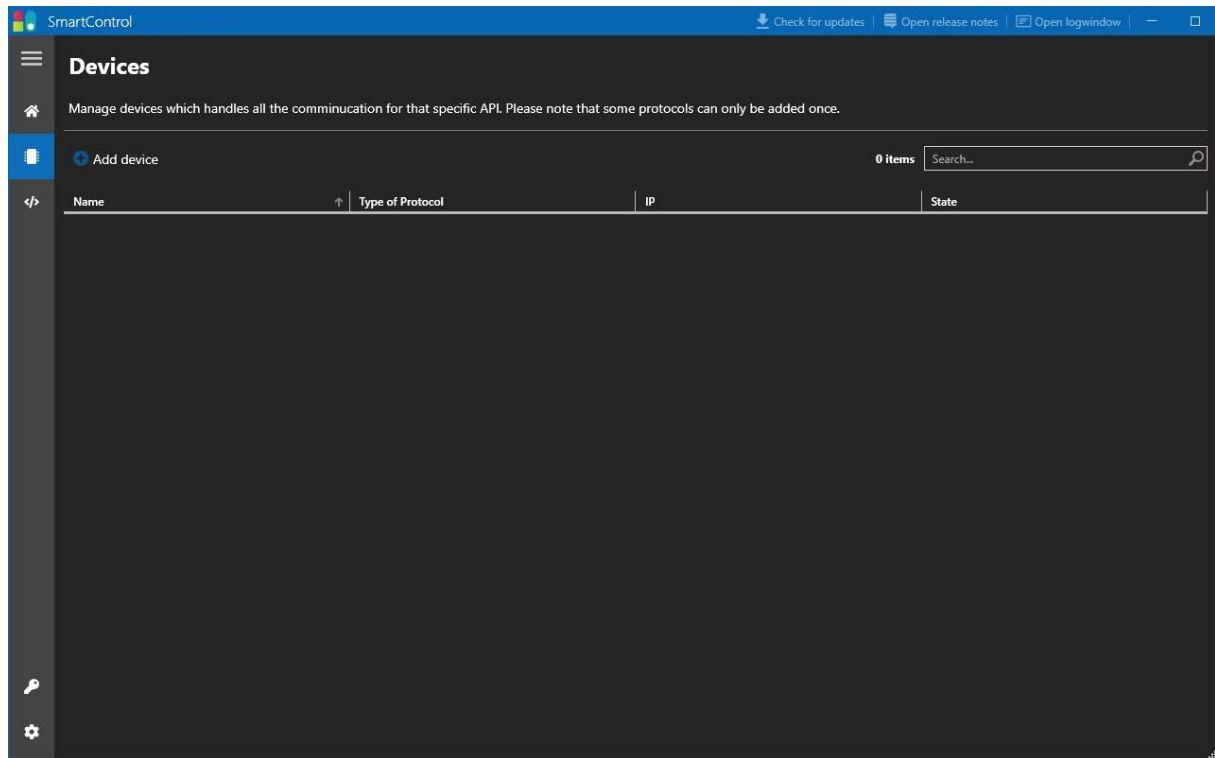


When you click continue, SmartControl starts. This window is only shown the first time SmartControl is started. After an update, there is no need to activate the license again.

Using the demo

You can also use SmartControl temporarily as a demo. If you click “Exit” in the activation window, SmartControl starts in demo mode. SmartControl will show a notification about this. In demo mode, SmartControl closes after 120 minutes. All features are available in the meantime.

Devices



The first step is to specify a device. The following device types are supported by SmartControl.

- [Livewire Routing Protocol](#)
- [Livewire Multicast GPIO](#)
- [DHD Global Logic](#)
- [Philips Hue](#)
- [SmartLed](#)
- [Comrex VH2](#)

Click the “Add device” button to add a device. In the next window, select a protocol and click Next. Below, each protocol is explained along with how to set it up. Note that some protocols can only be added once.

Livewire Routing Protocol

The Livewire Routing Protocol is supported by a wide range of devices from [Telos Alliance](#). Examples include the Axia xNode, Axia IQ, Axia Quasar and many more. When you select this protocol, SmartControl logs in to the device and listens for changes on the GPIO ports of that specific device. Which ports these are is set in the trigger itself. This is explained later in this manual.

See also: [Livewire GPIO](#) for more information.

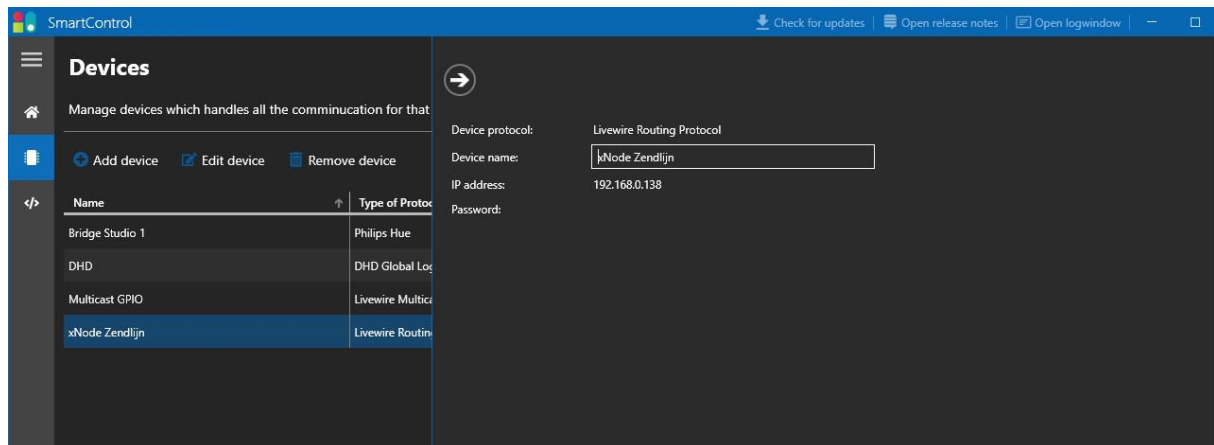
Fields:

- **Device Name:** Enter a recognizable name here. Useful for telling multiple devices apart.
- **IP Address:** Enter the IP address of the device you want to reach.
- **Password:** By default, devices have no password set. If you have changed this, enter the password here.



The screenshot shows a configuration window titled "Livewire Routing Protocol". At the top, there are four tabs: "Livewire Multicast", "Livewire Multicast GPIO", "192.168.0.138", and "Disconnected". The main area contains three input fields: "Device name:" with the value "Axia xNode Studio 1", "IP address:" with the value "192.168.0.138", and "Password:" with the value "Password". At the bottom right, there are two buttons: "Next" and "Cancel".

After clicking "Next", the device is initialized and added to the list. Double-click the device in the overview to open its settings. This is where you can change the name.



The screenshot shows the SmartControl interface. On the left, there is a sidebar with a "Devices" section. Below it, there is a table with two columns: "Name" and "Type of Protocol". The table contains the following rows:

Name	Type of Protocol
Bridge Studio 1	Philips Hue
DHD	DHD Global Log
Multicast GPIO	Livewire Multicast
xNode Zendijn	Livewire Routing Protocol

On the right, there is a configuration panel for the selected device, "xNode Zendijn". It shows the following fields:

- Device protocol: Livewire Routing Protocol
- Device name: xNode Zendijn
- IP address: 192.168.0.138
- Password:

If you want to change something like the IP address, you need to remove the device and add it again. Note that the device is also removed from any triggers in which you used it. You will need to assign it again in those triggers.

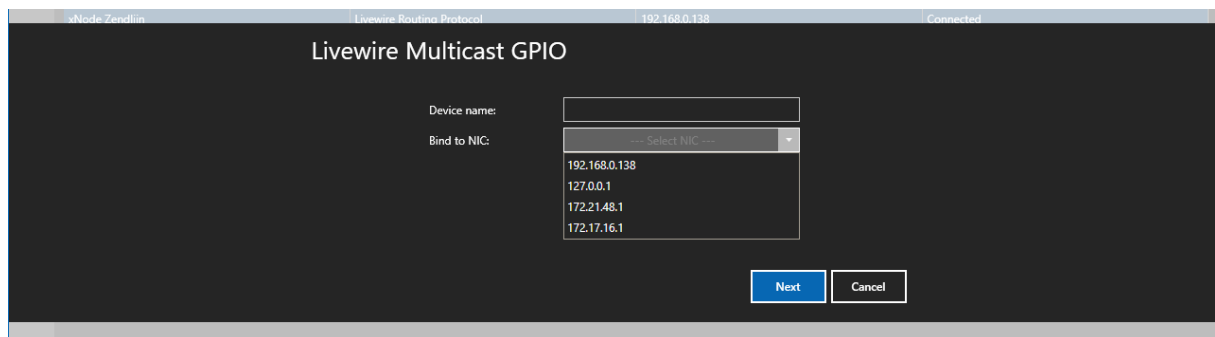
Livewire Multicast GPIO

Livewire Multicast GPIO works slightly differently from the Livewire Routing Protocol. With this protocol, SmartControl listens for GPIO commands on a selected network. This means you do not need to create a separate device for every piece of equipment. For each trigger you can choose which Livewire channel to listen to. This is explained later in this manual under Triggers. You can only create one device for the Livewire Multicast GPIO protocol.

