

# Blue Pill / Reactor Getting Started

January 2021

Congratulations on heading into the future of media production control with SKAARHOJ! This document is the first written source that describes the core concepts of the Blue Pill platform and the Reactor software running on it.

This document goes through the initial set up and basic configuration of SKAARHOJs new and exciting technology, Blue Pill / Reactor for use with default configurations. Enjoy. For a more detailed and advanced set up please see the Blue Pill/ Reactor Manual.



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# Connectivity

## Networking

Unlike UniSketch where a change of configuration and included device cores needed an online exchange with the SKAARHOJ server, on Blue Pill everything is stored and enabled locally in Reactor. Only software updates or installations of non-existing device cores and applications need communication with the SKAARHOJ server over the internet. All changes in configurations can be done via the local network.

### Network Recommendations

- SKAARHOJ Blue Pill controllers have a 1 GBit network interface
- 5W-30W PoE (+)
- PoE Standard: IEEE 802.3af/t

Remember a SKAARHOJ controller and client must be on the same subnet (192.168.10.\* or one defined for the local network used by the controller). With multiple SKAARHOJ units connected to the same network they need to have different IP addresses!

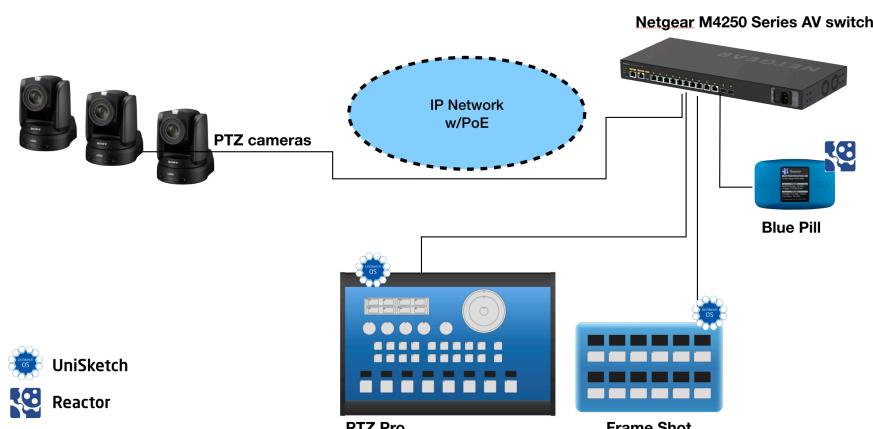
### Power over Ethernet (PoE) Specifications

We use the PoE industry standard 5W-30W PoE (+) IEEE802.3af7t. To power our controllers using PoE it is important the switch supports this standard. Please notice some manufactures such as Ubiquity have their own non-standard 24V type of PoE which is incompatible with our controllers. Especially pay attention to the standard when using a PoE injector.

### Network Layout

We recommend connecting SKAARHOJ UniSketch controllers and Blue Pill via professional PoE network switches, such as NetGears M4250-series which are at the same time designed for AV network traffic such as NDI video.

A PTZ Pro, Frame Shot, Blue Pill, and PTZ camera configuration could look like this:



Please note, we are not networking experts and are not able to assist in network set up.

# Accessing Blue Pill

## DHCP or Static IP

The Blue Pill's user interface is accessed via the device's IP Address and any web browser. The IP address can be found on the display after it is plugged into a network connection with PoE or a network connection and a power supply (5V Micro USB).



Entering the IP address into the address bar of a search engine will bring up a prompt for username and password. The default is username: **admin** password: **skaarhoj**

