

## NPXL™ - Pixelblade Lit Connector



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2018



# NPXL™ Pixelblade Lit Connector

## by ShtokCustomWorx

# User Manual

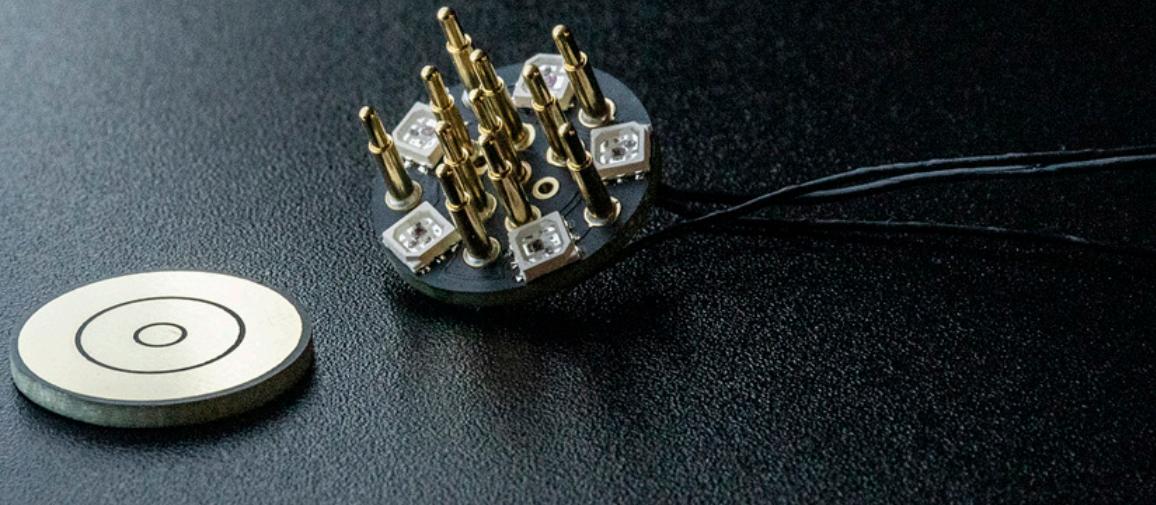
Updated: 28.02.2021

This manual shows and explains how to install and operate SCW NPXL™ pogo-pins connectors for Neopixel blade setup.

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# FEATURES



## Specifications and features:

- High quality components, manufacturing and assembling
- Black pcbs with Gold Plated pads
- Compatible with TCSS/VV/PlecterPixel Blade side pcbs/blades
- Rated for 20 Amperes max (up to 15 Amperes recommended) without current losses
- Reliable electrical connection
- 3-pole contact type: 1-pin Data, 5-pin Positive, 5-pin Negative
- High quality spring loaded Pogo pins (short and long style)
- 5 on-board RGB Neopixel leds with separate Data input for Blade Plugs backlight
- Dimensions:
  - Hilt pcb: 17.5x17.5x2.6mm
  - Blade pcb: 17.5x17.5x1.6mm

### Where to buy:

- [ShtokCustomWorx \(Russia\)](#)
- [Saberbay Etsy store \(USA\)](#)
- [KR-sabers TheSaberArmory store \(UK\)](#)



Old version  
(2018-2019)



Version 2  
(2019-2021)

Please watch these videos for full features demonstration:

- [Link to the demonstration video #1](#)
- [Link to the demonstration video #2](#)

Please watch this video for assembly demonstration:

- [Link to the assembly video](#)

# ASSEMBLY VARIANTS

1

## Long pins

for regular/dueling sabers



## Short pins

for "Thin-Neck" sabers and chassis



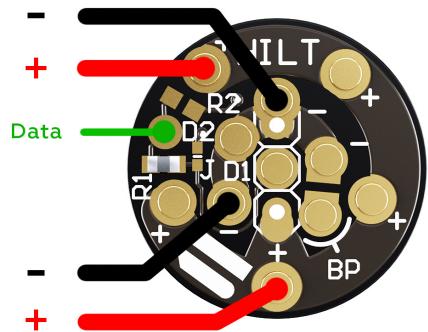


# DATA INPUT OPTIONS

## V1 – only blade, no pcb leds

This way Data wire controls only blade, no leds on connector pcb.