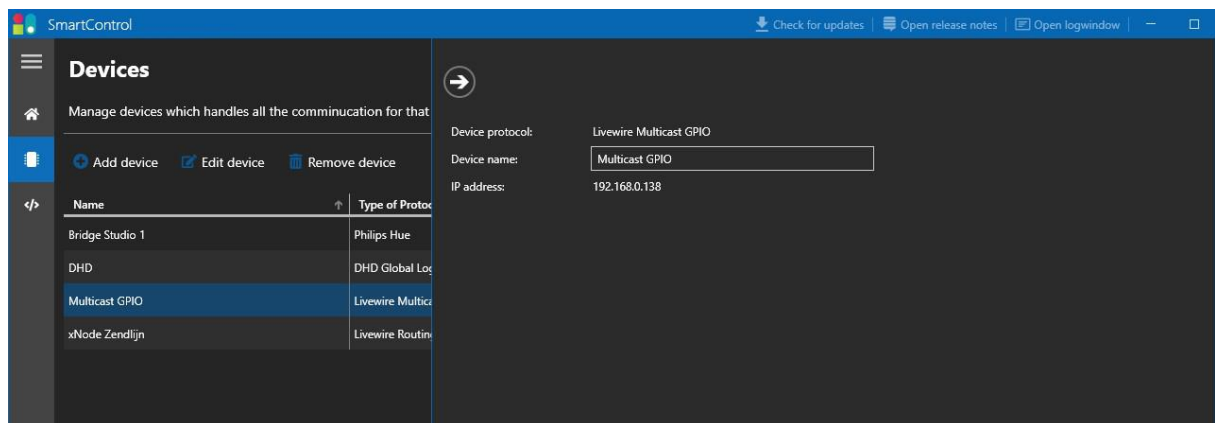
See also: [Livewire GPIO](#) for more information.

Fields:

- **Device Name:** Enter a recognizable name here. Useful for telling multiple devices apart.
- **Network Interface:** This drop-down shows all network interfaces of the computer SmartControl is running on. Choose the IP of the network interface on which Livewire Multicast GPIO is available.



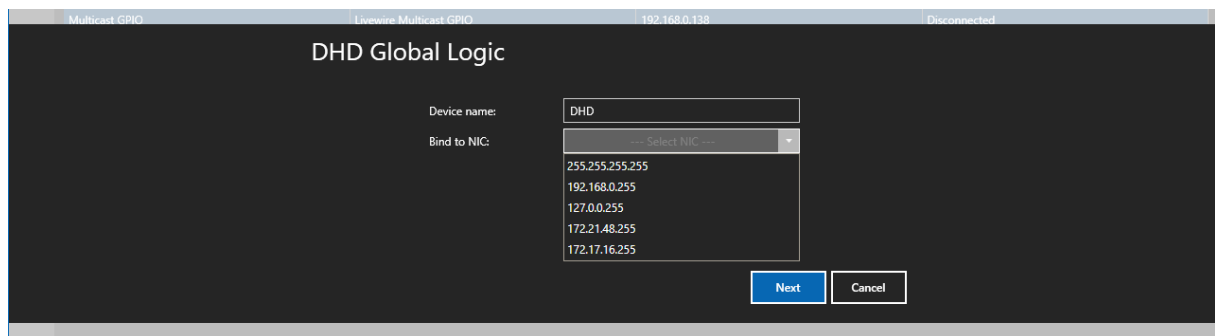
After clicking “Next”, the device is initialized and added to the list. Double-click the device in the overview to open its settings. This is where you can change the name.



If you want to change something like the “Bind to NIC” setting, you need to remove the device and add it again. Note that the device is also removed from any triggers in which you used it. You will need to assign it again in those triggers.

DHD Global Logic

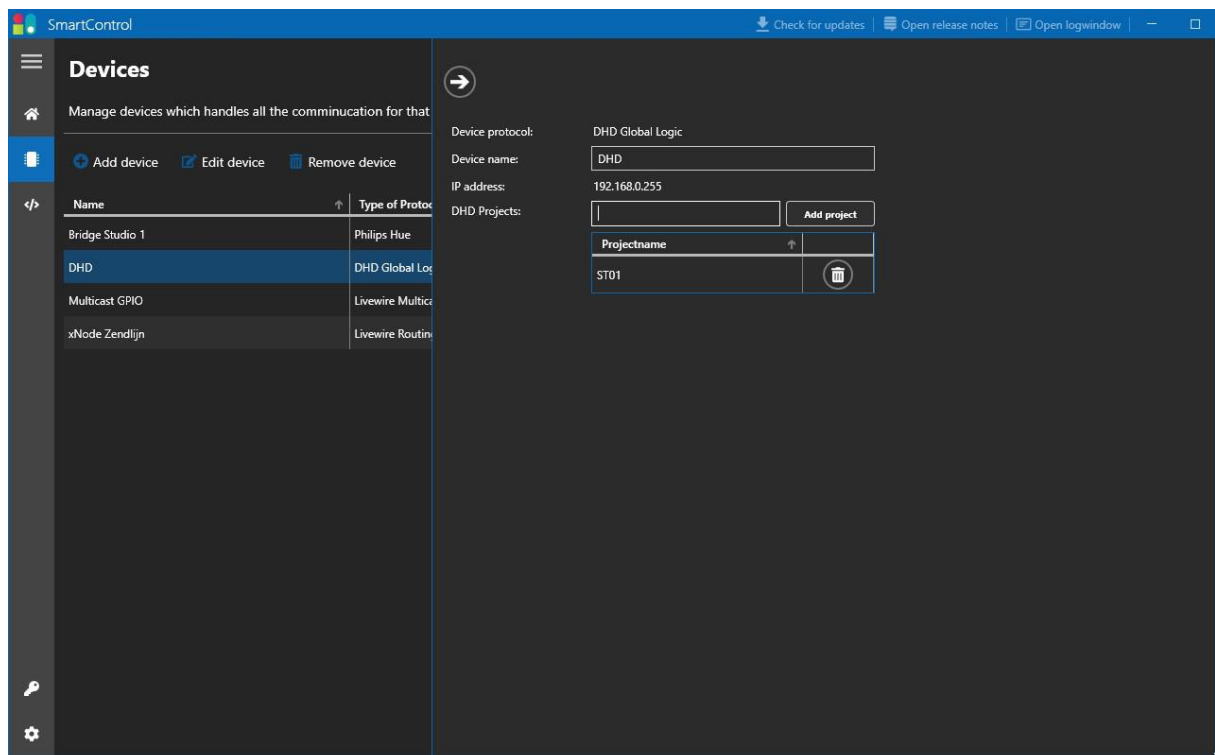
This protocol is supported by a wide selection of DHD products. You can only create one device for the DHD Global Logic protocol.



Fields:

- **Device Name:** Enter a recognizable name here. Useful for telling multiple devices apart.
- **Bind to NIC:** This drop-down shows all network interfaces of the computer SmartControl is running on. Choose 255.255.255.255 to listen on all interfaces of the computer SmartControl is running on.

After clicking “Next”, the device is initialized and added to the list. Double-click the device in the overview to open its settings. This is where you can change the name and add DHD Projects to use in triggers.



If you want to change something like the IP address, you need to remove the device and add it again. Note that the device is also removed from any triggers in which you used it. You will need to assign it again in those triggers.

Philips Hue

SmartControl can control Philips Hue lights. It can do this in several ways: via the standard protocol or via the Entertainment protocol. The standard protocol works in a conventional way that is well suited to a home setting, where lights only change color once in a while. With version 2 of the Hue Bridge, Philips introduced the Entertainment protocol. This makes it possible to change the color of lights 25 times per second — a lot faster than with the standard protocol. It is therefore recommended to control lights via the Entertainment protocol.

If you want to know more, we recommend reading [this article](#).

For SmartControl to be able to control the lights, you first need to pair the Hue lights with the Hue Bridge and set them up. This is quick and easy using the Hue app, which you can download from your phone's app store. For more information, visit the Philips Hue website and look for the support page.

Setting up lights in the Hue app

Make sure the Hue Bridge is connected to the same network as the computer SmartControl is running on. It is important that the network has a DHCP server that can assign an IP address to the Hue Bridge. Since you set up the Hue Bridge with your phone, the network must be reachable via WiFi.

The Hue app is fairly self-explanatory. The steps you need to go through are:

- Pair the Hue Bridge.
- Add lights.
- Create a room (group) and add the lights to it.
- *Optional:* Add your lights to an Entertainment group and Entertainment area.

You pair the lights with the Hue Bridge, and the settings of each light are stored there. So you only use the Hue app once to set up or add lights. After that, the app and WiFi connection are no longer needed.

Hue Bridge IP address

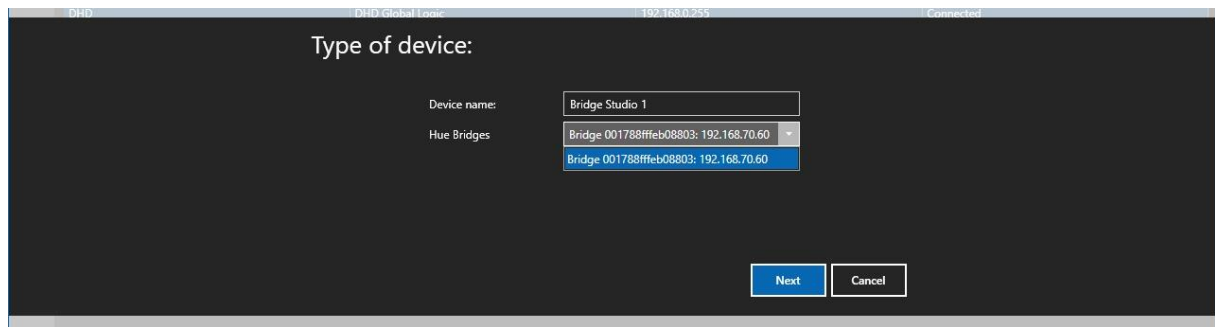
If the network the Hue Bridge and SmartControl are connected to has no internet access it is important to note down the IP address of the Hue Bridge. You can find it in the app under: Settings > Hue Bridges > then tap the added Bridge in the list. The IP address is shown at the bottom.