192.168.11.110  
This site is asking you to sign in.  
Username  
admin  
Password  
.....  
Cancel Sign in

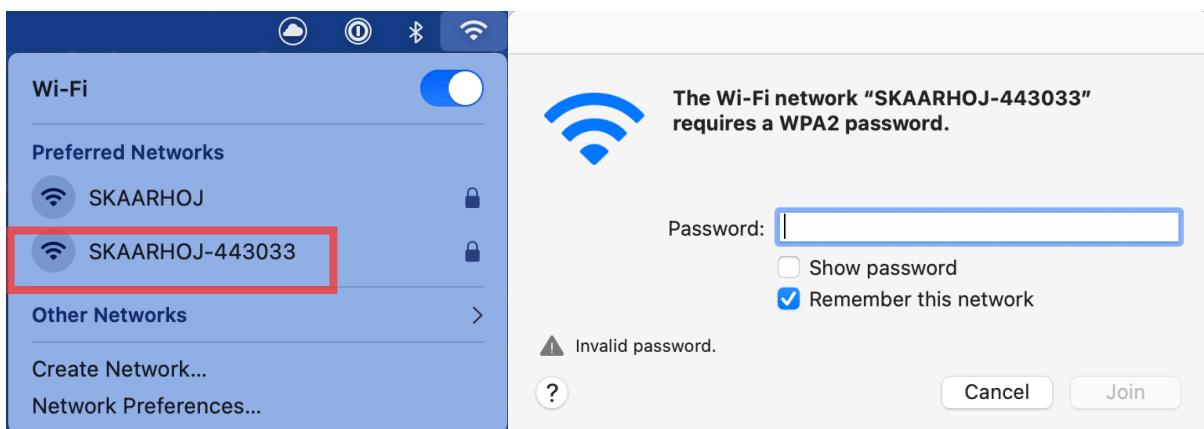
## Wi-Fi Access Point

If the Blue Pill is not displaying an IP address, the web interface is accessible by enabling the internal Wi-Fi access point.

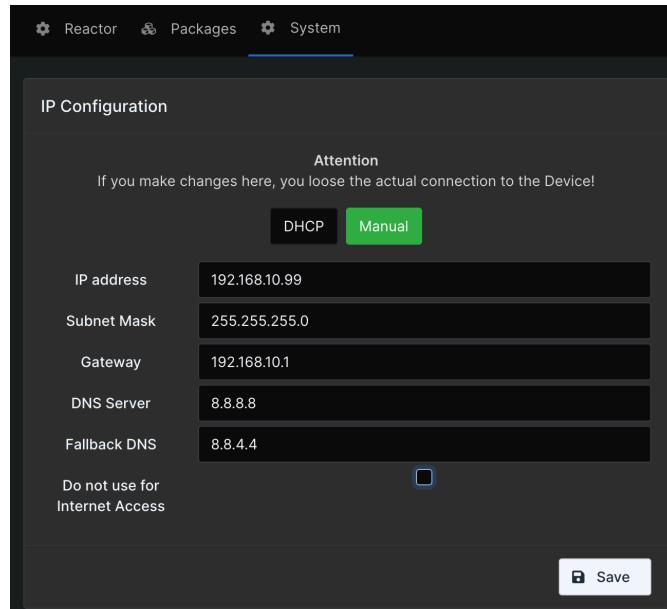
To enable the Wi-Fi access point, gently press and hold the config button on the side of the Blue Pill for about 3 seconds (Found next to the Ethernet jack. Use a flat screw driver, a paper clip or similar). When released, it will enable the internal Access Point and the LED will light up purple. It will show up in the Wi-Fi networks list as SKAARHOJ-XXXXXX (Blue Pill's serial number).

The default password is: **skaarhoj**

The web interface is then accessed at the IP address: **192.168.4.1**



After accessing the Blue Pill it is best to navigate to the System Menu/System page to set a static IP address. Once saved, the new IP address will appear on the Blue Pill's display, it may be necessary to reboot or power cycle the device afterwards.



## Link from SKAARHOJ Firmware Updater

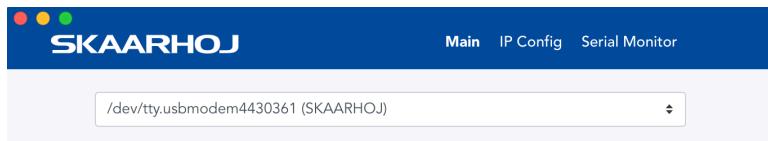
If the SKAARHOJ Firmware Updater open on a computer running on the same subnet as the Blue Pill, the Blue Pill should appear below the main controller access buttons of the updater. Clicking on Configure next to the panel's information will open the web interface directly. The Blue Pill does not need to be connected to the computer via USB.

The screenshot shows the SKAARHOJ Firmware Updater interface. The top navigation bar includes 'Main', 'IP Config', and 'Serial Monitor'. Below the navigation is a 'Select Device' dropdown and several buttons: 'Update Configuration/Firmware' (green), 'Online Configuration' (grey), 'Local Configuration' (blue), and 'Manuals and Support' (blue). A table lists three devices:

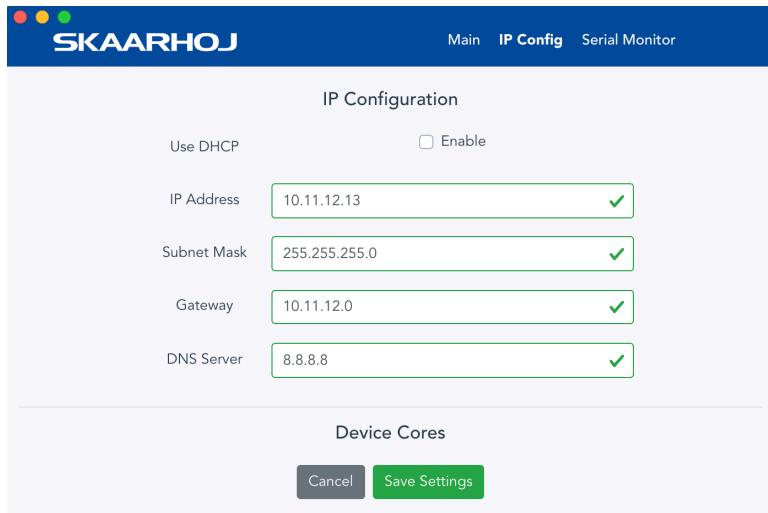
Device	Serial	Ipv4Address	Features	Actions
SK_BLUEPILL	443033	192.168.11.110	skaarOS, IBeam Cores	<button>Configure</button>
SK_RCPV2	432680	192.168.11.195	Unisketch, rawpanel	
SK_XC7SV3	432731	192.168.11.32	Unisketch, rawpanel	

## SKAARHOJ Firmware Updater and Micro USB

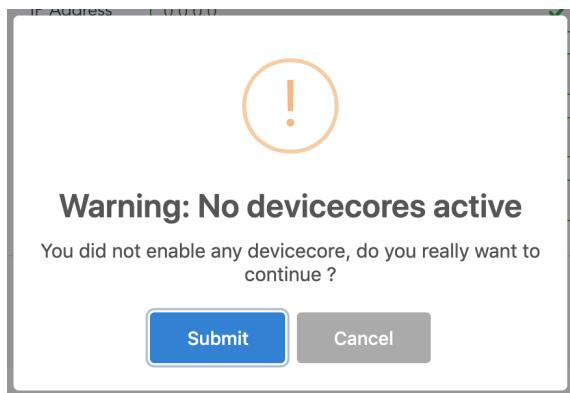
If a network connection to the Blue Pill in not available, the IP address can be set using a Micro USB cable. In this case the Blue Pill will appear in the "Select Device" dropdown and the "IP Config" tab in the Firmware Updater can be used to set the IP address (same procedure from UniSketch):



In this case it was identified as "/dev/tty.usbmodem4430361" (on MacOS) and pressing IP Config will open the IP set up page:

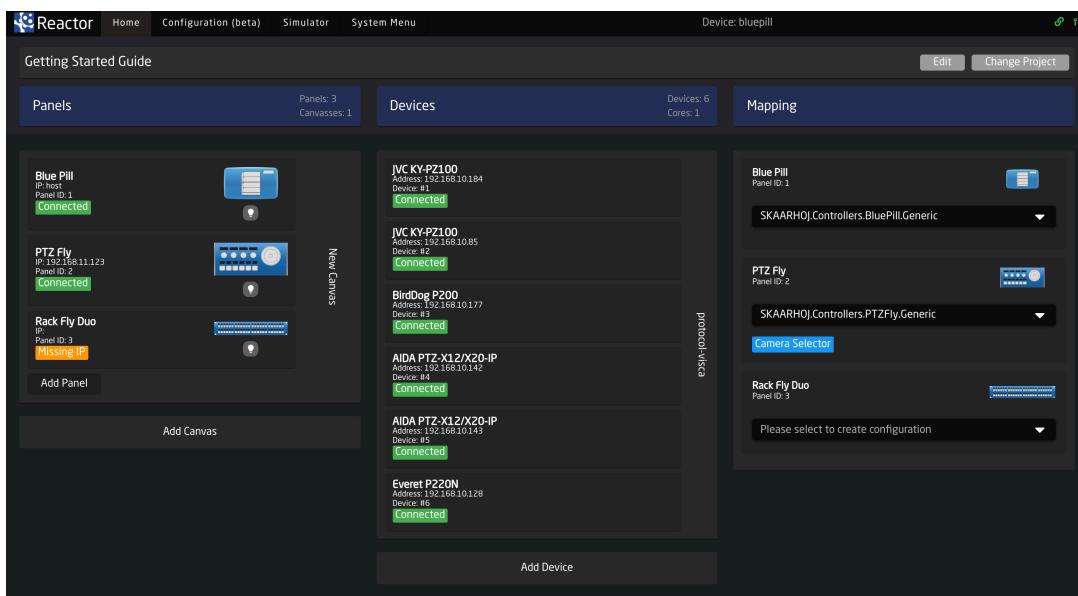


If/When the warning below appears, press "Submit" and reboot the Blue Pill:



# Reactor

The Home screen of Reactor will consist of a **Project** title at the top and three sections with **Panels**, **Devices** and **Mapping**. Clicking on the name bar of any of the three main sections will open that section for larger access.



## Projects

Projects are the unit that just has a title, description and references to a panel collection, a device collection and a configuration.