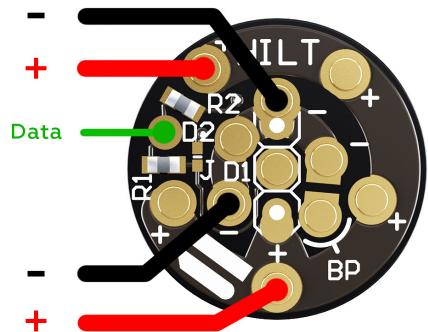
Data wire can be soldered whether to **D1** pad if 330 ohm resistor is on the sound board or to **D2** pad with on-board 330 ohm 0603 resistor **R1**.



## V2 – blade + pcb leds in parallel

This way a single Data wire controls both blade and on-board connector leds in parallel (mirrors).

Data wire is soldered to **D2** pad with on-board 330 ohm 0603 resistors **R1** and **R2**.

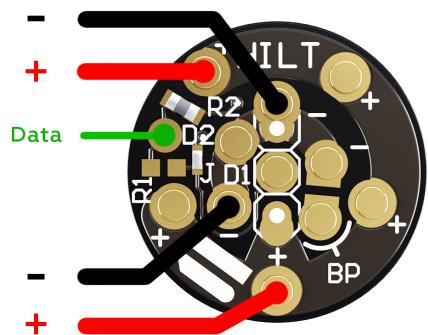


## V3 – blade + pcb leds in series

This way a single Data wire controls both blade and on-board connector leds in series (chain). Signal goes through 5 pcb leds first, then through jumper **J** to the blade strips.

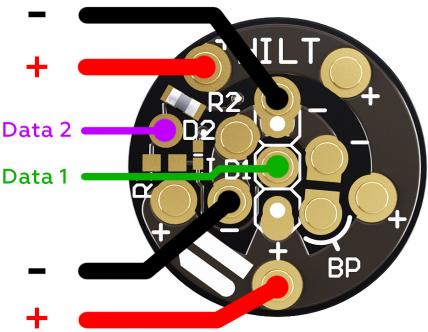
Data wire is soldered to **D2** pad with on-board 330 ohm 0603 resistor **R2** and bridged jumper **J**.

*Make sure to add additional 5 leds to the config file blade pixel number.*



## V4 – blade + pcb leds independent

This way blade and on-board connector leds are controlled separately by independent Data wires. Only for those sound boards that have 2 or more independent Neopixel Data outputs. Connector leds Data wire is soldered to pad **D2** with on-board 330 ohm 0603 resistor **R2**, blade Data wire is soldered to pad **D1**.



