FPP Push Button Stand for both Show and Remote Use

Presented by
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Charlees Props

Who I am & Why

- Thom, Lynden, owner Charlees Props
- First Show was 2020 in Sedro-Woolley
- Second Show was 2021 in Lynden
  - Also heavily assisted in Lights Of Lynden (drive Through)
- Third Show was 2022 in Lynden
  - Addition of FPP based push button stand for wings, which traveled
- Created Charlees Props January 2023

Purpose

- The 'Selfie Wings' from EFL became an instant hit in 2021
- Experience Lights created a remote GPIO Extender PiHat (later enhanced to create In/Out GPIO Extender)
- Using the 'Selfie Wings' and the GPIO Extender gave users ability to control 'Selfie Wings' colors (within reason)
- In 2022 we utilized this method, but with a twist

The Twist

- We wanted to
  - bring awareness to our food bank
  - share the wings at more than our show alone
  - share the wings at our show as well
  - Utilize as little equipment as possible
  -
- We learned to
  - Utilize the wings at our show OR away from our show with minimal configuration changes!

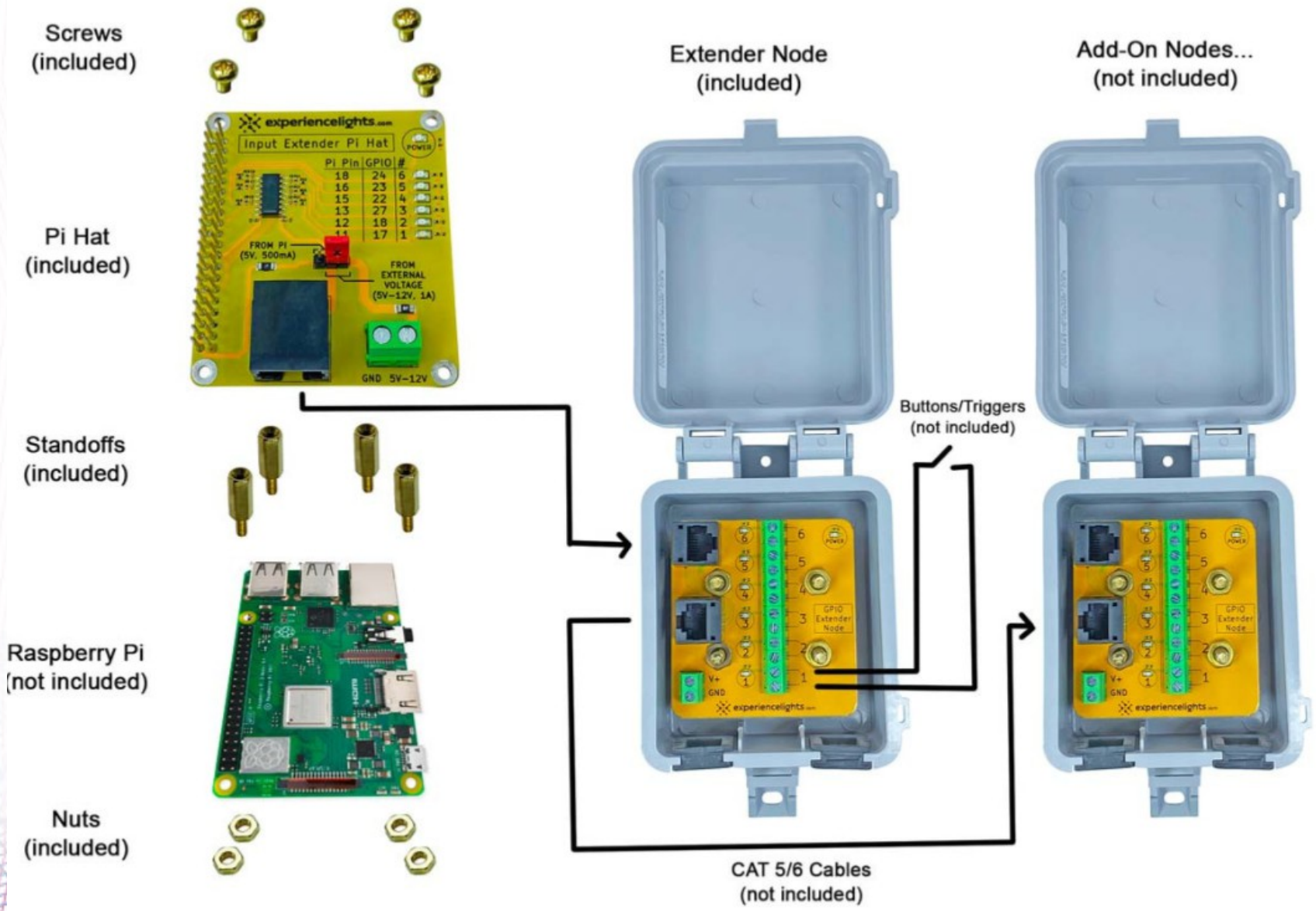
So... where are these wings?

- The wings are fun, especially for kids.
- They are quite large assembled.
- Opted not to bring them today.... sorry
- Here's a photo:

Hardware Needed

- Raspberry Pi (3b+ or newer preferred) and microSD card
- Experience Lights GPIO Extender, or In/Out Extender
- A prop/props to light up
- Case, power supply, appropriate cabling
- Buttons of your choice and a stand to house/hold them
  - Experience Lights offers buttons but we wanted light up buttons (WS2812b)

GPIO Extender Kit



Software needed

- FPP (Falcon Pi Player)
- A means to image FPP onto the MicroSD card
- Xlights
- Both are available “free” online
  - Both are free but we should all donate to the developers.
  - This hobby is anything but free.....