Blue Pills ship with a default project that will be open when the web interface is accessed.

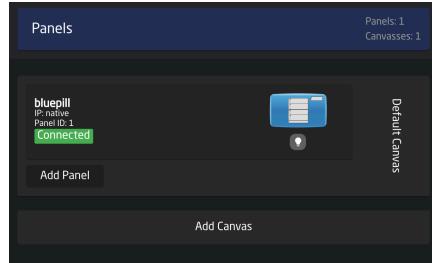
To change the details of the project click the Edit button. It is then possible to customize the name and description of the project. Press Ok to save.

The screenshot shows the "Edit Project" screen. At the top, it says "bluepill" and "Congratulations with your new bluepill! It's going to be amazing from here...". There are "Edit" and "Change Project" buttons. The main form fields include: "Name" set to "bluepill"; "Description" containing the same congratulatory message; "Mode" with radio buttons for "Command Dispatch" (selected), "Demo", and "Mono Panel"; and an "Advanced" checkbox which is unchecked. At the bottom are buttons for "Copy Project", "Export Project", "Ok" (highlighted with a red border), and "Delete".

# Panels

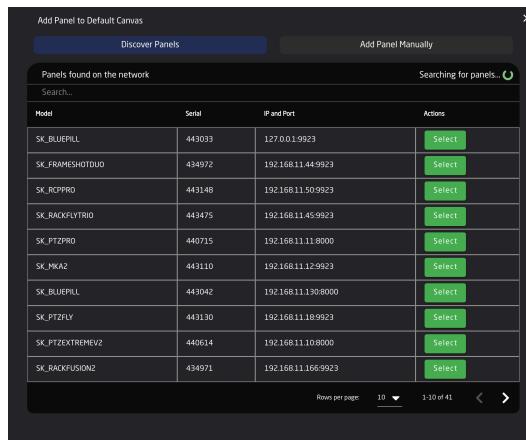
The Panels section is where new SKAARHOJ panels are added to the panel collection of the project. By default the Blue Pill will already be in the Panels section, this is because the Blue Pill is technically also a panel.

There are two ways a panel can be added, Auto Discover and Manually.



## Auto Discover

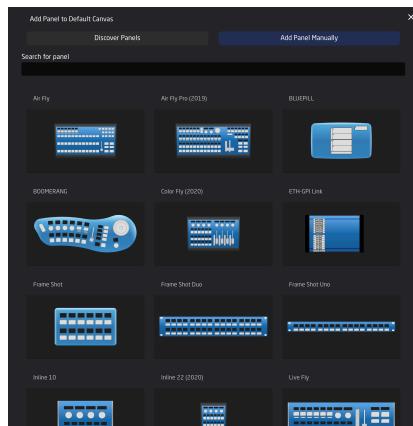
Panels can easily be discovered by mDNS look ups on the same subnet the Blue Pill is on. This makes it very easy to discover and include a panel in the configuration. mDNS will usually search the current subnet, but with a correctly configured Blue Pill, panels on other subnets can easily be included too as long as the IP and port is known to the user.



Pressing SHIFT + the green Select button will allow for multiple panel selection.

## Manually Added

Panels can be picked from SKAARHOJs included library of products. Following a manual choice of panel, the user will have to enter the IP address himself including any constraints desired. See the Panel Details section for set up.

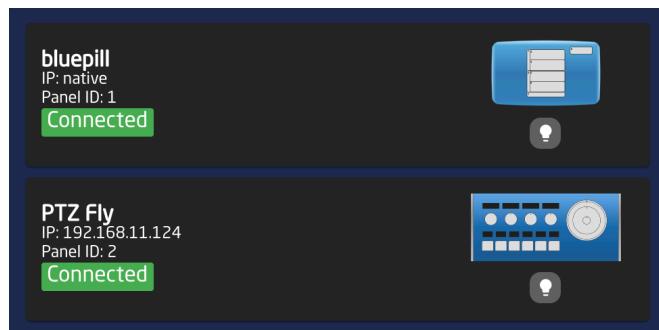


## Panel Details

Panels have their status displayed clearly in the overviews on the Home screen. Their IP address is visible as well as their ID (useful to know for configurations/mapping).

The state of connectivity is also clearly displayed.

There is a button for panel identification which can be used to light up the panel temporarily. This is very useful with large collections of panels.



Clicking on a panel in the Panels section will open up the details. Here the name, ID number, and Active status of the panel can be changed. By default the controller name will be the same as the model name, the ID will be auto generated in order, and the status will be active. A controller's status needs to be active for use.

Constraints are requirements regarding the panel. Here it is determined which models are allowed, which serials are allowed, which IP and port numbers can be used and if the panel is of the server or client type (Raw Panel protocol related). Empty constraints will allow any value, but consider that a configuration always maps functionality to hardware component IDs which will change with the panel model for obvious reasons, so it's rarely a good idea to omit constraints such as the allowed models.