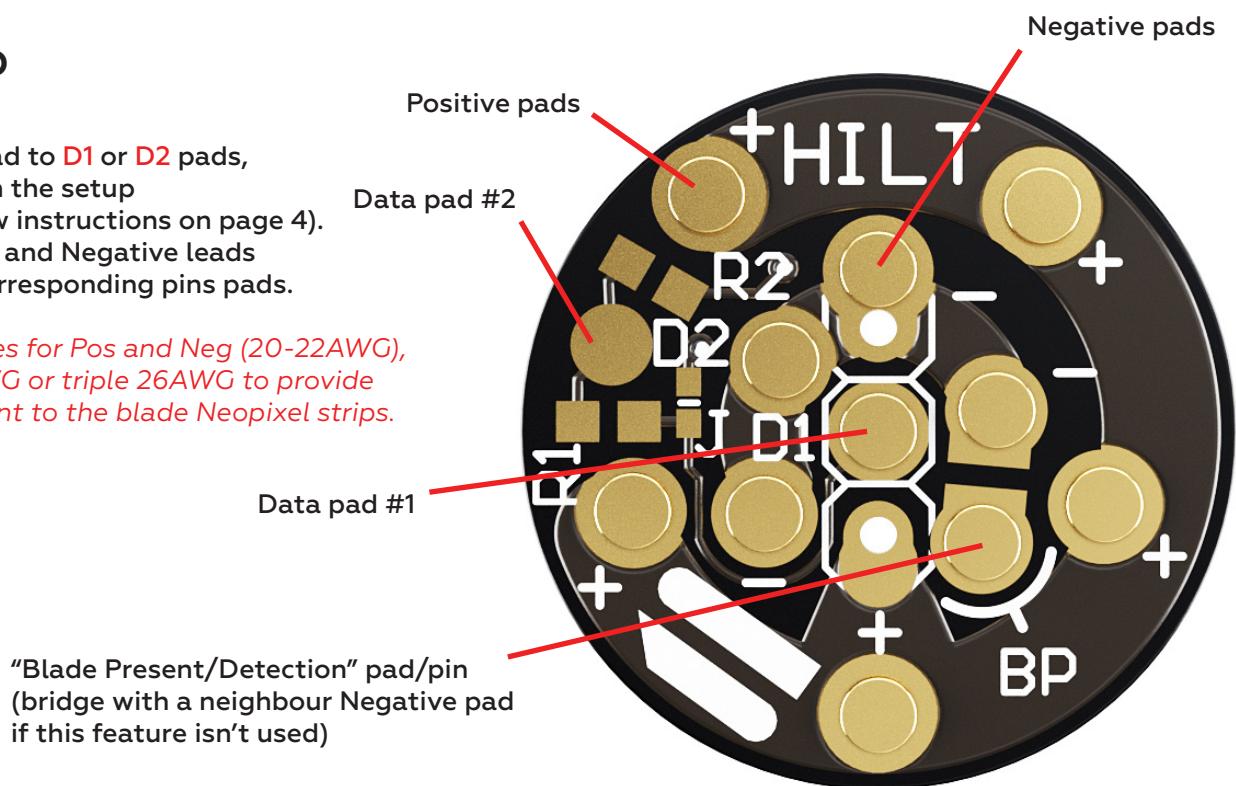
# WIRING DIAGRAMS



## Hilt pcb

Wire Data lead to D1 or D2 pads, depending on the setup (please follow instructions on page 4). Wire Positive and Negative leads directly to corresponding pins pads.

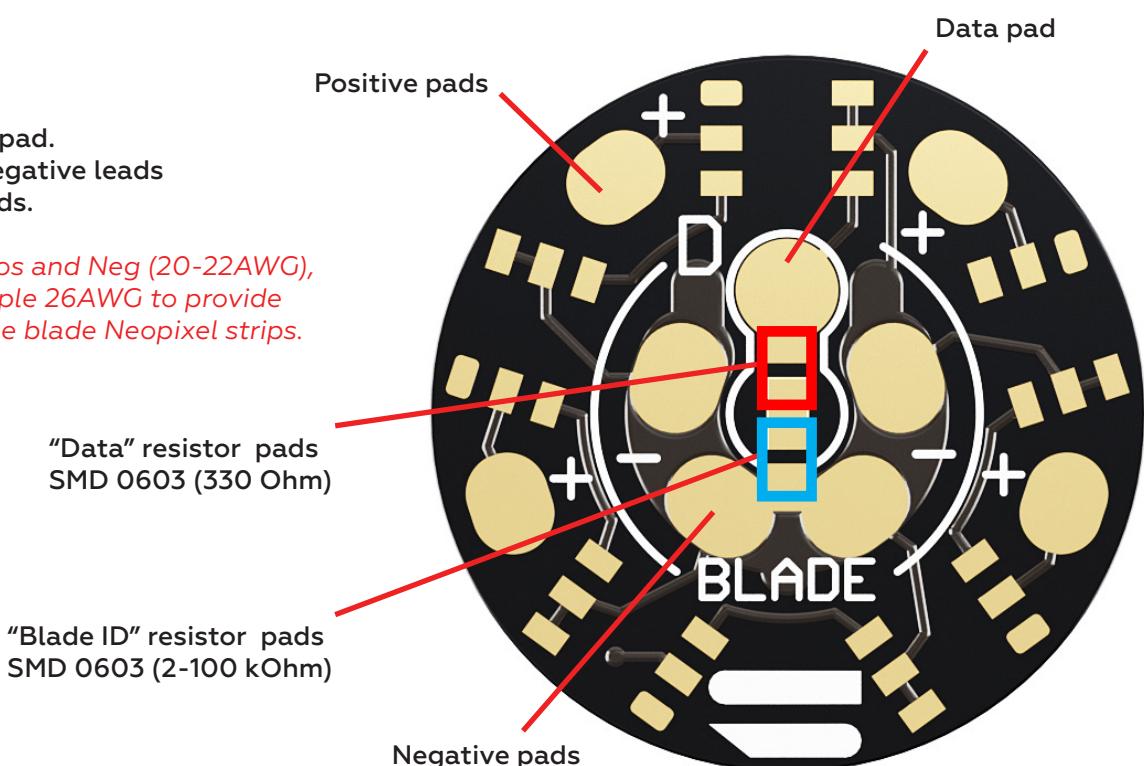
*Use thick wires for Pos and Neg (20-22AWG), double 24AWG or triple 26AWG to provide enough current to the blade Neopixel strips.*