If you want to give the Bridge a static IP address, you can do so via the Hue app. Go to Settings > Bridge Settings > Network settings. Switch off DHCP and enter your details.

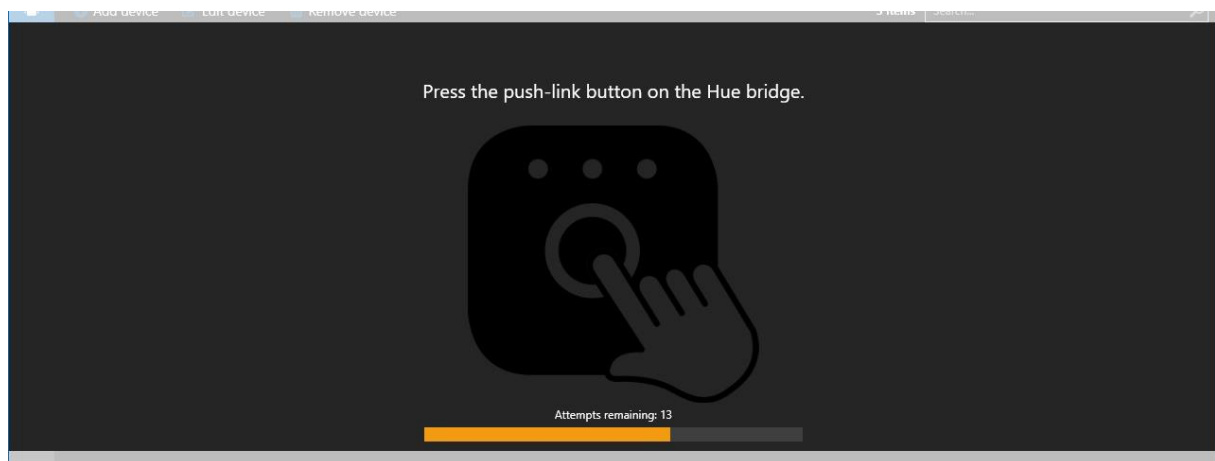
Hue Bridge Pairing

The Hue Bridge has to be paired with SmartControl before it can work. To do this, SmartControl and the Hue Bridge need access to the same network.

Click "Add device", select "Phillips Hue" and click "Next". SmartControl searches the network for a Hue Bridge. When the search is finished, all bridges that have not yet been added to SmartControl can be found in the "Hue Bridges" dropdown.



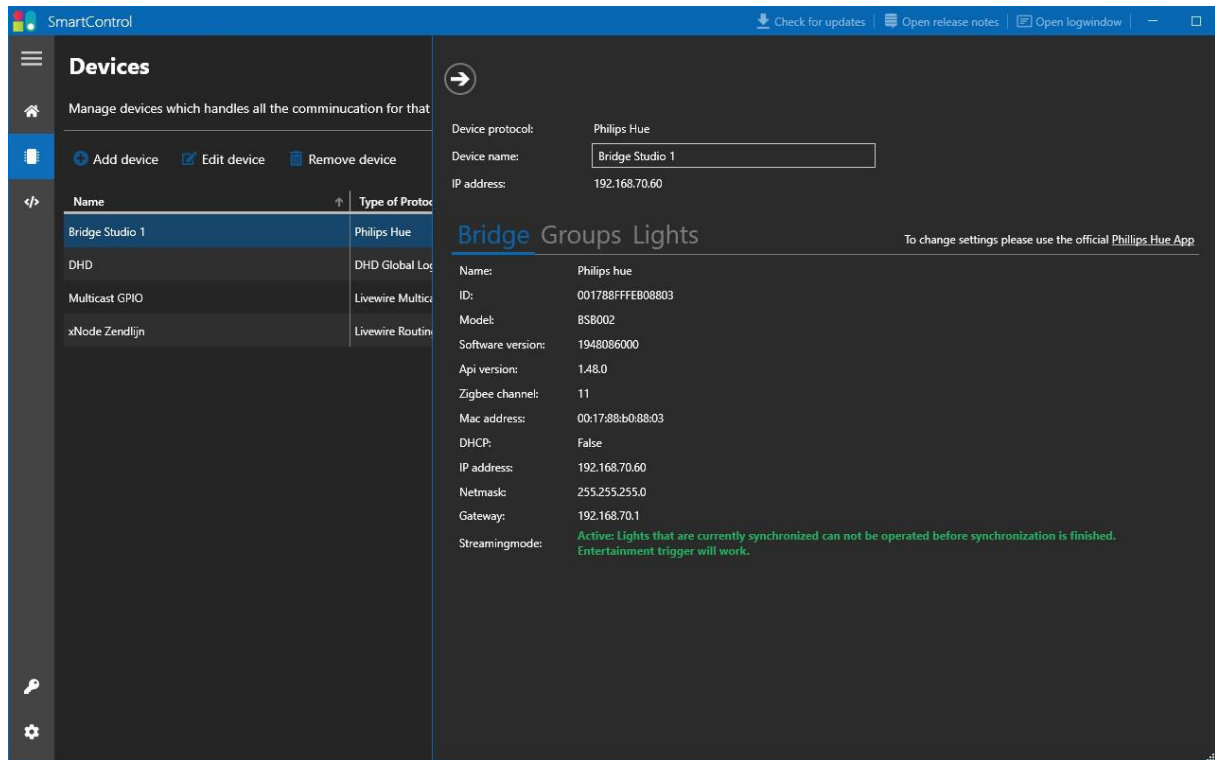
Click “Next” again to pair the Bridge with SmartControl. Then, within 20 seconds, press the “push-link” button on the Bridge.



If this succeeds, the Bridge is added to the list of devices and you can use it in triggers. How that works is explained in the chapter [Triggers](#).

Edit Bridge device

Double-click the device in the overview to open its settings. This is where you can change the name, see which lights belong to which group, and view a number of details about the Bridge and the lights themselves.



When Streamingmode is set to “Active”, SmartControl can control the Hue Bridge using the Entertainment protocol. In some cases streaming mode may be inactive. The Hue lights may then stop responding.

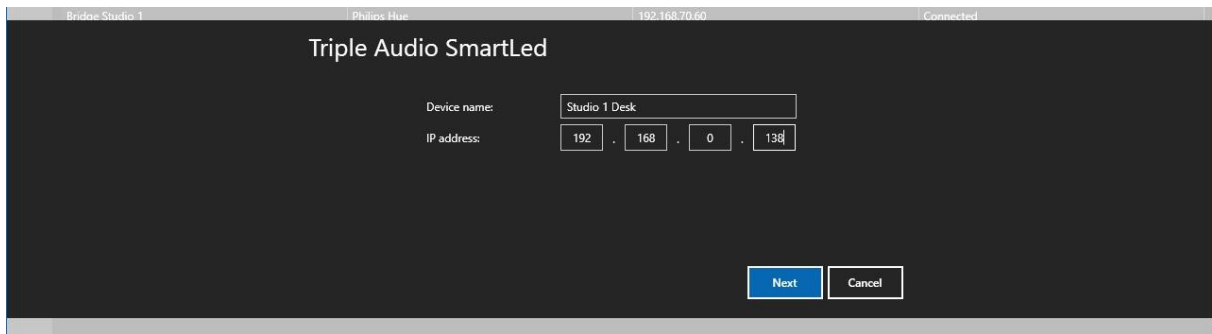
There are several causes that can make streaming mode become inactive. SmartControl actively monitors this and will try to restore streaming mode if it is inactive.

On the “Groups” and “Lights” tabs you can see which lights are paired with the Bridge. With the button at the top right of the tab you can make the selected group or light blink briefly. This makes it easy to identify a light.