Name	PTZ Fly
Id	2
Active	<input checked="" type="checkbox"/>
Models	SK_PTZFLY
Serials	491115
IP and Port	192.168.11.124:9923
Type	server

By default our controllers connect using port 9923. It is important to include the port number, separated from the IP address by a colon (:), for example 192.168.11.124:9923

## Confirm Connection

A panel that has established a connection with a blue pill will no longer display "Waiting for Blue Pill" or "Waiting for Raw Panel".



## Devices

The Devices section is where new devices are added to be connected with the SKAARHOJ panels. There are two ways a device can be added, Auto Discover and Manually.

Devices

Devices: 2  
Cores: 2

CR-N500  
Address: 192.168.10.223  
Device: #1  
Connected

canon-vc

ATEM Television Studio (1. edition)  
Address: 192.168.10.56  
Device: #1  
Connected

bmd-atem

Add Device

The Devices tab in Reactor offers a bit of statistics for the user too: Like how many devices and cores are found in the collection. Also, connectivity issues are reported with a warning sign.

Devices

Devices: 3  
Cores: 3

!

## Auto Discover

Searching on the network for devices will find many types by a combination of mDNS look-ups and other methods. However, not all devices can be discovered easily, but with those that can, it's a simple click of a button to add it to the Blue Pill device collection. Following an Auto Discover some device details may still be needed to establish connectivity. See Device Details section for set up.

The screenshot shows the 'Add Devices' window with the 'Discover Devices' tab selected. At the top, there is a search bar labeled 'Search...'. Below it is a table with columns: 'Device Name', 'Device Core', 'IP', and 'Actions'. The table lists six devices:

Device Name	Device Core	IP	Actions
JVC PTZ KY-PZ400	core-protocol-visca:29	192.168.10.85	Select
Blackmagic ATEM Production Studio 4K	core-bmd-atem:12	192.168.10.57	Select
RoboSHOT 30E NDI	core-vaddio-ptz:1	192.168.10.138	Select
Blackmagic Smart Videohub	core-bmd-videohub:2	192.168.10.61	Select
CR-N500	core-canon-xc:1	192.168.10.223	Select
AIDA PTZ	core-protocol-visca:6	192.168.10.143	Select

At the bottom, there are pagination controls: 'Rows per page: 10', '1-6 of 6', and navigation arrows.

Pressing SHIFT + the green Select button will allow for multiple panel selection.

## Manually Added

If a device must be added manually, it's easy to look it up in the list of supported models. Following a manual choice of device, the user will have to enter the IP address and other possible device detail information. See the Panel Details section for set up.

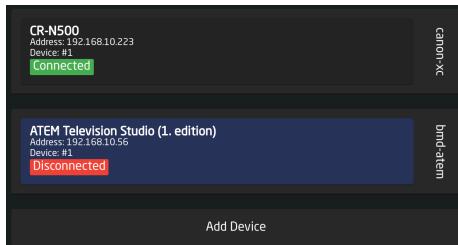
The screenshot shows the 'Add Devices' window with the 'Add Device Manually' tab selected. On the left, there is a 'Models' list containing several device names. The 'aja-kumo KUMO 1616' model is highlighted with a green background. On the right, there is a 'Model Information' panel with fields for 'Name' (set to 'KUMO 1616') and 'Description' (set to 'AJA KUMO 16 input, 16 output router'). There is also a green 'Add Device' button.

Pressing SHIFT + the green Add Device button will allow for multiple panel selection.

## Device Details

Devices are presented in a nice overview with their connectivity state shown clearly. The Device number (Device ID) is also important for configuration. Most configurations will expect device ID 1, but if there are multiple switchers, routers etc, they need to be assigned different numbers to address them in the configuration. Different Device IDs are most clearly used in camera selectors with PTZ configurations.

Devices will be shown broken down into different groups based on their associated device core. Device cores are auto loaded onto the blue pill when a new core is selected via a device.