Hardware Setup

- Build your box to house the rPi, PSU, and connect all cabling needed
- Attach the Experience Lights PiHat to your rPi
- Ensure you have an ethernet cable long enough from your 'box' to your button stand
- Connect your buttons to your GPIO extender box from Experience Lights

Pixels Directly Off the Pi

- This configuration supports ~1,000 WS281x pixels, each, on 2 channels
- Per FPP instructions:
  - Data String #1 – connect to Pin 12 (GPIO18)
  - Data String #2 – connect to Pin 35 (GPIO19, only on 40 pin Pi's)
  - Ground – connect to Pin 25
  - Pixel Power – DO NOT connect to/through Pi

Pi GPIO Layout

	Pin No.		
3.3V	1	2	5V
GPIO2	3	4	5V
GPIO3	5	6	GND
GPIO4	7	8	GPIO14
GND	9	10	GPIO15
GPIO17	11	12	GPIO18
GPIO27	13	14	GND
GPIO22	15	16	GPIO23
3.3V	17	18	GPIO24
GPIO10	19	20	GND
GPIO9	21	22	GPIO25
GPIO11	23	24	GPIO8
GND	25	26	GPIO7
DNC	27	28	DNC
GPIO5	29	30	GND
GPIO6	31	32	GPIO12
GPIO13	33	34	GND
GPIO19	35	36	GPIO16
GPIO26	37	38	GPIO20
GND	39	40	GPIO21

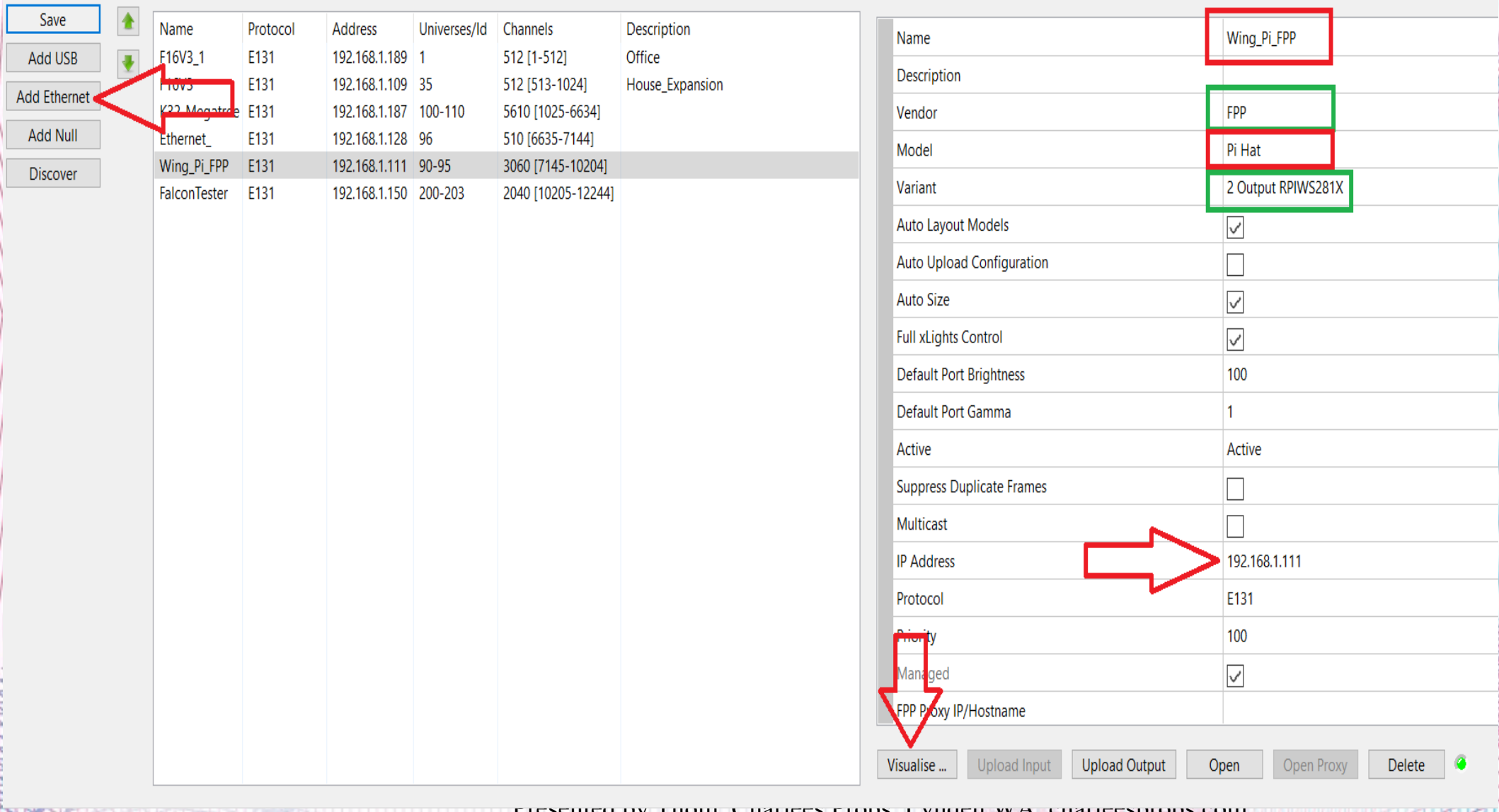
FPP Initial Setup

- Power your FPP up when connected to your router (preferably show router if different)
- Obtain the FPP IP address
  - Easiest method – connect your phone to the same router, use an App called “Fing” - search all connected devices
- Update your router to keep this IP address static

Xlights

- Load in your necessary props
- Add in your new FPP device as a controller
  - Click “Add Ethernet”
  - Enter a Name
  - Select “FPP” as the Vendor
  - Select “Pi Hat” as the Model
  - Variant should be “2 Output RPIWS281x”
    - One note – no more audio from this FPP
  - Enter your IP address

Screenshot of Xlights



Xlights cont.