SmartLed

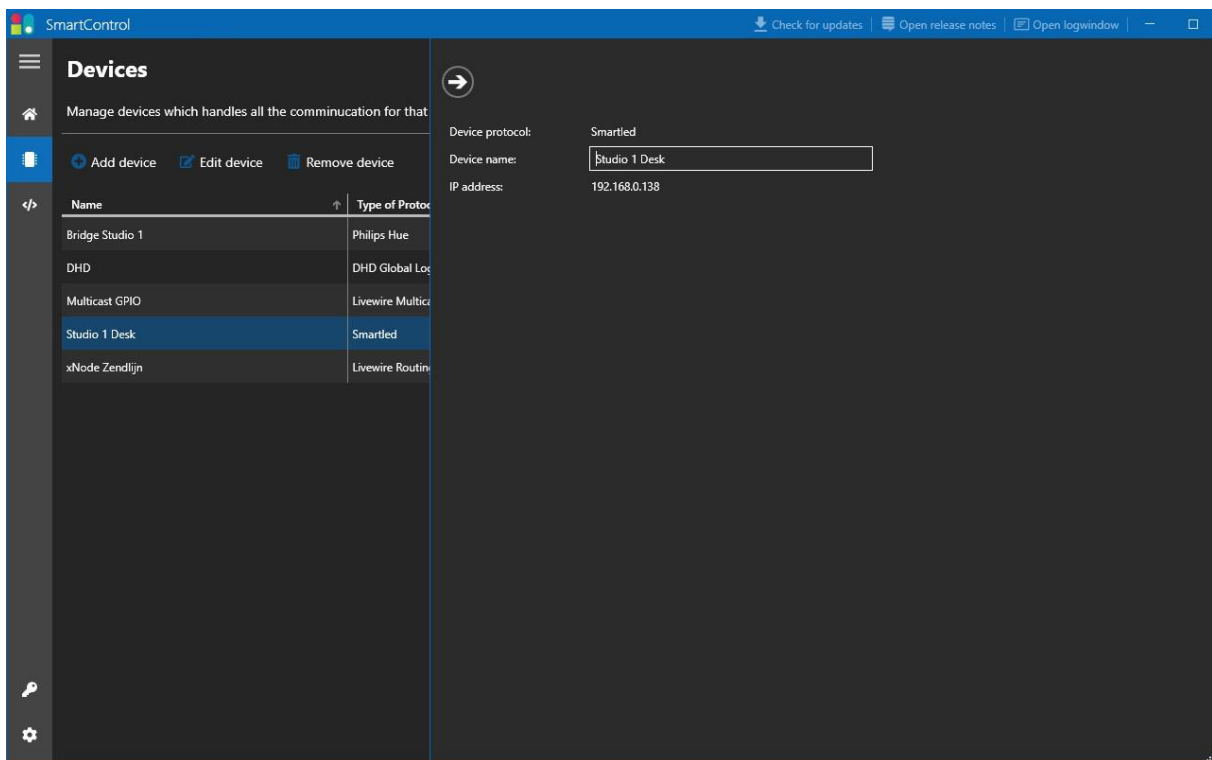
The standard version of SmartLed works together with SmartControl to control SmartLed objects. Want to know more about SmartLed? Get in touch with [Triple Audio](#).



Fields:

- **Device name:** Enter a recognizable name here. Useful for telling multiple devices apart.
- **IP address:** Enter the IP address of the SmartLed server here.

After clicking “Next”, the device is initialized and added to the list. Double-click the device in the overview to open its settings. This is where you can change the name.



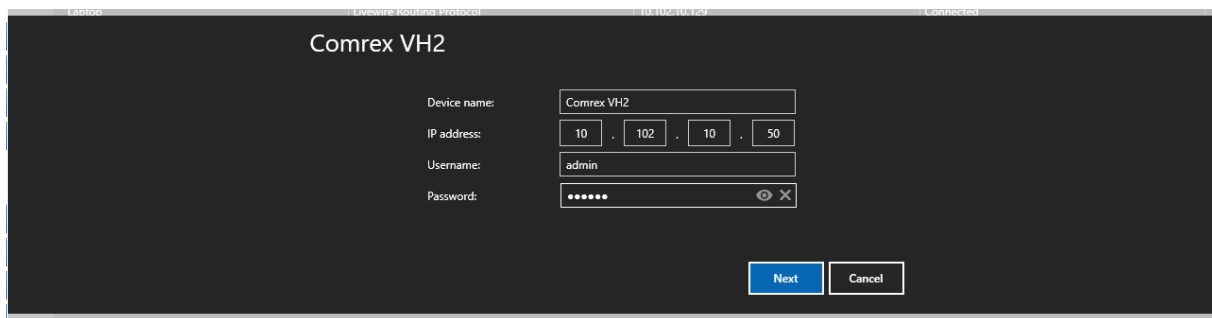
If you want to change something like the IP address, you need to remove the device and add it again.

Comrex VH2

The Comrex VH2 is a VoIP telephone hybrid. It allows you to hold phone calls in studio quality and route the signal to your mixer. The Comrex VH2 uses a separate VoIP handset, which is essentially the control unit of the VH2. It is used to set up or answer a call. The call can then be sent, using the buttons on the VH2, to for example a channel on a mixer. Events, such as an incoming call on a line, and the VH2's functions can be handled from SmartControl.

Make sure the Comrex VH2 is configured on the same network as SmartControl and that calling works. If needed, use the [Comrex Device Manager](#) to find the VH2 on the network.

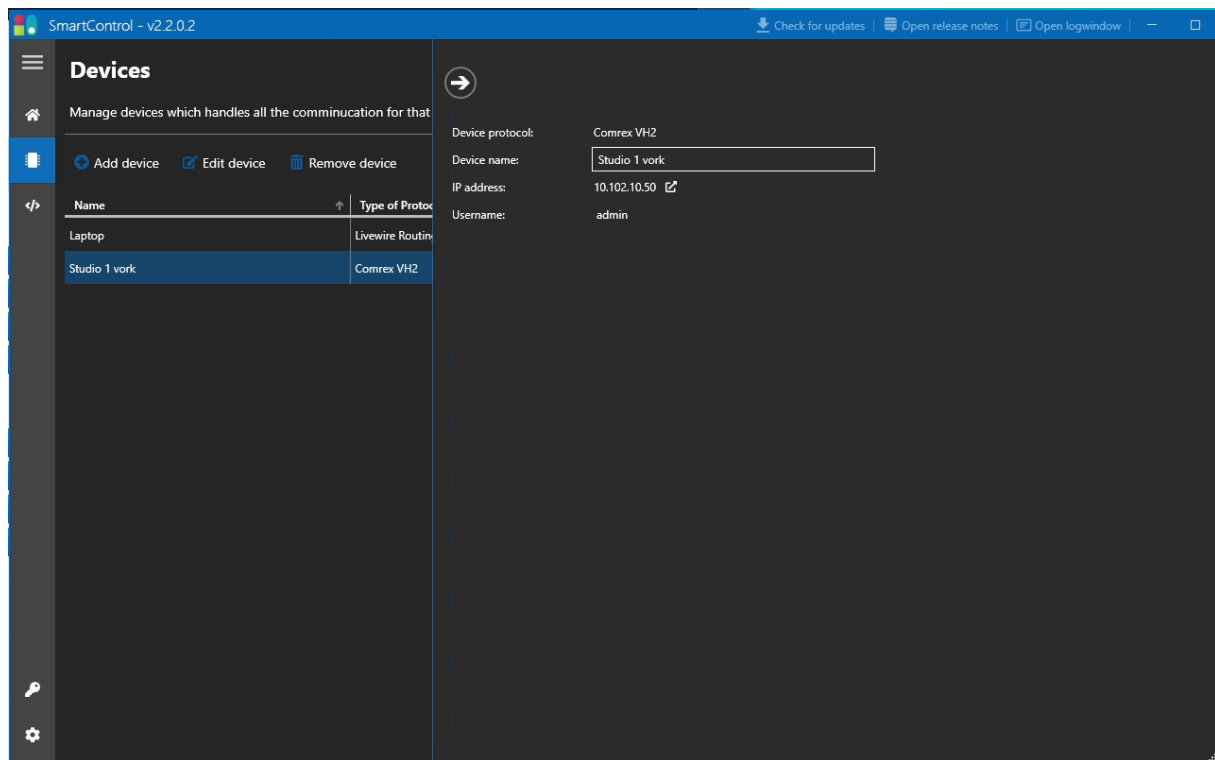
This version of SmartControl is confirmed to work with VH2 firmware v1.2 (21-Aug-2017).



Fields:

- **Device name:** Enter a recognizable name here. Useful for telling multiple devices apart.
- **IP address:** Enter the IP address of the Comrex VH2 here.
- **Username:** Enter the username of the Comrex VH2 here. (Default is “admin”)
- **Password:** Enter the password of the Comrex VH2 here. (Default is “comrex”)

After clicking “Next”, the device is initialized and added to the list. Double-click the device in the overview to open its settings. This is where you can change the name.