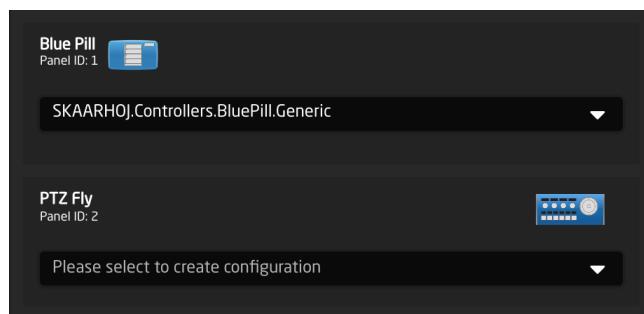
Clicking on a device in the Devices section will open up the details. Here the IP address, Username and Password, DeviceID, ModelID, and Description can be adjusted. (Details shown here are for a Canon CR-N500 PTZ camera, available detail options are device specific)

A screenshot of a configuration form for a CR-N500 device. The title at the top is 'CR-N500'. The form fields include: 'Active' (checkbox checked), 'IP' (192.168.10.223, description: 'The IP address of the Canon device'), 'Username' (admin, description: 'The Username for the Canon device'), 'Password' (\*\*\*\*\*, description: 'The password that is set on the device'), 'Name' (CR-N500), 'DeviceID' (1, description: 'Unique number identifier for this device, This field is auto filled'), 'ModelID' (CR-N500, description: 'The model type of the device'), and 'Description' (empty input field). At the bottom right is a red 'Delete' button.

## Mapping

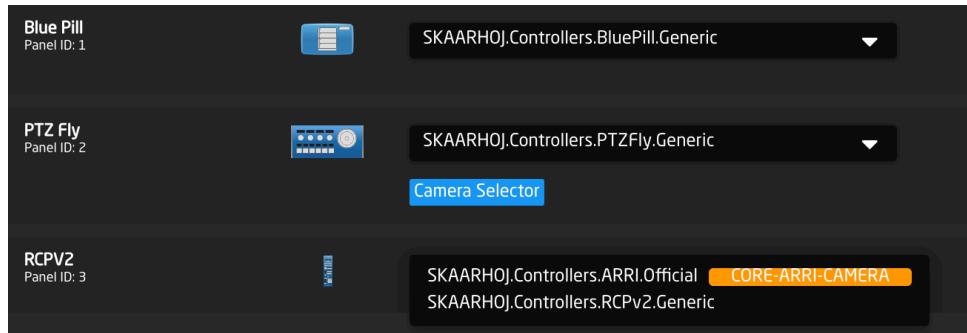
The Mapping section on the Home screen is designed to provide a view into the current configuration and often it will refer to embedded standard configuration with associated *constant sets* for setting up cameras, router input/outputs or switcher inputs.

This is configuration the simple way using a pre-made default configurations.



## Configuration

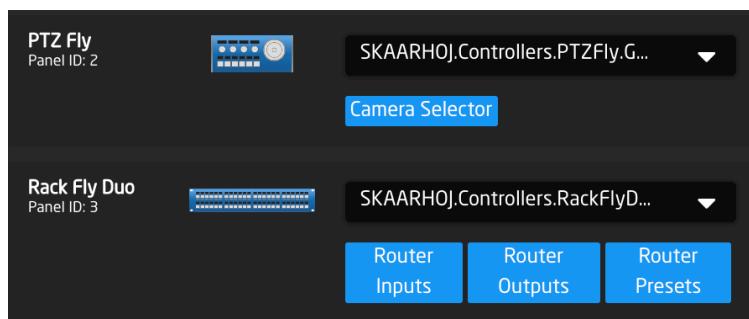
The mapping page makes it easy to select a configuration for each controller. When the panel is added to the Blue Pill it automatically loads in the Mapping section with a drop down containing all the compatible configurations for that panel.



## Setup Tables (aka Constant Sets)

The final step is to fill in any setup tables, also known as *constant sets*. The constant sets are available based on the chosen configuration and should contain entries such as specific cameras for a PTZ controller, or the inputs for a video switcher etc. They are most common when working with PTZ cameras and routing panels, though may be available for additional device configurations.

The setup tables will auto save and quickly appear on displays and enable the function.

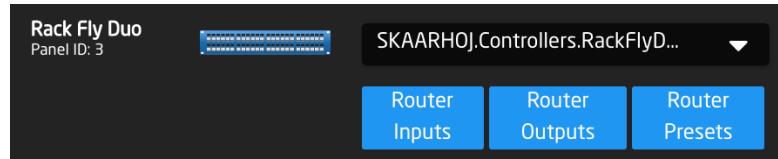


An example of a setup table would be a camera selector and can be seen below. These can be different depending on the selected configuration. From here the order on the camera selector row of the panel will be set as well as the desired name on the displays.