- Create the sequences you want for your prop
- Suggestions are:
  - At least 1 sequence per button color
  - 1 additional sequence (for 'away from show' settings)
- Connect to FPP and load these sequences!

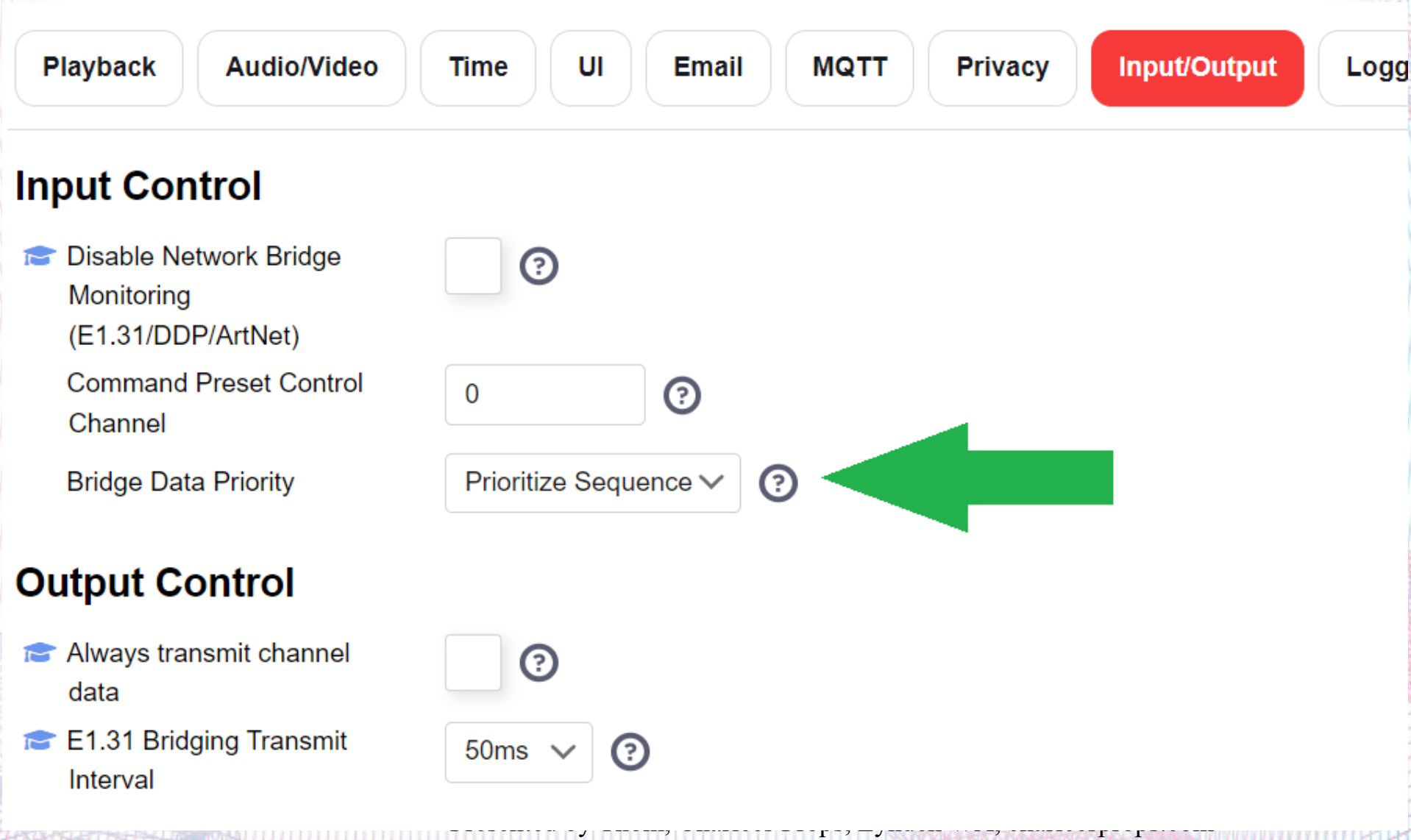
FPP Overall Configurations

- Follow FPP instructions for general setup
- Content Setup:
  - Create playlists and scheduler
- Input/Output Setup:
  - E1.31 Output – enable output
  - Enter your Pixel String information
  - GPIO Inputs

