

FPP Push Button Stand for both Show and Remote Use

Presented by
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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:



Prese

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

Screws
(included)



Pi Hat
(included)

Standoffs
(included)



Raspberry Pi
(not included)



Nuts
(included)



Extender Node
(included)

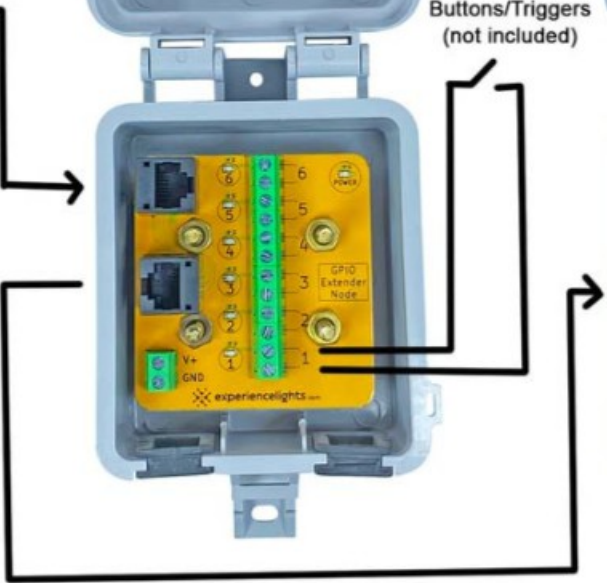


Add-On Nodes...
(not included)



Buttons/Triggers
(not included)

CAT 5/6 Cables
(not included)



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

The screenshot displays the Xlights software interface. On the left, a sidebar contains buttons for 'Save', 'Add USB', 'Add Ethernet', 'Add Null', and 'Discover'. The main area features a table of universes, with 'Wing_Pi_FPP' selected. A red arrow points to the 'Add Ethernet' button, and another red arrow points to the 'Wing_Pi_FPP' row in the table. The configuration panel on the right shows various settings for the selected universe, with red and green boxes highlighting specific fields: 'Wing_Pi_FPP' (Name), 'FPP' (Vendor), 'Pi Hat' (Model), '2 Output RPIWS281X' (Variant), '192.168.1.111' (IP Address), and 'E131' (Protocol). A red arrow points to the IP Address field, and another red arrow points to the 'FPP Proxy IP/Hostname' field. The bottom of the interface includes buttons for 'Visualise ...', 'Upload Input', 'Upload Output', 'Open', 'Open Proxy', and 'Delete'.

Name	Protocol	Address	Universes/Id	Channels	Description
F16V3_1	E131	192.168.1.189	1	512 [1-512]	Office
F16V3	E131	192.168.1.109	35	512 [513-1024]	House_Expansion
K22 Megatrie	E131	192.168.1.187	100-110	5610 [1025-6634]	
Ethernet_	E131	192.168.1.128	96	510 [6635-7144]	
Wing_Pi_FPP	E131	192.168.1.111	90-95	3060 [7145-10204]	
FalconTester	E131	192.168.1.150	200-203	2040 [10205-12244]	

Name	Wing_Pi_FPP
Description	
Vendor	FPP
Model	Pi Hat
Variant	2 Output RPIWS281X
Auto Layout Models	<input checked="" type="checkbox"/>
Auto Upload Configuration	<input type="checkbox"/>
Auto Size	<input checked="" type="checkbox"/>
Full xLights Control	<input checked="" type="checkbox"/>
Default Port Brightness	100
Default Port Gamma	1
Active	Active
Suppress Duplicate Frames	<input type="checkbox"/>
Multicast	<input type="checkbox"/>
IP Address	192.168.1.111
Protocol	E131
Priority	100
Managed	<input checked="" type="checkbox"/>
FPP Proxy IP/Hostname	

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:

Playback

Audio/Video

Time

UI

Email



MQTT


Privacy

Input/Output

Logg

Input Control



 Disable Network Bridge Monitoring (E1.31/DDP/ArtNet) 