Name: Camera Selector			Description: This sets up the cameras using Standard Class configurations.					
Drag	Mute	Binding	Device Number:	Camera name:	Use device configuration:	Configuration for Iris/Master black channels:	Tally Index:	FrameLink Window:
☰	✖	BirdDog P200	3	BirdDog P200	SKAARHOJ.Devices.VISCA-Allstars.StdClass.basic ▾	SKAARHOJ.Devices.VISCA-Allstars.IrisChannel ▾		
☰	✖	JVC KY-PZ100	1	JVC KY-PZ100	SKAARHOJ.Devices.VISCA-Allstars.StdClass.basic ▾	SKAARHOJ.Devices.VISCA-Allstars.IrisChannel ▾		
NEW								

Column	Description
Drag	Allows for quick rearranging of camera order
Mute	Allows for removing access to a specific camera or to leave a blank spot on the panel
Binding	Allows for the selecting of a specific connected camera
Device Number	Ties the camera selector to the specific device. This is found in the Devices section. Each device will have a unique device number per device core. This box should auto-populate when a camera is selected in binding
Camera Name	Customizable name to appear on the displays. Character limit is determined by size of display and can vary.
Use Device Configuration	Selects the protocol based configuration associated with camera. Needed protocol can be seen in the Devices section, each device is grouped into their native protocols. <b>Double check the correct configuration is selected. Improper selection will effect camera control.</b>
Configuration for Iris/Master Black Channel	Selects the needed protocol for Iris/Master Black control. For cameras without a variable lens this will follow the same protocol as the device. For cameras with a variable lens, select the protocol for the attached lens.
Tally Index	Tally Index number set in advanced configuration tool. See Blue Pill/Reactor Manual for more information. This column does not need to be filled out for standard operation.
FrameLink Window	Sets the FrameLink Window value associated with the FrameLink device core for use with FrameLink compatible devices. See Blue Pill/Reactor Manual for more information. This column does not need to be filled out for standard operation.

An example of a router inputs selector can be seen below. These can be different depending on the selected configuration and device. From here the order on the inputs/outputs row of the panel will be set as well as the desired name on the displays and button color.

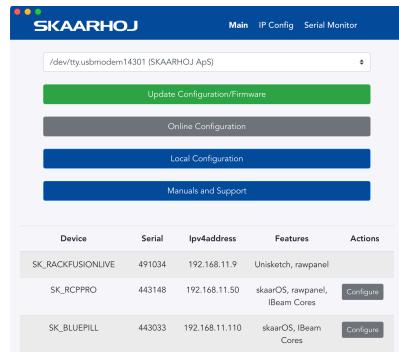


Name: Router Outputs		Description: Setting up router output order, custom labels and colors		
Drag	Mute	Output number	Alternative label	Color
⋮	👁️	1	Monitor	RED
⋮	👁️	2	Desk	GREEN
⋮	👁️	3	Display	PINK
⋮	👁️	4	Control	ICE
NEW				

Column	Description
Drag	Allows for quick rearranging of input/output order
Mute	Allows for removing access to a specific input/output or to leave a blank spot on the panel
Output Number/Input Number	Ties the selector to the specific input/output. This is found is determined by the individual router.
Alternative Label	Customizable name to appear on the displays. Character limit is determined by size of display and can vary.
Color	Sets the button feedback color. Color options are: OFF, WHITE, WARM, RED, ROSE, PINK, PURPLE, AMBER, YELLOW, DARKBLUE, BLUE, ICE, CYAN, SPRING, GREEN, MINT. The format for color selection is all large letters with no spaces between words.

# Connecting UniSketch Controllers

The Blue Pill works as a wonderful add-on to connect and control UniSketch controllers like never before. There are three ways to set a UniSketch controller to allow for connection to the Blue Pill. Two of the methods will involve using the SKAARHOJ Firmware Updater available [here](https://www.skaarhoj.com/support/firmware-updater): (<https://www.skaarhoj.com/support/firmware-updater>). The controller will need to be connected to the computer by USB cable. After the controller is set to Blue Pill Mode, it will no longer need USB connection for programming. This will be done through the Blue Pill web interface.



## Blue Pill Mode - Via Serial monitor

Starting with UniSketch v2.5.14, it is possible to put the panel into Blue Pill Mode with a command in the serial monitor. Using this method the controller will be assigned an IP address only via DHCP.

To enter Blue Pill mode, type in: **TakeTheBluePill** in the serial monitor. The mode will be confirmed:

```
|.Blue Pill Mode enabled! (Raw Panel Server Mode), resetting..
```

The IP address of the controller will now be confirmed in the boot up information for the controller:

```
*****
SKAARHOJ Controller Booting
*****
SK VERSION: v2.5.14
SK MODEL: SK_RACKFLYUNO
SK SERIAL: 433769
EEPROM Sizer: 8192
Blue Pill DIRECT MODE enabled
I2C 400 kHz mode activated
Infrared and buttons
presets 1 loaded
MAC address: 82:a1:d4:00:73:4a
Requesting DHCP address... OK
IP address: 192.168.11.222
Subnet mask: 255.255.254.0
Gateway: 192.168.10.1
DNS: 192.168.10.1
mDNS: 192.168.11.222, announced for port 80
Boots Count: 191
Uptime: 250 hours, 12 minutes
Screen Saver: 99 hours, 41 minutes
Usage Stats Flags: 01
*****
Blue Pill DIRECT MODE enabled (DHCP + Raw Panel Server Mode on port 993)
*****
DeviceCore #1: UniSketch TCP Client0, IP = 0.0.0.0:9923
True Encoder Button Action: 1
UNISKETCHTCPCLIENT: Server Mode = ON
Compiled: Dec 1 2021 09:14:53
setup() Done
-----
59
|UNISKETCHTCPCLIENT: Reset sleep timer last trigger
```