## Blade pcb

Wire Data lead to D pad. Wire Positive and Negative leads to corresponding pads.

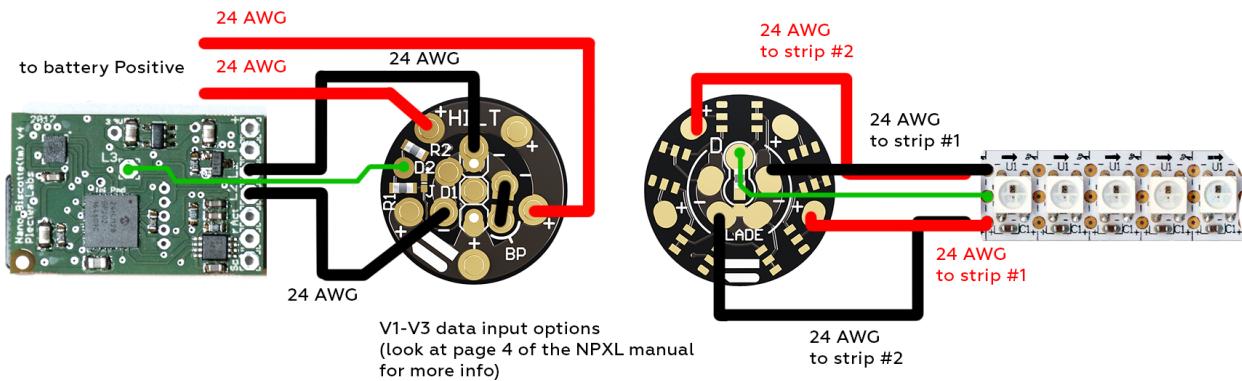
*Use thick wires for Pos and Neg (20-22AWG), double 24AWG or triple 26AWG to provide enough current to the blade Neopixel strips.*