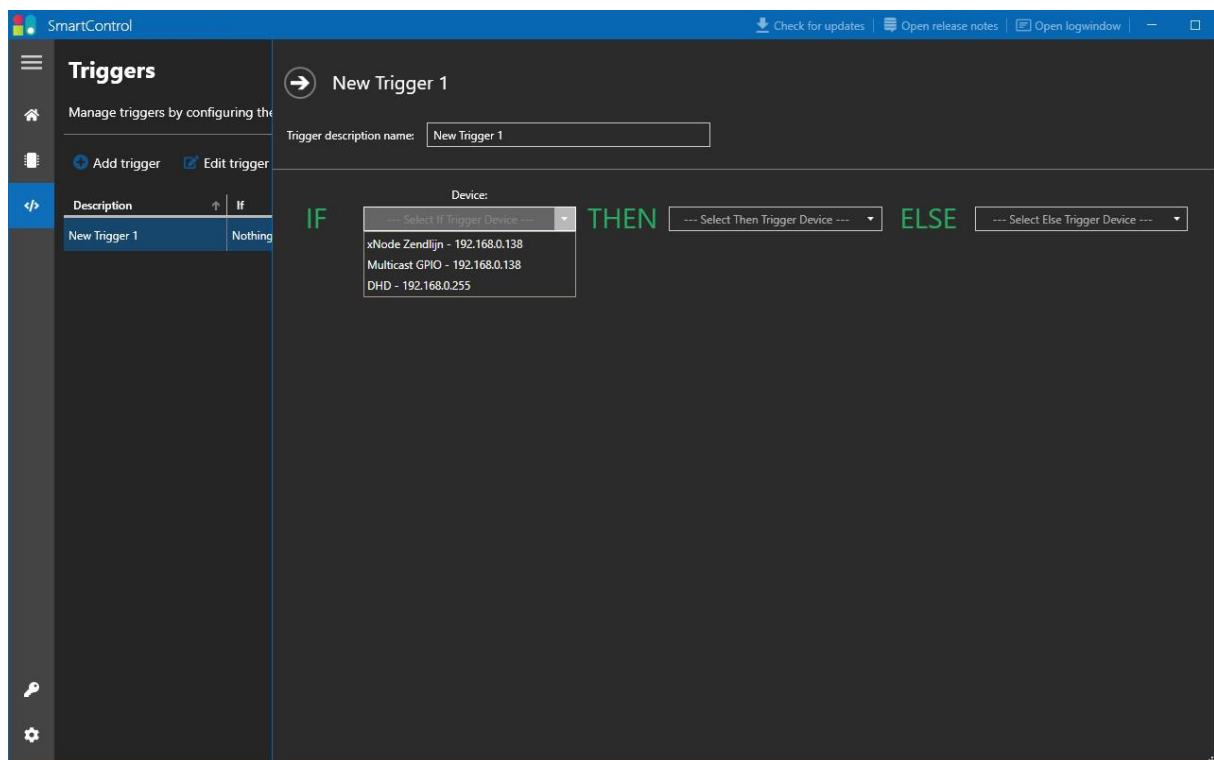


If you want to change something like the IP address, you need to remove the device and add it again.

Triggers

Once you have successfully created the right devices for the equipment you want to control, you can start building triggers. Triggers in SmartControl work according to the “If this, Then that, Or else” principle.

To get started, add a new trigger with the “Add trigger” button. For each part you can specify how the trigger should behave.



If (This)

This is where you define the condition SmartControl triggers on. Not every device can receive triggers, so not every device is shown in the dropdown.

In the “Device” dropdown, select the device the trigger should respond to. Each protocol has a number of settings you can then define.

Livewire Routing Protocol

See: [Livewire GPIO](#) for more information.

Fields:

- **Type:** Specify the GPIO type here. GPI stands for *General Purpose Input*, i.e. the inputs of the device. GPO stands for *General Purpose Output*, i.e. the outputs of the device.
- **GPIO Block nr:** This is the physical GPIO port number of the device.
- **Pinnr:** The pin number of the port. You can choose from 1 to 5.
- **State:** Determines when the trigger fires: when the port goes On or Off.

Livewire Multicast GPIO

See: [Livewire GPIO](#) for more information.

Fields:

- **Channel ID:** Enter the Livewire channel ID here.
- **Type:** Specify the GPIO type here. GPI stands for *General Purpose Input*, i.e. the inputs of the device. GPO stands for *General Purpose Output*, i.e. the outputs of the device.
- **Pinnr:** The pin number of the port. You can choose from 1 to 5.
- **State:** Determines when the trigger fires: when the port goes On or Off.

DHD Global Logic

Fields:

- **Project ID:** Select an item from the dropdown menu. Project IDs are set up under [Devices](#).
- **Global Logic Number:** Enter the Global Logic number here. Usually a value from 1 to 200.
- **State:** Determines when the trigger fires: when the port goes On or Off.

Comrex VH2

Fields:

- **Channel:** Select the Comrex VH2 channel.
- **Event type:** Select the event the trigger should respond to. You can choose from the following options:
 - **Created (Start of in/outbound call):** The channel concerned has become active.
 - **Ringing (incoming):** There is an incoming caller.
 - **Hung up:** The call has ended.
 - **Call is busy:** On an outgoing call, a busy tone is heard.
 - **Dialing error:** On an outgoing call, a dialing error has occurred.
 - **On hold:** The call has been put on hold.
 - **On air:** The call has been sent to the mixer.
 - **Call is on handheld:** The call has been sent to the handheld.

- **Calling (Outbound):** An outgoing call has been set up and is waiting to be answered.

Then / Else

This is where you specify which task SmartControl should perform when the trigger fires. Here, too, you can choose from several protocols.

In the “Device” dropdown, select the device that should be triggered. Each protocol has a number of settings you can then define.

Livewire Routing Protocol

See: [Livewire GPIO](#) for more information.

Fields:

- **Type:** Specify the GPIO type here. GPI stands for *General Purpose Input*, i.e. the inputs of the device. GPO stands for *General Purpose Output*, i.e. the outputs of the device.
- **GPIO Block nr:** This is the physical GPIO port number of the device.
- **Pinnr:** The pin number of the port. You can choose from 1 to 5.
- **State:** Determines which state the port should be switched to: On or Off.

Livewire Multicast GPIO

See: [Livewire GPIO](#) for more information.

Fields:

- **Channel ID:** Enter the Livewire channel ID here.
- **Type:** Specify the GPIO type here. GPI stands for *General Purpose Input*, i.e. the inputs of the device. GPO stands for *General Purpose Output*, i.e. the outputs of the device.
- **Pinnr:** The pin number of the port. You can choose from 1 to 5.
- **State:** Determines which state the port should be switched to: On or Off.

DHD Global Logic

Fields:

- **Project ID:** Select an item from the dropdown menu. Project IDs are set up under [Devices](#).
- **Global Logic Number:** Enter the Global Logic number here. Usually a value from 1 to 200.
- **State:** Determines which state the port should be switched to: On or Off.

Philips Hue

See also the explanation on configuring the Bridge for more information on the difference between an Entertainment Light/Group and a normal Light/Group.

Fields:

- **Type:** Choose the type SmartControl should control. You can choose from the following:
 - **Light:** These are the lights in normal mode.
 - **Group:** These are groups in normal mode.
 - **Entertainment Light:** These are the lights that have been selected for entertainment.
 - **Entertainment Group:** These are the groups that have been selected for entertainment.
 - **Smartplug:** This is the Philips smart plug.
- **Select objects:** In this list, tick the lights or groups you want to control.
- **Action:** Choose which action the light should perform.
 - **On:** Turns the light on with the color settings below.
 - **Off:** Turns the light off immediately, without a fade.

- **Alert:** Makes the light blink briefly.
- **Flash:** Makes the light blink continuously. The fade is set with “Transition Time”.
- **Color:** Here you choose the color of the light when the trigger is executed. There are a number of predefined colors, but on the “Advanced” tab you can create your own color.
- **Brightness:** The brightness of the light.
- **Transition Time:** The fade time of the light when the trigger is executed.

SmartControl Trigger

This action lets you override another trigger and then refer back to another trigger. For example, you can make a Hue light temporarily change color on a phone ringing signal. When the ringing signal is deactivated, the trigger takes over the state of the selected SmartControl trigger again.

Fields:

- **SmartControlTrigger:** Choose a trigger.

Comrex VH2

Fields:

- **Channel:** Choose the VH2 channel SmartControl should control. The VH2 has 2 channels.
- **Action:** Choose which action should be performed:
 - **Drop (hang up) call:** End the call.
 - **Place call on hold:** Put the call on hold.
 - **Place call on handset:** Send the call to the handset.
 - **Place call on console/ On Air:** Send the call to the mixer.

Failover

New as of SmartControl version 2 is the failover function. It allows you to run SmartControl redundantly. This way, a failover on another system can take over the functionality if SmartControl on the main system goes down.

When everything is configured correctly, the failover behaves as a silent copy of the main system. All changed settings are immediately applied to the failover as well. The failover continuously checks whether the main system is reachable. If it no longer is, the failover takes over. Once the main system is up and running again, the failover becomes inactive again.

The failover function requires a separate license. More info about licenses can be found in the chapter [Licenses](#).

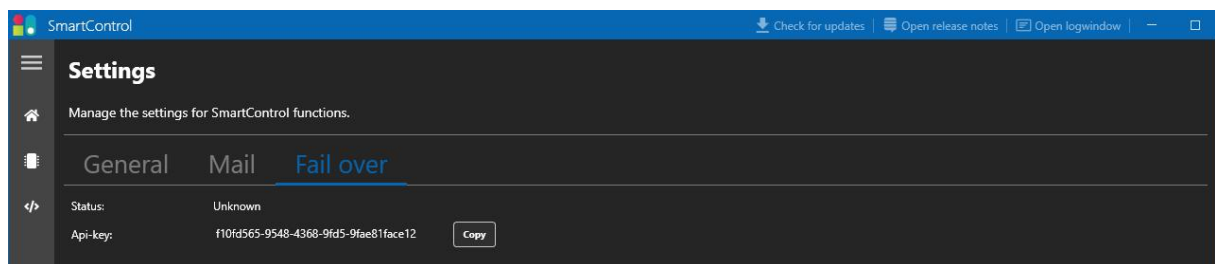
Setting up a failover system

Installation and activation

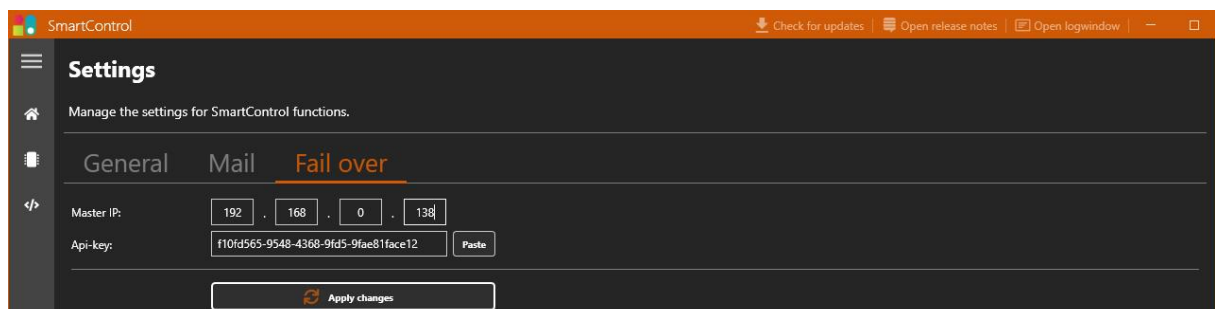
Follow the chapter [Installation](#) to install SmartControl. At the activation step, enter the code that includes the failover option. Once this is done, SmartControl starts in failover mode. In failover mode, the window is orange.