Command Preset Control Channel 

Bridge Data Priority 



Output Control

 Always transmit channel data 

 E1.31 Bridging Transmit Interval 

Setup Screenshot 2

Playback Audio/Video Time UI Email MQTT Privacy Input/Output Logging Storage **System** Developer

System Settings


FPP Player Mode

Player




Send MultiSync Packets



 Disable Scheduler



 Granular Scheduling



Locale

Global



Blank screen on startup



Force HDMI Display



Force HDMI Resolution

Default



Status Display

Disabled



FPPD Boot Delay

0s



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

Playlists

Status/Control ▾

Content Setup ▾

Input/Output Setup ▾

Help ▾

Your Playlists 6

[+ New Playlist](#)

 Blue

 Green

 Red

 Static

 USA

 Yellow



Blue



Playlist Actions ▾

Save Playlist

Lead In

0 items

DURATION

00:00

[+ Add a Sequence/Entry](#)

Main Playlist

1 item

ITEMS

DURATION

00:10



1.

Sequence: ButtonBlue.fseq

Length: 00:10

Lead Out

0 items

ITEMS

DURATION

00:00

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”**

Scheduler Status/Control ▾ Content Setup ▾ Input/Output Setup ▾ Help ▾

Preview Reload Clear Selection Delete Clone + Add Save

ACTIVE	START DATE	END DATE	DAY(S)	START TIME	SCHEDULE TYPE	PLAYLIST / COMMAND ARGS	END TIME	REPEAT	STOP TYPE
<input checked="" type="checkbox"/>	2001-10-31	2050-12-31	Everyday ▾	12:00 AM	Sequence ▾	CLAP	11:59 PM	Immediate ▾	Graceful ▾

Disable Schedule

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.

Controllers

Name	Protocol	Address	Universes/Id	Channels
F16V3_1	E131	192.168.1.189	1	512 [1-512]
F16V3	E131	192.168.1.109	35	512 [513-1024]
K32-Megatree	E131	192.168.1.187	100-110	5610 [1025-6634]
Ethernet_	E131	192.168.1.128	96	510 [6635-7144]
Wing_Pi_FPP	E131	192.168.1.111	90-95	3060 [7145-10204]
FalconTester	E131	192.168.1.150	200-203	2040 [10205-12244]

E1.31 / ArtNet / DDP Inputs

Enable Input: Timeout: 1000 Inputs Count: 1 Set

INPUT	ACTIVE	DESCRIPTION	INPUT TYPE	FPP CHANNEL START	FPP CHANNEL END	UNIVERSE #	UNIVERSE COUNT	UNIVERSE SIZE
1	<input checked="" type="checkbox"/>	Wing_Pi_FPP	E1.31 - Unicast	7145	10204	90	6	510

(Drag entry to reposition)

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

E1.31 / ArtNet / DDP / KiNet

Pixel Strings

LED Panels

Other

E1.31 / ArtNet / DDP / KiNet

Delete

Clone

Save

Enable Output:

Source Interface: eth0

Multi-Threaded:

Outputs Count: 2

OUTPUT	ACTIVE	DESCRIPTION	OUTPUT TYPE	UNICAST ADDRESS	FPP START CHANNEL	FPP END CHANNEL	UNIVERSE #	UNIVERSE COUNT	UNIVERSE SIZE	UNIVERSE PRIORITY	MONITOR	DEDUP	PING
1	<input type="checkbox"/>	Office	E1.31 - Unicast	192.168.0.189	1	16384	1	32	512	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="button" value="Ping"/>
2	<input type="checkbox"/>	House_Expansion	E1.31 - Unicast	192.168.0.109	16385	40960	35	48	512	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="button" value="Ping"/>

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:

xLights (Ver 2023.04 64bit) Mar 12 2023

File Edit Tools View Audio Import Help

Wing_Pi_FPP E131 192.168.1.111 (7145-10204)