# WIRING DIAGRAMS

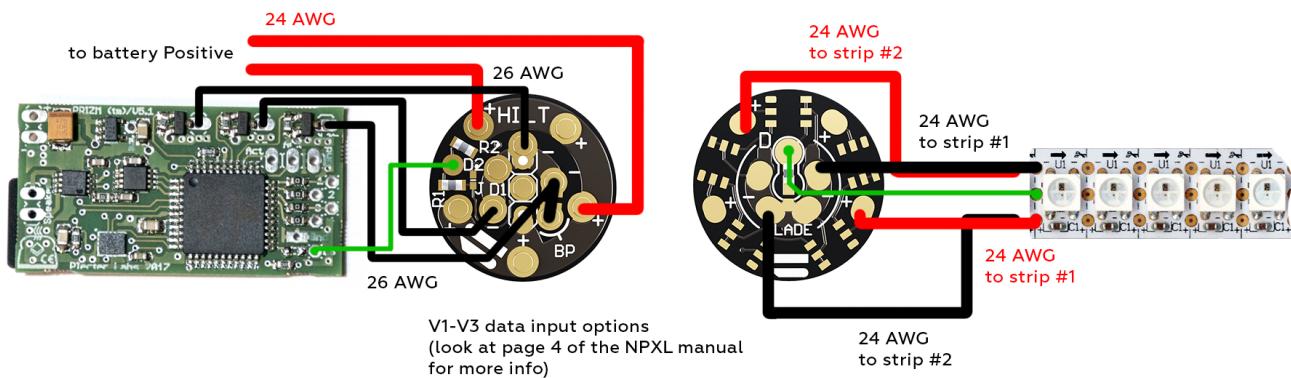
3  
2

## NANO BISCOTTE (V2 setup shown)



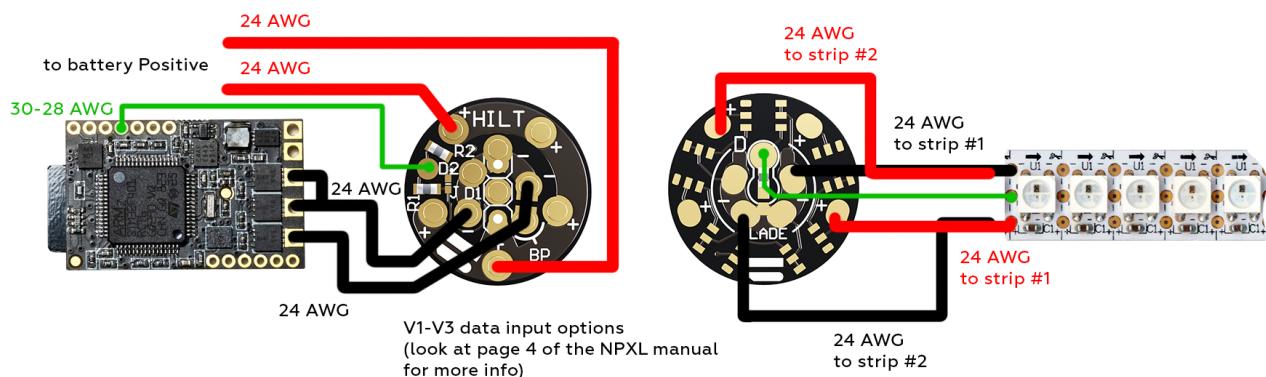
Solder wires to any corresponding pins on the back of Hilt pcb.  
 Recommended Power wires (Positive and Negative GND) - 22 AWG single or 24 AWG dual or 26 AWG triple.

## PRIZM v5.5 (V2 setup shown)



Solder wires to any corresponding pins on the back of Hilt pcb.  
 Recommended Power wires (Positive and Negative GND) - 22 AWG single or 24 AWG dual or 26 AWG triple.