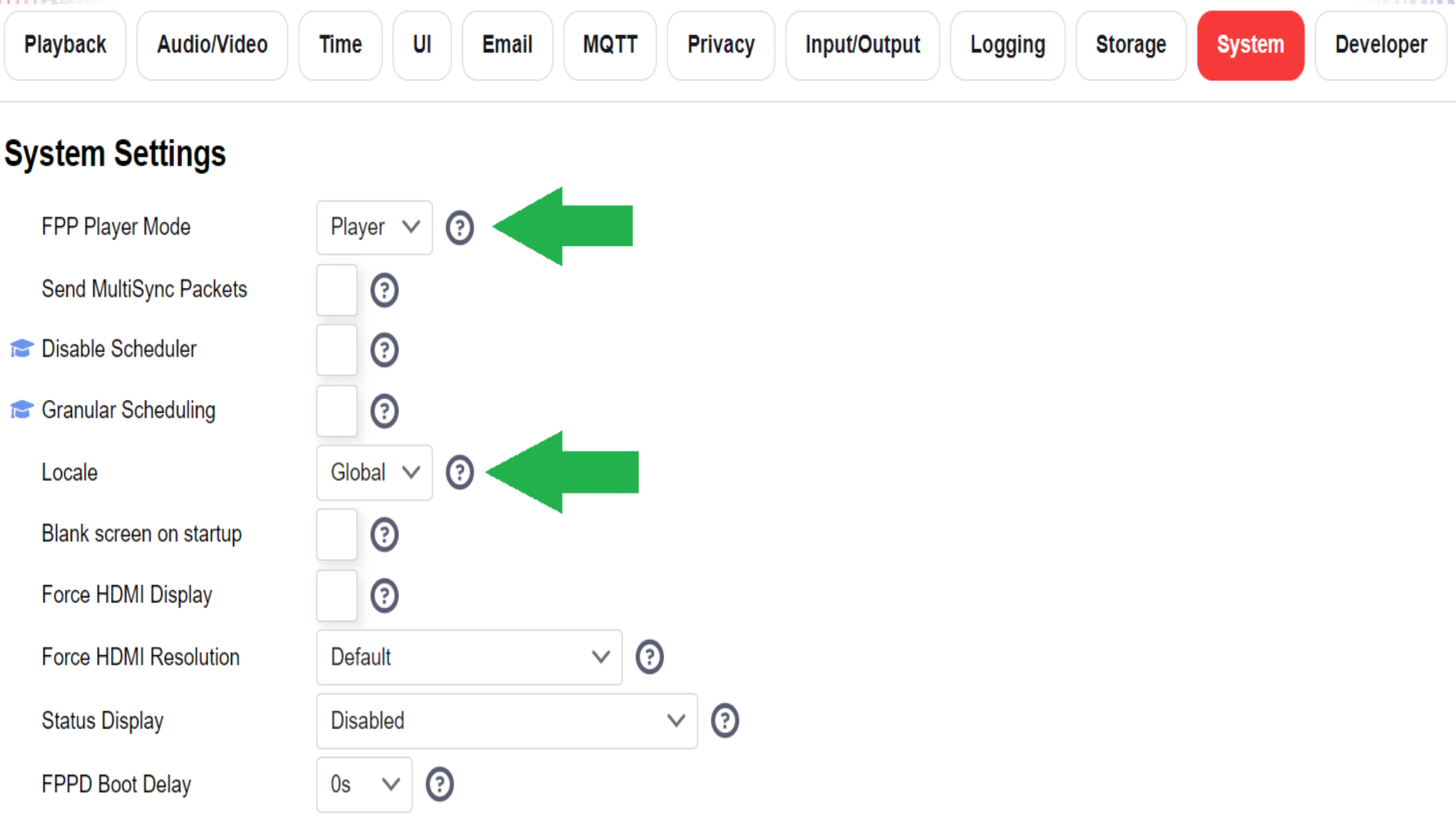
FPP General Setup

- Extended instructions available online
- IGNORE the clock settings if you plan to move this place to place
- Input/Output Tab (FPP Settings):
  - Under Input Control, Bridge Data Priority select “Prioritize Sequence”
- System (FPP Settings):
  - System Settings, FPP Player Mode select “Player”, ensure Locale is “Global”

Setup Screenshot:



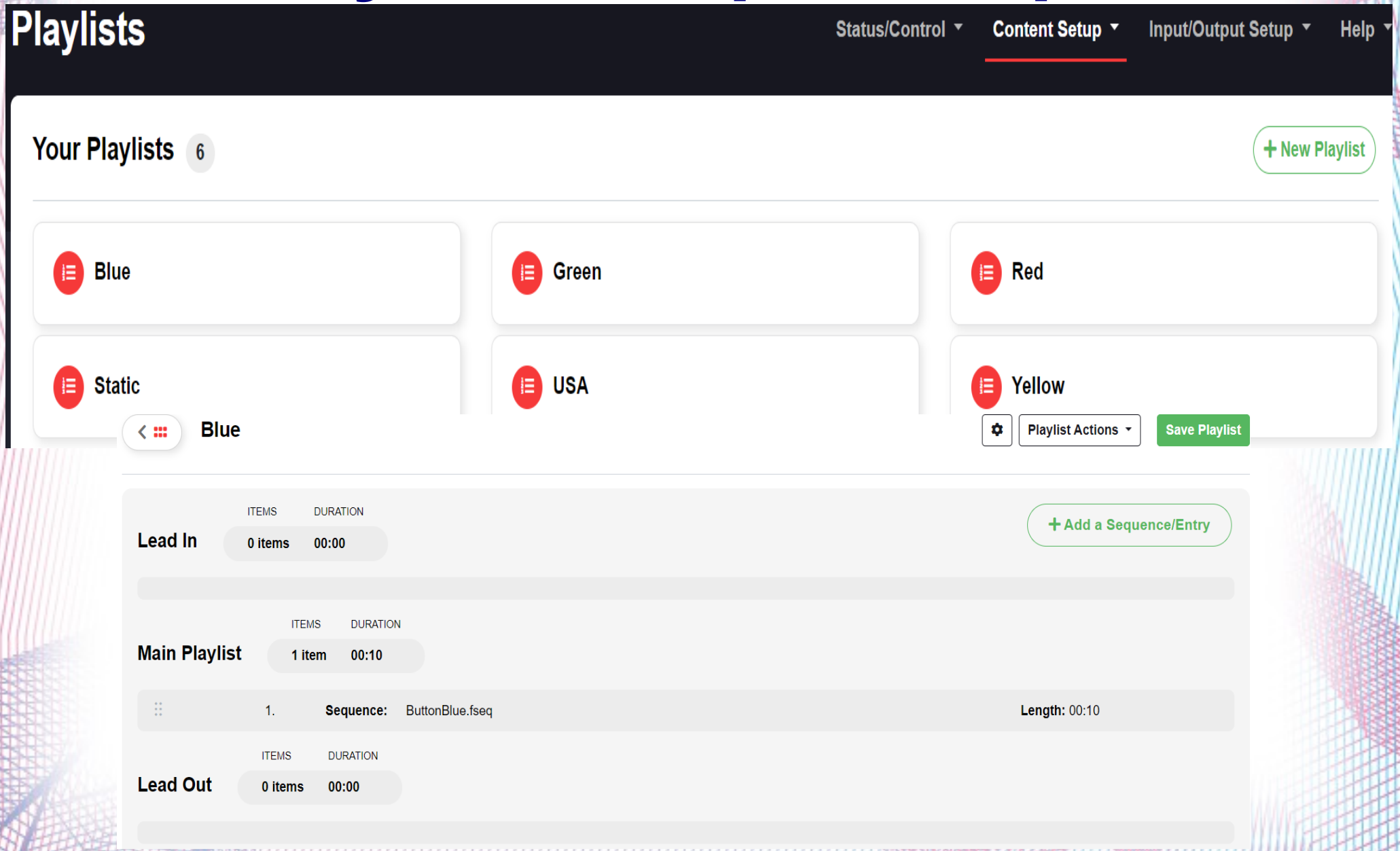
Setup Screenshot 2



FPP Content Setup

- Under Content Setup, create a playlist for each button press
  - These are the 'playlists' that plays on each button being pressed
  - Suggestion is to use 1 simple/short sequence for each
- Create an additional playlist for when a button is not pressed
  - This is only used when not part of your show

Playlist Setup Example

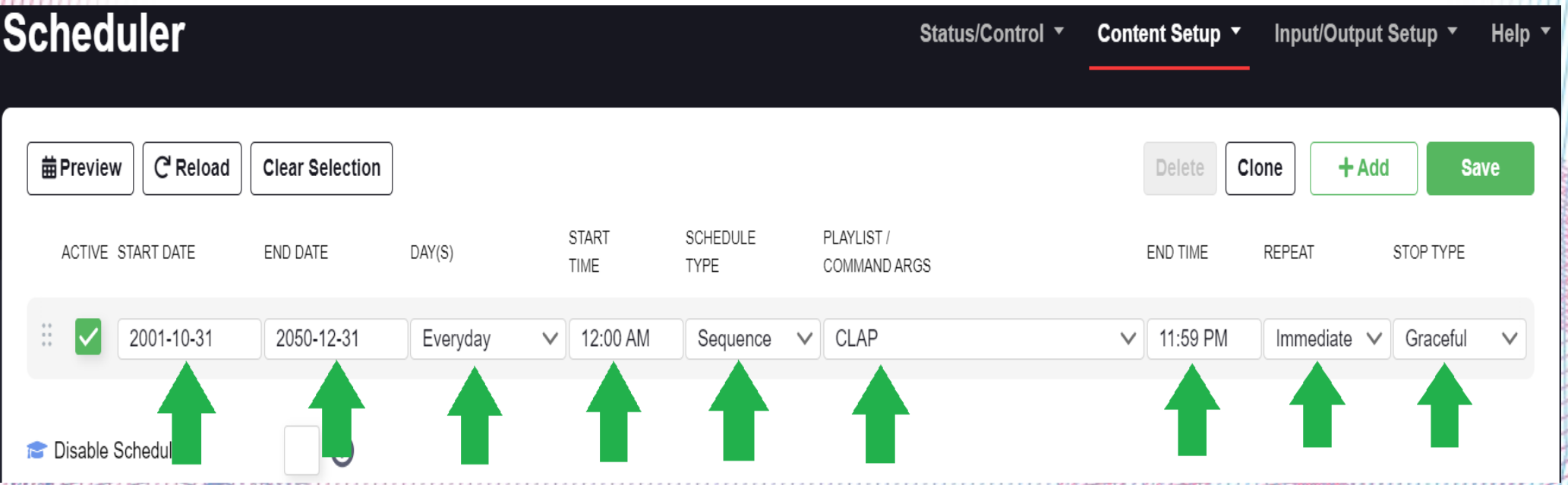


Scheduler

- This is only necessary if you want this to run independent of your show!
- Why we ignore the clock:
  - If no internet and power cycled, FPP loses time
    - (yes there's an exception if you use batteries....)
  - We can “trick” scheduler to always run
- Create a schedule that has a far back and far forward start and end dates. Create the times as starting at 12:00 AM and ends at 11:59 PM.
  - Set as active to be independent