Pixel Port 1
Pixels: 550

Baddie_550_Fusid
Pixels: 550

Pixel Port 2
Pixels: 550

Dinomite400
Pixels: 400

Serial Channel 1
Channels: 0

Virtual Channel 1
Channels: 0

LED Panel 1
Channels: 0

Name: Baddie_550_FusionDone_Needswiring_subs
Controller Name: Wing_Pi_FPP
Model Chain : Beginning
Start Channel: !Wing_Pi_FPP:1 (7145) [#90:1]
End Channel !Wing_Pi_FPP:1650 (8794)
Strings 1
Port: 1
Protocol: ws2811
Estimated Current Draw: 30.25

Box Size: Font Size:

FPP - FPPBackup2022 x FPP - FPP-Backup x +

Not secure | 192.168.1.111/channeloutputs.php

FPP v5.3 FPP-Backup

Channel Outputs

E1.31 / ArtNet / DDP / KiNet **Pixel Strings** LED Panels Other

String Capes

Revert Clone String Save

Enable String Cape: Cape Type: PiHat

Press F2 to auto set the start channel on the next row.

PORT	PROTOCOL	DESCRIPTION	START CHANNEL	PIXEL COUNT	GROUP COUNT	END CHANNEL	DIRECTION	COLOR ORDER	START NULL
1)	ws2811	Baddie	7145	550	1	8794	Forward	RGB	0

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!

Enable String Cape:

Cape Type: PiHat

Press F2 to auto set the start channel on the next row.

PORT	PROTOCOL	DESCRIPTION	START CHANNEL	PIXEL COUNT	GROUP COUNT	END CHANNEL	DIRECTION	COLOR ORDER	START NULLS	END NULLS	ZIG ZAG	BRIGHTNESS	GAMMA
1)	ws2811	<input type="text" value="Baddie"/>	<input type="text" value="7145"/>	<input type="text" value="550"/>	<input type="text" value="1"/>	<input type="text" value="8794"/>	<input type="text" value="Forward"/>	<input type="text" value="RGB"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="25%"/>	<input type="text" value="1.5"/>
2)	ws2811	<input type="text" value="Dinomite"/>	<input type="text" value="8795"/>	<input type="text" value="400"/>	<input type="text" value="1"/>	<input type="text" value="9994"/>	<input type="text" value="Forward"/>	<input type="text" value="RGB"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="25%"/>	<input type="text" value="1.5"/>
		<input type="text" value="Buttons"/>	<input type="text" value="9995"/>	<input type="text" value="5"/>	<input type="text" value="1"/>	<input type="text" value="10009"/>	<input type="text" value="Forward"/>	<input type="text" value="GRB"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="50%"/>	<input type="text" value="1.0"/>

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

EN.	HDR-PIN	GPIO# - GPIOD	PULL UP/DOWN	DESCRIPTION	COMMANDS: RISING EDGE	COMMANDS: FALLING EDGE
<input type="checkbox"/>	P1-3	2 - 0/2	None/External ▾		Command: <input type="text"/>	Command: <input type="text"/>
<input type="checkbox"/>	P1-5	3 - 0/3	None/External ▾		Command: <input type="text"/>	Command: <input type="text"/>
<input type="checkbox"/>	P1-7	4 - 0/4	None/External ▾		Command: <input type="text"/>	Command: <input type="text"/>
<input type="checkbox"/>	P1-8	14 - 0/14	None/External ▾		Command: <input type="text"/>	Command: <input type="text"/>
<input type="checkbox"/>	P1-10	15 - 0/15	None/External ▾		Command: <input type="text"/>	Command: <input type="text"/>
<input checked="" type="checkbox"/>	P1-11	17 - 0/17	Pull Down ▾	Green	Command: Start Playlist ▾ Multicast: <input type="checkbox"/> Playlist Name: Green ▾ Repeat: <input type="checkbox"/> If Not Running: <input type="checkbox"/>	Command: <input type="text"/>



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....