## VERSO (V2 setup shown)

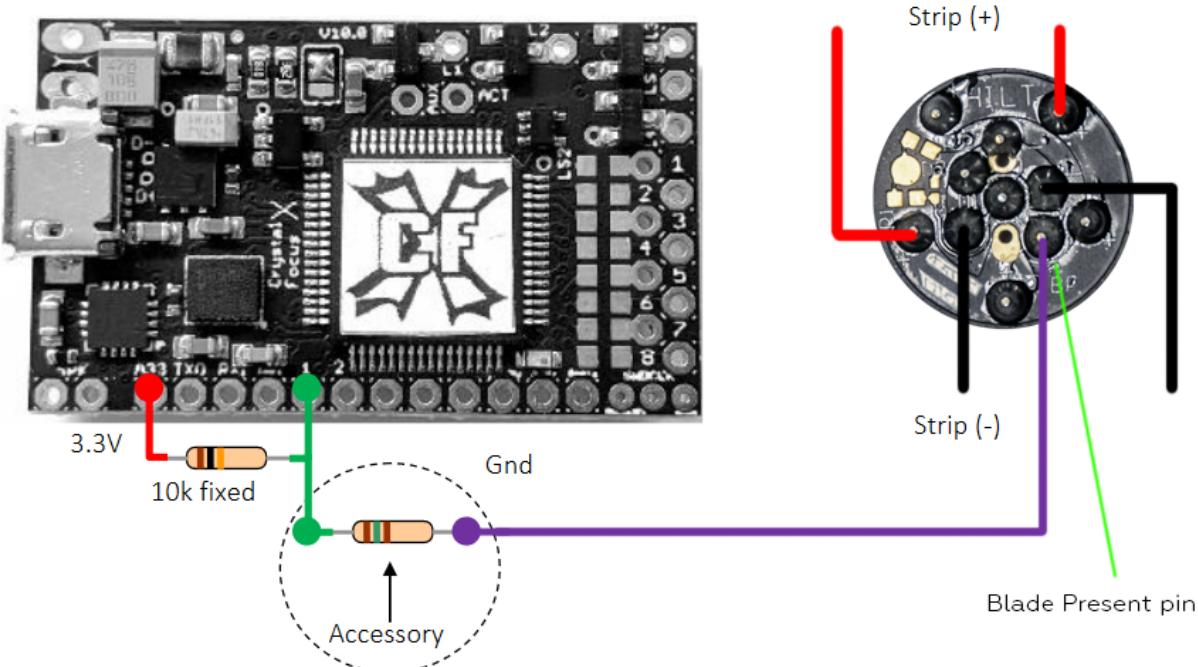


Solder wires to any corresponding pins on the back of Hilt pcb.  
 Recommended Power wires (Positive and Negative GND) - 22 AWG single or 24 AWG dual or 26 AWG triple.