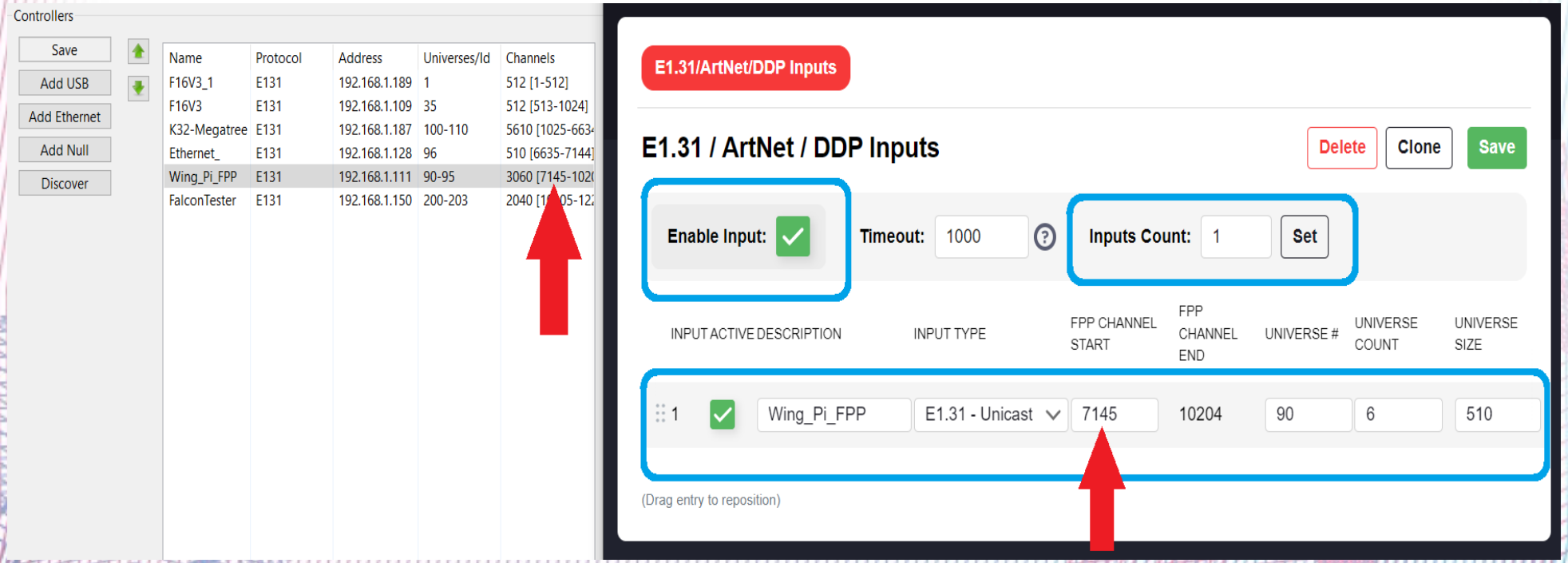
Scheduler screenshot

- Enter:
  - Start Date, End Date, Days (“Everyday”)
  - Start time (12:00AM), Schedule Type (“Sequence”)
  - Playlist/Command Args (select your static sequence)
  - End Time (11:59 PM), Repeat (“Immediate”)
- **Making this independent of your show is as simple as checking “Active”**



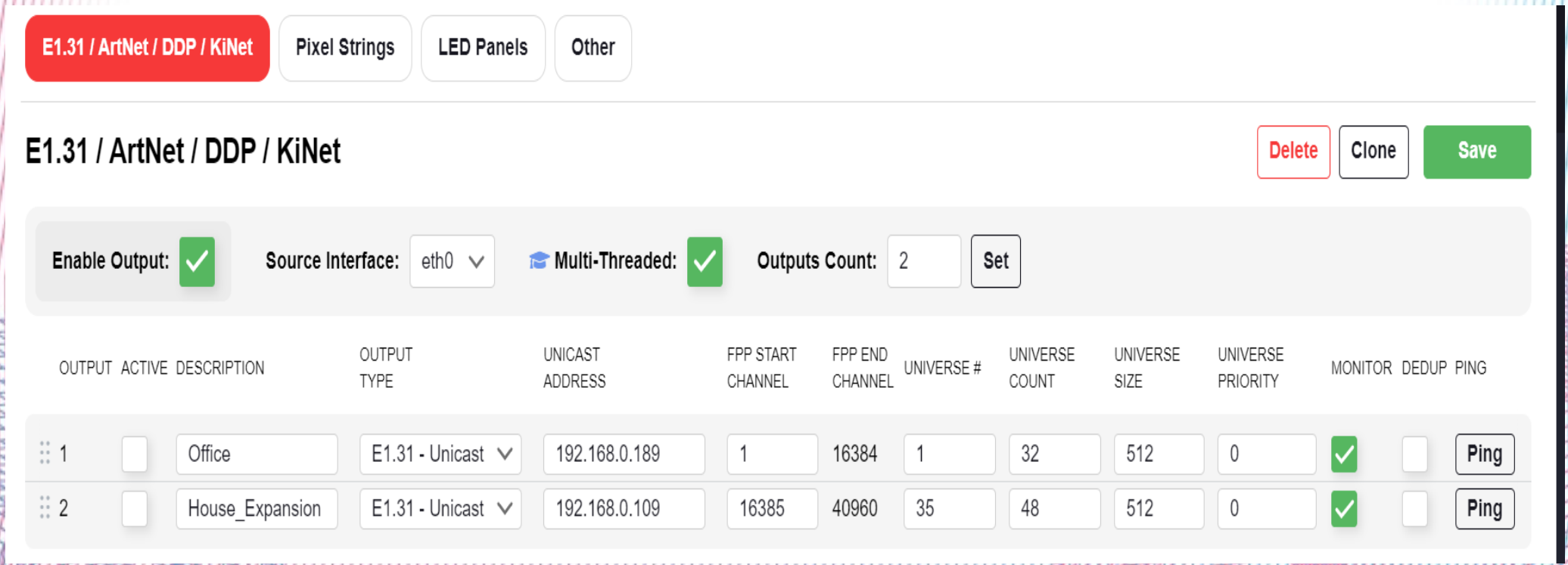
Channel Inputs

- On the Channel Inputs page:
  - "Enable Input" should be checked and have 1 input count
  - Enter your input description/information to match Xlights. Ensure channel start, universe #, count, and size match.