Linking the failover and the master

At startup you will get the message “Could not find master...”. This makes sense, as the failover does not yet know where to find the master. To fix this, you need to exchange the API keys. The key can be found on the master on the Settings page, under the “Failover” tab. Write it down or copy it.



Enter this API key on the failover, on the Settings page under the Failover tab. Then click the “Apply changes” button. You will be asked whether you want to restart SmartControl. Click “Yes”. Once SmartControl has fully started, the failover is active immediately. You can recognize this by the orange bar in the SmartControl window.

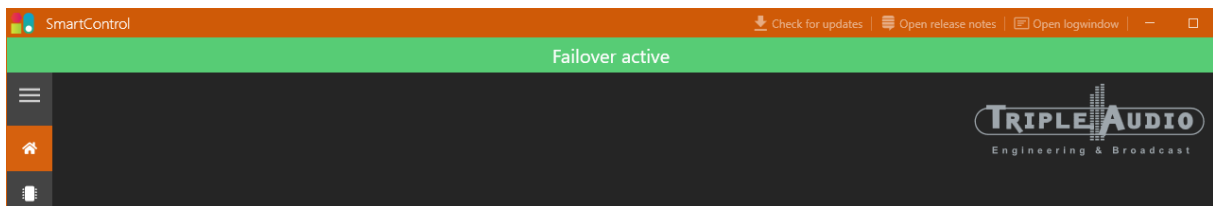


Failover statuses

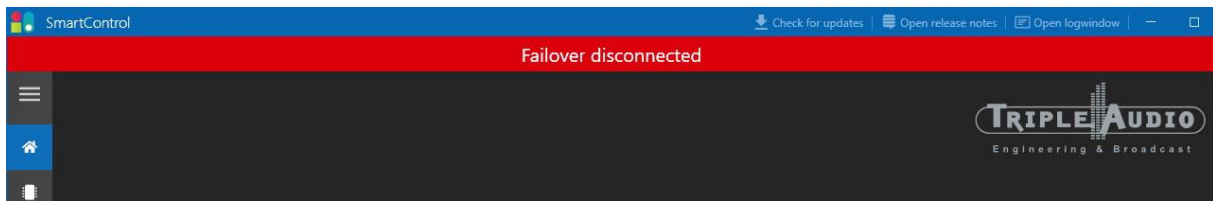
At the top of the window, the message “Failover idle” is shown. This means the failover is ready to take over the master’s tasks if the master goes down.



If the master goes down, the orange bar turns green and the text changes to “Failover active”. This means the failover has taken over all of the master’s tasks.



If the failover goes down, this is reported on the master with a red bar with the text “Failover disconnected”.



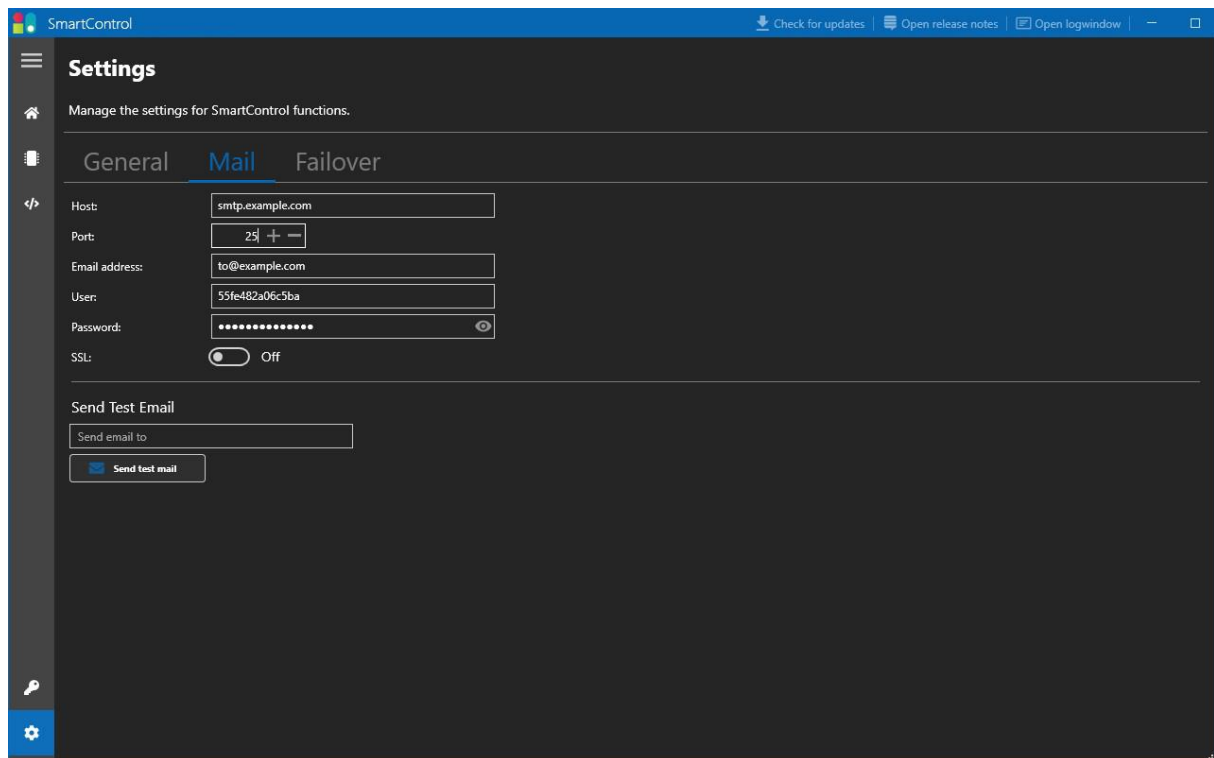
Failover exceptions

Important to know: at the moment, only the master can control a Hue Bridge. For technical reasons, this is not yet possible from the failover.

If you would still like to make this possible, please contact Triple Audio and we will see whether we can find a suitable solution.

Notification mail

SmartControl can automatically send a notification e-mail when something is wrong with the failover or the master. For this, you need to enter the details of an SMTP server in the SmartControl settings.



It is recommended to send a test mail to check the settings. If they are correct, SmartControl automatically sends an e-mail on the following events:

- When the master goes down
- When the failover goes down
- When the master is back online
- When the failover is back online

Licenses

The SmartControl license model works with different levels. The higher the level, the more triggers you can create. A trigger upgrade is available from the [Triple Audio webshop](#).

Level	Triggers
0	5
1	20
2	50
3	100
4	150
5	200
6	250
7	Unlimited

To use the SmartControl failover function, you need a failover license.

For more info, please contact Triple Audio.

Settings

General

Startup minimized

Tick this option to start SmartControl minimized. SmartControl will then be hidden in the taskbar.

Config ex-/import

You can export the SmartControl configuration as a backup or if you want to move SmartControl to, for example, another computer. When you restore the configuration on another computer, the license is not transferred. You will need to have a new license code generated; please contact your contact person at Triple Audio.

Backup

If the computer has a D drive, the configuration is stored on that drive. If there is no D drive, the configuration is stored in the folder "%localappdata%\SmartControl".

Close application

Because SmartControl is an application designed to run continuously, the close (X) button of the window is hidden. Do you still want to close the application? Click the "Close Application" button.

Mail

You can set up an SMTP server to automatically send an e-mail when the failover becomes active. Enter the server details and, if you like, send a test mail to check the settings. See the chapter [Notification mail](#) under Failover for more information.

Failover

This is where you set up the failover function. More info can be found in the chapter [Failover](#).

How To's

Because SmartControl is very versatile and can sometimes be quite complex, we have put together a few how-tos to help you set up SmartControl and the associated equipment.

Mic live signaling with Philips Hue and the Axia IQ(x)

Follow these steps to make a Philips Hue light work as a “mic live” red light signal in combination with an Axia IQ(x). It is assumed that the IQ(x) and the Hue Bridge are present on the network and on the same subnet as the computer SmartControl is running on.

Configuring the Philips Hue device

The chapter [Devices, Philips Hue](#) of this manual explains how to set up the Hue lights and how to pair the Hue Bridge with SmartControl. Make sure the Hue light is marked as an “Entertainment Lamp”. Give the light a recognizable name.

Configuring Livewire Multicast GPIO

Go to the chapter [Devices, Livewire Multicast GPIO](#) and configure a Livewire Multicast GPIO device.

Configuring the IQ(x)

The Control Room monitor is muted when a Control Room mic is opened. We can use this to trigger SmartControl.

Open the web page of the IQ(x) and go to “Shows”. Click the show profile that is used by default. If you use multiple show profiles, you need to change the settings below in those as well.