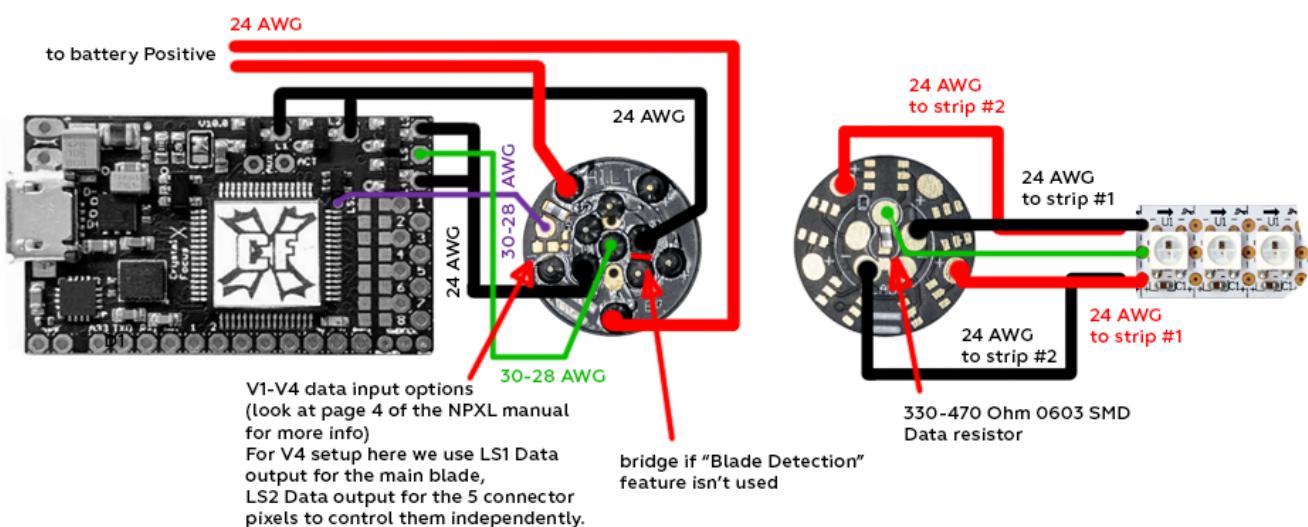
# WIRING DIAGRAMS

3  
2

## CFX Blade Detection wiring with NPXL lit connector by SCW



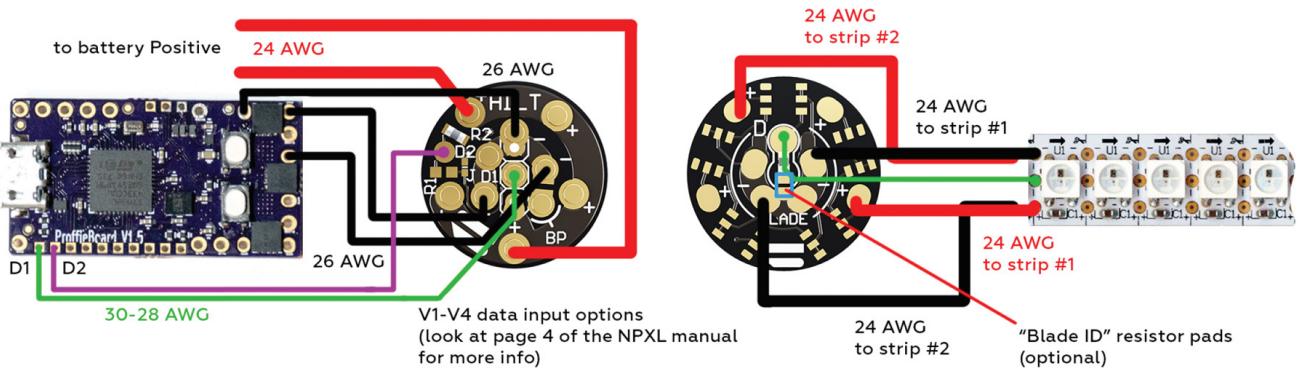
## CFX wiring with NPXL lit connector by SCW (V4 setup shown)





# WIRING DIAGRAMS

## Proffieboard v1.5 (V4 setup shown)



Solder wires to any corresponding pins on the back of Hilt pcb.

Recommended Power wires (Positive and Negative GND) - 22 AWG single or 24 AWG dual or 26 AWG triple.

Data 1 (D1) is used for Blade data signal, Data 2 (D2) is used for independent 5 on-board Hilt pcb led pixels data signal.

Or a "Sub-blade" configuration can be used to separate connector led pixels from main blade pixels for different blade styles, in this case only D1 data output is used and a V3 data input option for the NPXL connector (for more info look at page 4 of the NPXL manual).

## Config file setup

```
#ifdef CONFIG_TOP
#include "proffieboard_v1_config.h"
#define NUM_BLADES 2 // define 2 blades (main blade style and connector pixels blade style)
#define NUM_BUTTONS 2
#define VOLUME 1000
const unsigned int maxLedsPerStrip = 144;
#define CLASH_THRESHOLD_G 1.0
#define ENABLE_AUDIO
#define ENABLE_MOTION
#define ENABLE_WS2811
#define ENABLE_SD
#define SHARED_POWER_PINS // make sure to add a #define SHARED_POWER_PINS line
// (only for V4 resistoring setup!)
#endif

#ifndef CONFIG_PRESETS
Preset presets[] = {
{ "your sound font name", "tracks/your music track name.wav", // your main blade style code,
  "your main blade style code", // your connector blade style code, "your preset name" }
};

```

your main blade style code

your connector blade style code

```
BladeConfig blades[] = {
{ 0, // hooked up to Data 1 output
  WS2811BladePtr<136, WS2811_ACTUALLY_800kHz | WS2811_GRB, bladePin, PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3>>0, // Main Blade with 136 pixels
  WS2811BladePtr<5, WS2811_ACTUALLY_800kHz | WS2811_GRB, blade2Pin, PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3>>0, // Connector "Hilt" pcb 5 pixels
  CONFIGARRAY(presets) },
};

#ifndef CONFIG_BUTTONS
Button PowerButton(BUTTON_POWER, powerButtonPin, "pow");
Button AuxButton(BUTTON_AUX, auxPin, "aux");
#endif
```

PowerPINS are LED Negative outputs,  
they are same for main blade and  
connector pixels