Channel Outputs, E1.31/Artnet/DDP

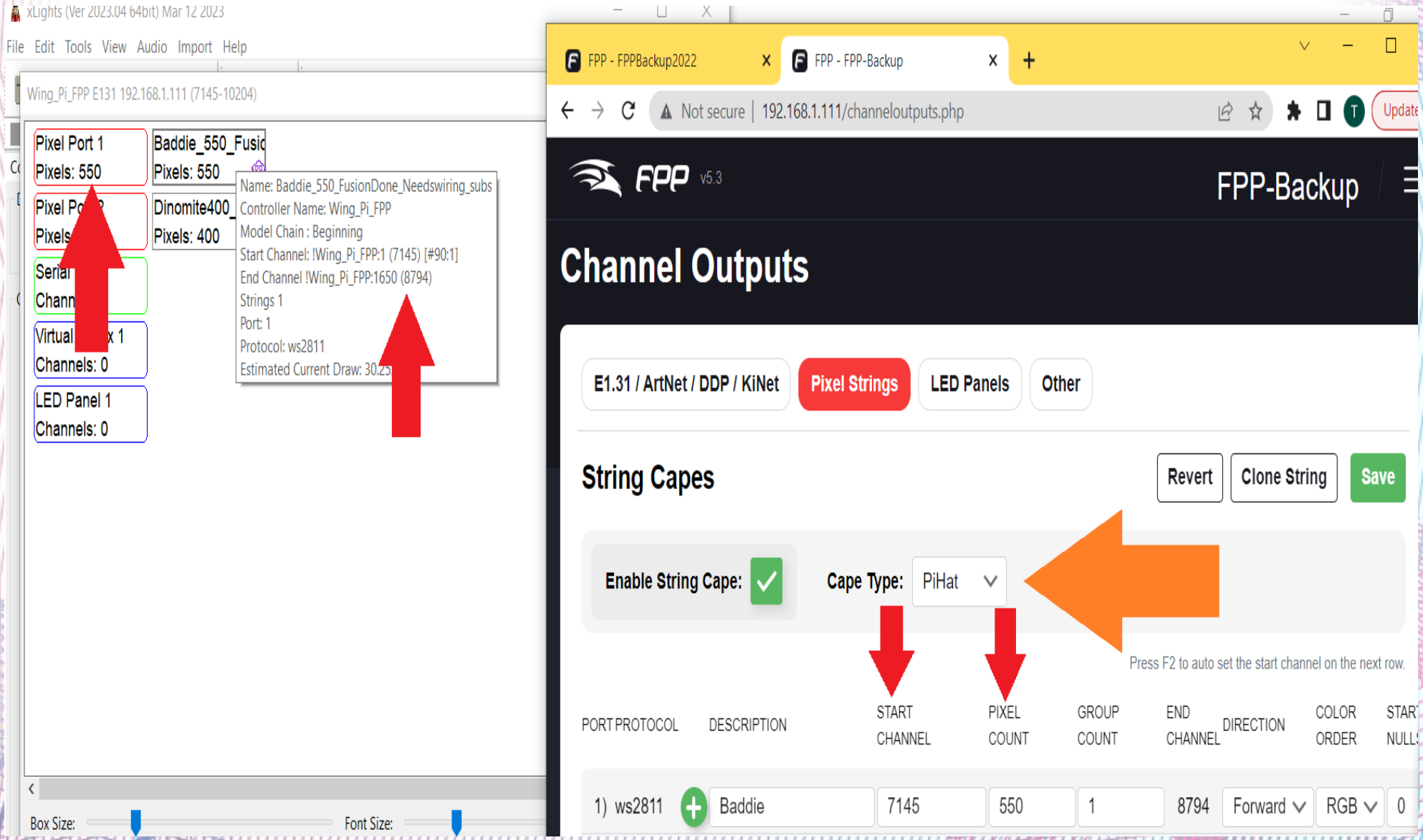
- Check mark “Enable Output” and “Multi-threaded”
- You can enter your other controllers but it isn't necessary and they don't need to be active



Channel Outputs, Pixel Strings

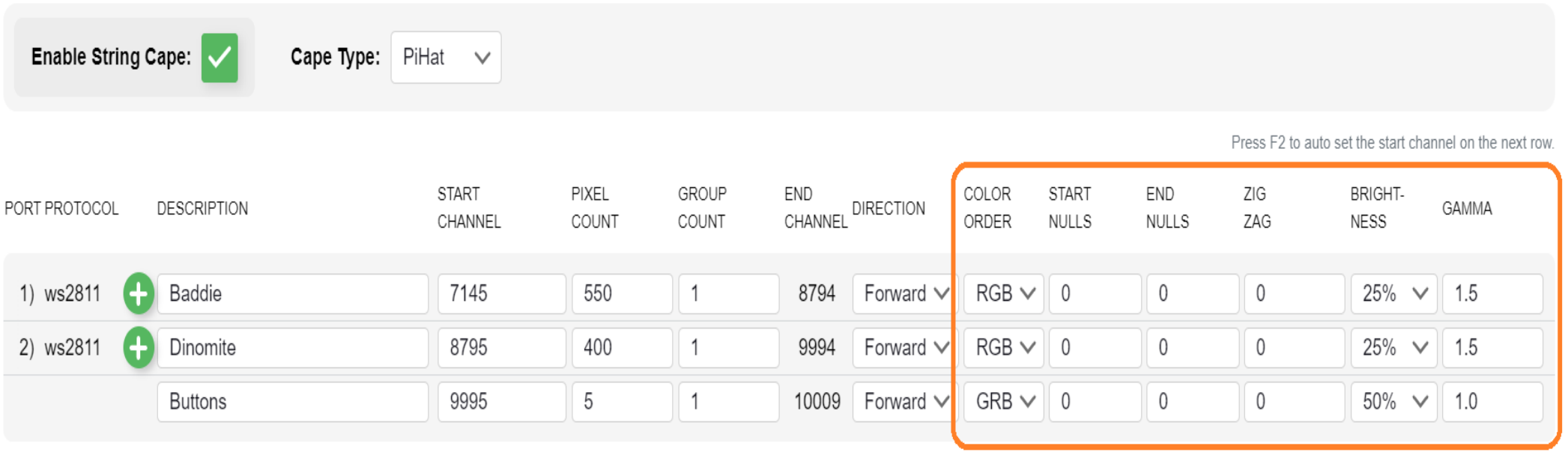
- Basic configuration:
  - Check “Enable String Cape”
  - Cape Type should be “PiHat”
  - Enter your pixel string data to match Xlights configuration (easily found in the visualizer by hovering over models)