Check the IP address of the IQ(x). If it is, for example, 192.168.1.150, use 15099 as the Livewire channel. It is common practice to start a device’s Livewire GPIO channels at 99, as mentioned above. A detailed explanation of how best to organize Livewire channels can be found here: [Livewire Channel Numbering - TelosHelp \(telosalliance.com\)](#)

Enter this channel number under “Logic port” in the “CR Monitor” section. (Circled in red)

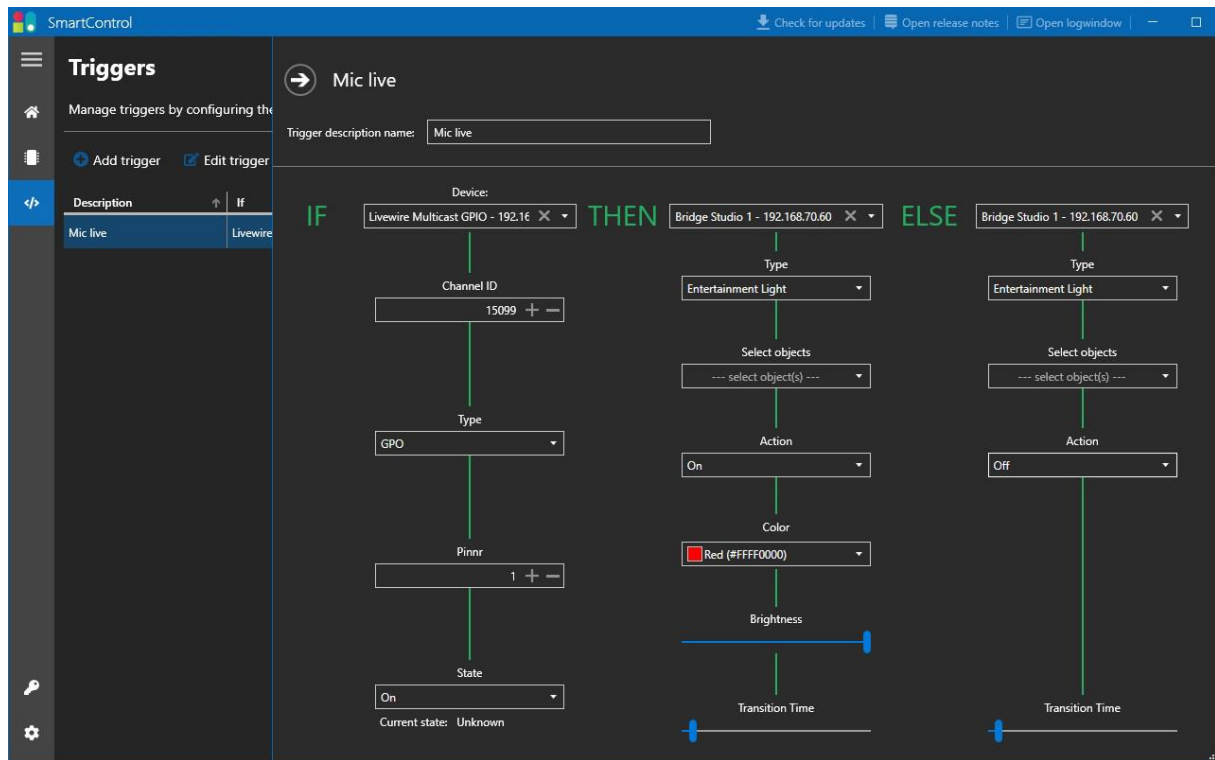
	Monitor Section			
	CR Monitor	CR Headphones	Preview	Studio Monitor
Volume (-85 .. 0 dB):	☐ Set -30.0 dB	☐ Set -30.0 dB	☒ Set -12.0 dB	☒ Set -85.0 dB
Volume adjust:	☒ Allowed	☒ Allowed	☒ Allowed	☐ Allowed
Dim gain: (-inf, -30 .. 0 dB)	-12.0 dB	-inf dB		-inf dB
Gain in Muted state: (-inf, -85 .. 0 dB)	-inf dB		-inf dB	-inf dB
Source:	Program 1 ▼			--- no source --- ▼
Source selection:	☒ Allowed			☐ Allowed
Preview in:	☐ Enabled	☒ Enabled		
Preview mode:		Normal ▼		
Logic port:	15099			0

Click “Ok” at the bottom of the page to save the settings.

Note: make sure you reload the show profile on the IQ(x). Otherwise these settings will not be activated.

Creating the trigger

Once the settings above have been entered correctly, we can start creating a trigger in SmartControl.



- To start, click “Add trigger” on the trigger page.
- It is useful to change the name of the trigger; do this in the “Trigger description name” field.

IF column

First select the trigger action in the first column, “IF”. For “Device”, choose “Livewire Multicast GPIO”.

- For Channel ID, enter the same number you entered for “Logic Port” in the IQ(x) settings.
- Choose type “GPO”
- Pinnr: 1
- And set “State” to “On”

More info about pin numbers can be found here: <https://docs.telosalliance.com/docs/gpio>

Then column

Now we set what should happen when the trigger becomes active.

- In the second column, “THEN”, choose the Hue Bridge you set up under Devices.
- For “Type”, choose “Entertainment Light”. (More info about these types can be found in the chapter [Devices, Philips Hue](#))

- “Select objects” lists all lights configured for this Hue Bridge. You can tick multiple lights if you like.
- Select the action you want to perform when the trigger is executed. In this case “On”.
- Choose a color, for example red.
- Use the “Brightness” slider to set how bright the light should be when it turns on.
- Finally, set the fade time with the “Transition Time” slider.

Else column

Here we set what should happen when the “IF” trigger is deactivated.

- This is almost the same as the “THEN” column, except that for “Action” we choose “Off”.

You are now done. The settings are active immediately and are saved automatically.

Combining GPIOs

SmartControl lets you combine pins of GPIO ports from multiple Livewire channels onto a single GPIO port. This way you can combine red light signaling from multiple channels on one GPIO port. In this example we assume you are using an Axia IQx and an xNode GPIO.

Make sure all devices are reachable on the network.

Configuring Livewire Multicast GPIO

Go to the chapter Devices > Livewire Multicast GPIO and configure a Livewire Multicast GPIO device.

Configuring the xNode GPIO

Enter a Livewire channel for each GPIO port.

Check the IP address of the xNode GPIO. If it is, for example, 192.168.1.150, use 15001 to 15006 as Livewire channels. A detailed explanation of how best to organize Livewire channels can be found here: [Livewire Channel Numbering - TelosHelp \(telosalliance.com\)](http://telosalliance.com/TelosHelp/LivewireChannelNumbering.html)

IF column

First select the trigger action in the first column, "IF".

- For "Device", choose the "Livewire Multicast GPIO" device.
- Enter the Channel ID of the Livewire channel of the first microphone assigned on the IQx. For example 1101.
- Choose type "GPO", Pinnr: 1 and set "State" to "On"

More info about pin numbers can be found in the appendix of this manual: [Livewire GPIO](#)

Then column

Now we set what should happen when the trigger becomes active, in the second column, "THEN".

- For "Device", choose the "Livewire Multicast GPIO" device.
- Enter the Channel ID of a GPIO port on the GPIO xNode, for example 15001.
- Choose type "GPO", Pinnr: 1 and set "State" to "On"

Else column

Here we set what should happen when the "IF" trigger is deactivated.

- This is almost the same as the "THEN" column, except that for "Trigger on" we choose "Off".

You can repeat the steps above for each microphone channel. In the IF column, enter the Livewire channel of the microphone assigned on the mixer each time, and in the THEN and ELSE columns increase the "Pinnr" by one each time.

Troubleshooting

Here are a few tips for tracking down problems. They can come in handy when you have temporarily lost the thread.

Controlling Livewire GPIO manually

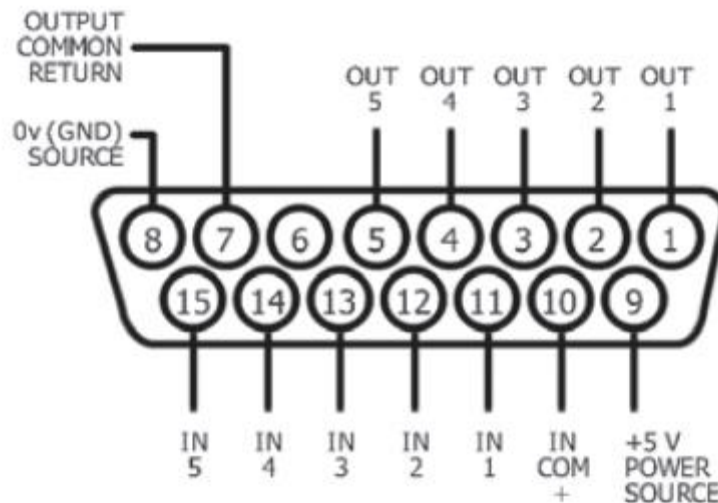
It is possible to switch and view the virtual GPIO pins of the Axia IP Driver. The Telos Alliance has written a handy guide on how to do this. You can find it here: [Troubleshooting IP-Driver GPIO - TelosHelp \(telosalliance.com\)](#)

Appendices

Livewire GPIO

Introduction

GPIO stands for General Purpose Input/Output. In the Livewire domain, each GPIO port consists of 5 inputs and 5 outputs, both physical and virtual. The image below shows the pinout of a physical GPIO port.



Standard Axia GPIO port

For more information about the electrical specifications of a GPIO port, see [this manual](#).