The IP address will also be displayed on the panel along with "Waiting for Blue Pill"



An advantage of Blue Pill Mode is, that it will not destroy any existing configuration on the panel and can easily be exited from again by writing “**reset**” or pressing the reset button in the serial monitor. Blue Pill Mode is meant as a quick way to get in and out of Blue Pill Mode when using UniSketch panels in both ways regularly.

## Blue Pill Mode - Via Special Key

Blue Pill Mode can be enabled and disabled without the serial monitor on most UniSketch panels running firmware version 2.5.14 and above.

- *Enter Blue Pill Mode:* During power-up, when the color animation first appears across the buttons, press the button in the lower left corner of the controller twice. When the color animation completes, it should sweep across the controller with just blue color - and it will reboot Blue Pill Mode
- *Exit Blue Pill Mode:* Same procedure as above. When Blue Pill Mode is exited, the color sweep to confirm it will be white instead of blue.

The IP address will also be displayed on the panel along with “Waiting for Blue Pill” the same as when using the serial monitor to enter Blue Pill Mode.

## Fixed Configuration

If a static IP is needed it is possible to do so by selecting the default configuration called Blue Pill Mode and loading it onto the controller. This uses our SKAARHOJ Raw Panel integration with the needed device core options already selected. We recommend this type of configuration for any static or long term installation.



Once it has been selected the IP address can be set either in the Network Configurations section in the Simple Configuration page before the firmware is loaded onto the controller via the Update Configuration/Firmware button on the updater.

 A screenshot of the "Network configuration" section in the UniSketch Simple Configuration page. It shows the following settings:
 

- DHCP  Static
- IP: 192.168.10.99
- Subnet: 255.255.255.0
- Gateway: 192.168.10.1
- DNS: 192.168.10.1
- Devices**

Enabled	Name	IP
<input checked="" type="checkbox"/>	UniSketch Raw Panel	192.168.10.250

 A green "Save Network Configuration" button is at the bottom.

Or it can be set in the IP Config tab of the SKAARHOJ Firmware Updater.

 A screenshot of the "IP Configuration" tab in the SKAARHOJ Firmware Updater. It shows the following settings:
 

- Use DHCP  Enable
- IP Address: 192.168.10.99
- Subnet Mask: 255.255.255.0
- Gateway: 192.168.10.1
- DNS Server: 192.168.10.1
- Device Cores**

UniSketch Raw Panel	192.168.10.250	<input checked="" type="checkbox"/> Enable
---------------------	----------------	--

 Buttons for "Cancel" and "Save Settings" are at the bottom.

Please note, in both methods, the IP address for the UniSketch Raw Panel device core does not need to be set to a specific IP as it has been set to Server Mode and is being connected to and not connecting to anything. Having it Enabled is enough.

The IP address will also be displayed on the panel along with "Waiting for Raw Panel"



# Contact Support

It is always possible to contact us for support questions - write an email to [support@skaarhoj.com](mailto:support@skaarhoj.com) and we will do our best to accommodate the request.

In order for us to provide the best support please state:

- Which SKAARHOJ unit it is about
- The serial number of the device (small silver label with 6 digits)
- The nature of the problem
- Which hardware device(s) are to be controlled and their firmware version
- If the device's web interface has been successfully accessed
- The connected computer's operating system



# WEEE Information



Figure 1

#### **For private households: Information on Disposal for Users of WEEE**

This symbol (figure 1) on the product(s) and / or accompanying documents means that used electrical and electronic equipment (WEEE) should not be mixed with general household waste. For proper treatment, recovery and recycling, please take this product(s) to designated collection points where it will be accepted free of charge.

Alternatively, in some countries, it may be possible to return the products to the local retailer upon purchase of an equivalent new product.

Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling.

Please contact the local authority for further details of the nearest designated collection point.

Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislations.

#### **For professional users in the European Union**

To discard electrical and electronic equipment (EEE), please contact the local dealer or supplier for further information.

#### **For disposal in countries outside of the European Union**

This symbol is only valid in the European Union (EU). To discard this product please contact local authorities or dealers and ask for the correct method of disposal.