Basic Pixel String Config:



Additional Pixel String Config

- This page also allows you to enter pixel string configuration like:
  - Null pixels, brightness, color order, and gamma values
- Note: same output can have varying config's!



GPIO Input Triggers

- This configuration is what allows the buttons to launch a sequence
- Experience Lights has a walk through on how to identify which button is on which GPIO input
  - In short:
    - Connect buttons to the GPIO extender box
    - Connect GPIO extender box to your PiHat (cat5/6)
    - Push button and look at GPIO extender box
      - Lights will show which GPIO lights up with each button!

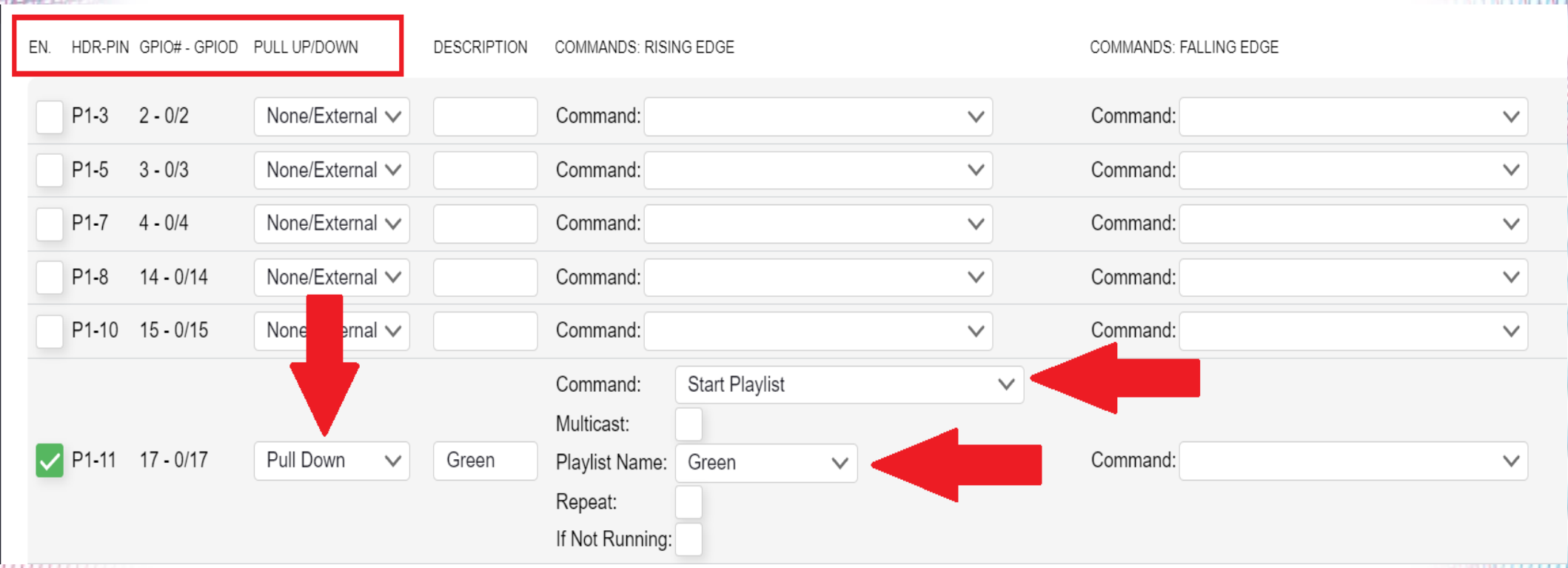
GPIO Extender Box

- Note numbers 1-6 is button connections
- LED's to left of button connections will light when that button is pushed

GPIO Trigger Configuration

- Once you have the GPIO numbers for each button – you will be able to configure the 'triggers'!
- If using a ground based momentary switch (most common) then you will configure them as follows:
  - Check/Select to make that GPIO # active
  - Select “Pull Down”
  - Add a description to help you remember
  - Select “Start Playlist” under Command
  - Choose the appropriate Playlist/name

GPIO Configuration Screenshot



Configuration is complete!

- FPP will have told you to restart (most likely many times) – so restart if necessary!
- Connect your props and buttons – test it!

How to integrate with your show!

- During regular Xlights sequencing – you will want/need to sequence those specific props how you want them to display
- Since the FPP setting was set to “Prioritize Sequence” - any sequence run from this Pi/FPP will run on those props!
  - If a button is pushed, it will override anything else
  - If the scheduler is enabled, it will override your show....

Show Integration (cont)

- Make sure this setup is within reach (wifi, if setup, or ethernet connected to your show network)
- Use your computer (or phone/tablet) – enter the IP address into a browser
- Navigate to 'Scheduler'
  - Uncheck the active status!
  - That's it – other than you may want to restart/power cycle.
- These props will now display as your show tells you, unless someone pushes a button!

Questions or Comments?

- I heard David Peace is here... direct them to him....