Each Livewire channel consists of around ten components that handle audio transport, timing and logic. In addition, each Livewire channel also has 1 virtual GPIO port.

Physical Telos Alliance devices can also have one or more GPIO ports. On these devices, the virtual GPIO port that belongs to a Livewire channel can be linked to the physical port on the device.

There are 2 ways to read or manipulate the status of a GPIO port: via the Livewire Routing Protocol or via the Livewire Multicast GPIO protocol.

Livewire Routing Protocol

This protocol essentially looks directly at the physical GPIO ports on a device. For example: SmartControl logs in to the device and asks it to send back all changes that occur on the pins of all GPIO ports. It also works the other way around: when SmartControl wants to set a pin high or low, it communicates directly with the device.

This method is direct, but has a few drawbacks. Because you communicate directly with the device, you need to create a connection for each device. For larger installations this is a lot of administrative work and can become hard to keep track of.

To avoid this, it is better to listen to the state of a GPIO port via the Livewire Multicast GPIO protocol, explained further below.

Livewire Multicast GPIO

All changes on every GPIO port pin of every Livewire channel on the network are published on a single “channel”. This channel is distributed over the network using multicast. Multicast is an efficient way to distribute data over an IP network.

Every Livewire device on the network monitors the GPIO channel for changes. It is good to know that there is no register on the network that keeps track of which channels are currently high or low. Only changes (pin goes high or pin goes low) are published on the GPIO “channel”.

This makes it very easy for a Livewire device on the network to keep track of changes on all GPIO ports — without having to know anything about the device itself.

Contact



P.C. Staalweg 130 | 3721 TJ | Bilthoven | The Netherlands | Tel +31(0)30 2217788
<https://tripleaudio.nl> | Info@tripleaudio.nl

Philips Hue Entertainment protocol

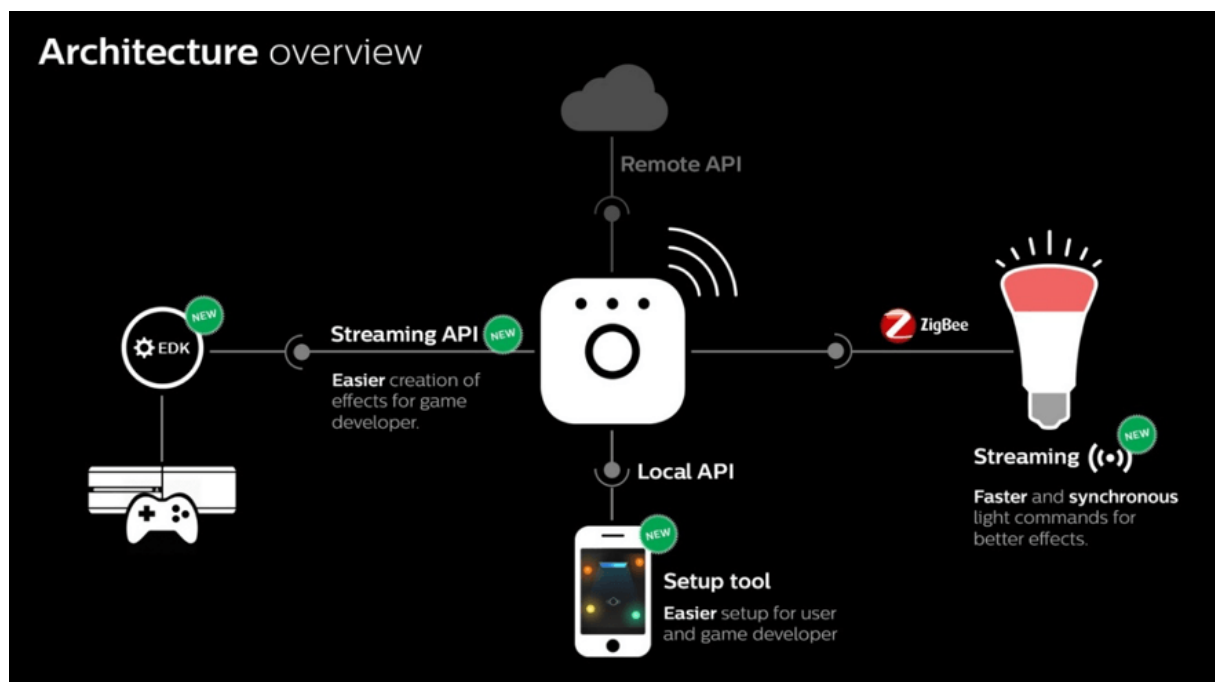
Article from the Philips Hue developer website.

Source: <https://developers.meethue.com/philips-hue-a-natural-ingredient/>

Philips Hue – a natural ingredient of any gaming, movie or audio experience

‘Philips Hue Entertainment’ is a major software update for the Philips Hue v2 bridge, Philips color capable lights and the Philips Hue app which is going to strengthen the lighting system’s integration into any home entertainment experience.

Our goal with Hue Entertainment is to fully immerse Hue users in their music, TV, movies and video games with high-quality, synchronized lighting effects.



As we’re sure you know, wireless communication with Philips Hue is based on the ‘Zigbee’ protocol. Zigbee uses a mesh network where every light repeats a message, providing simple, secure and reliable coverage in any home. This technology is fantastic for scene setting and automated-command use cases but runs into limitations when we try to push fast-changing special effects in live entertainment content.

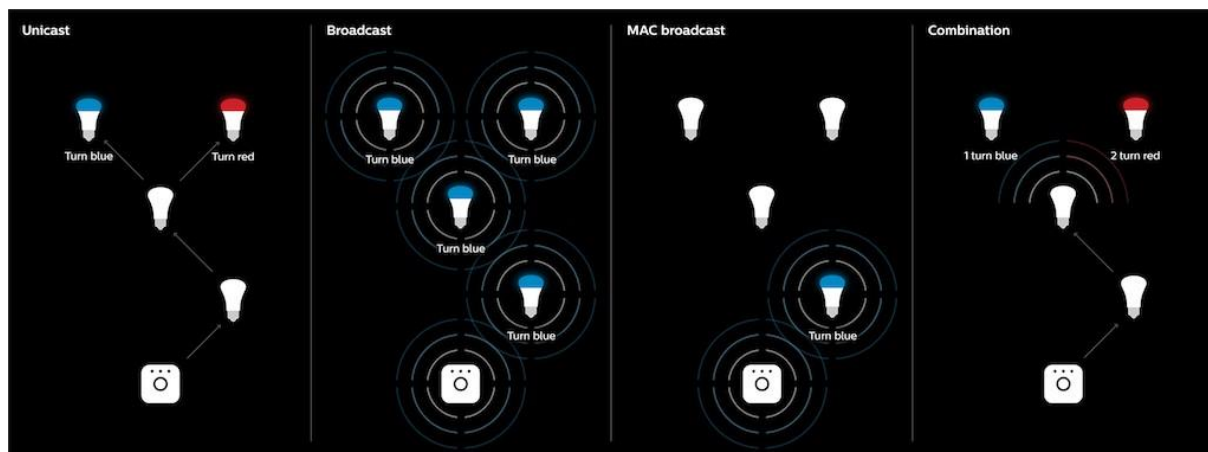
To create the synchronized effect we wanted, Hue Entertainment is developed as a new streaming-optimized interface which co-exists next to Zigbee.

How Hue Entertainment works

A Hue Entertainment command is built through the following process:

1. The command packages together the target state of up to 10 light channels in a custom Zigbee message.
2. This message is sent as a unicast over the mesh network to an automatically chosen proxy node in the target entertainment room.
3. This proxy node sends out a non-repeating low level MAC layer broadcast which all nearby lights will hear.
4. The nearby lights unbundle the message and act on their states.

Since the command is unicasting together with MAC broadcasts, we can stream commands 25 times per second to any light in the home whilst still creating spatial effects across multiple lights, all without causing network congestion. Additionally, the mechanism has no retries, which benefits an entertainment setting where synchronization is critical: for example, a delayed frame from an explosion in an action movie is worse than skipping the frame entirely.



Unicast	Broadcast	MAC broadcast	Combination
~25/s	~3/s	~25/s	~25/s
1 light at a time	Multiple lights at a time. Same state or pre-stored	Multiple lights at a time	Multiple lights at a time. Ad hoc states
Any light using mesh	Any light using mesh	Only nearby lights	Any light near the proxy
Great for light control and scene creation.	Great for room control and scene recall	Great for room based entertainment synchronization	
Explicit retries for confirmed delivery	Implicit retries from many neighbours	No retries	No retries

A new API and SDK

The need for a time synchronization-driven interface led us towards a new bridge-streaming API for Hue Entertainment. This bridge API is based on UDP and DTLS rather than HTTP, allowing us to drop frames to maintain synchronization as necessary. We plan to release the source code for a dedicated software development kit we've created, so developers can easily build applications combining lighting and entertainment. Called the **Hue Entertainment Development Kit** (EDK), it is written in C++ with portability and usability in the gaming world in mind.

The EDK not only wraps the Hue bridge discovery and streaming API, but also provides a light effect-rendering engine. Often, replicating effects in a room needs to be independent of the specific home setup, so the EDK takes care of mapping spatial effects onto the user's specific entertainment layout, which is created in the Hue app. This means the explosion or lightning to your left can be programmed to affect all three lights on that side of the room, or just one light, depending on your setup. It also offers other primitives for controlling or iterating over specific lights.