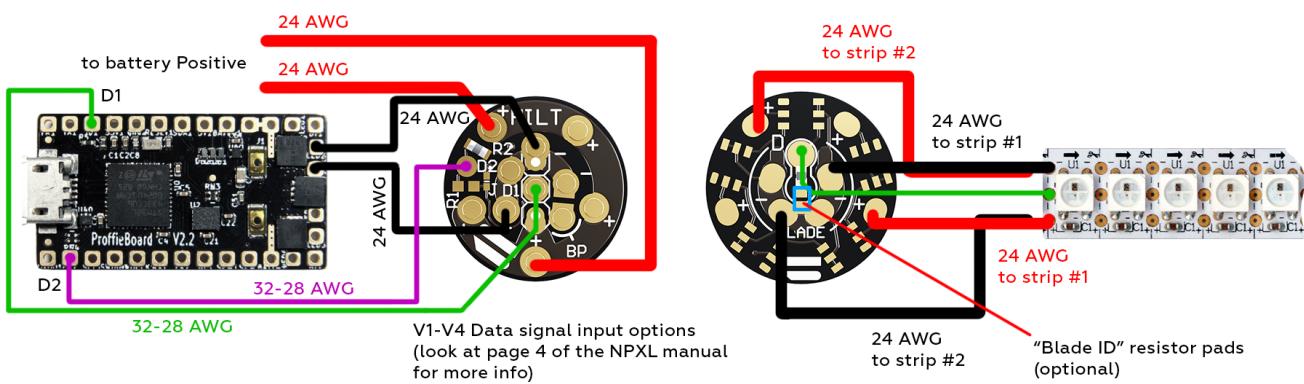
hooked up to Data 1 output

hooked up to Data 2 output

# WIRING DIAGRAMS

# Proffieboard v2.2

(V4 setup shown)



Solder wires to any corresponding pins on the back of Hilt pcb.  
Recommended Power wires (Positive and Negative GND) - **22 AWG single or 24 AWG dual or 26 AWG triple**.  
Data 1 (D1) is used for Blade data signal, Data 2 (D2) is used for independent 5 on-board Hilt pcb led pixels data signal.  
Or a "Sub-blade" configuration can be used to separate connector led pixels from main blade pixels for different blade styles, in this case only D1 data output is used and a V3 data input option for the NPXL connector (for more info look at page 4 of the NPXL manual).

## Config file setup

```

#ifndef CONFIG_TOP
#include "profieboard_v2_config.h"
#define NUM_BLADES 2
#define NUM_BUTTONS 2
#define VOLUME 1000
const unsigned int maxLedsPerStrip = 144;
#define CLASH_THRESHOLD_G 1.0
#define ENABLE_AUDIO
#define ENABLE_MOTION
#define ENABLE_WS2811
#define ENABLE_SD
#define SAVE_STATE
#define SHARED_POWER_PINS
#endif

#ifndef CONFIG_PRESETS
Preset presets[] = {
  {"your sound font name", "tracks/your music track name.wav",
   your main blade style code, // your main blade style code
   your connector blade style code, "your preset name"} // your connector blade style code
};

```

make sure to add a `#define SHARED_POWER_PINS` line  
(only for V4 resistor setup!)

`your main blade style code`

`your connector blade style code`

`BladeConfig blades[] = {`

- `{ 0,`
- `WS281XBladePtr<136, bladePin, Color8::GRB, PowerPINS<bladePowerPin2, bladePowerPin3>>(), // Main Blade with 136 pixels`
- `WS281XBladePtr<5, blade2Pin, Color8::GRB, PowerPINS<bladePowerPin2, bladePowerPin3>>(), // Connector "Hilt" pcb 5 pixels`
- `CONFIGARRAY(presets),`
- `};`

`#endif`

`#ifndef CONFIG_BUTTONS`

- `Button PowerButton(BUTTON_POWER, powerButtonPin, "pow");`
- `Button AuxButton(BUTTON_AUX, auxPin, "aux");`

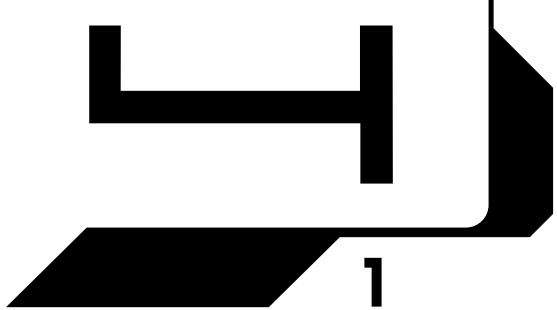
`#endif`

hooked up to Data 1 output

PowerPINS are LED Negative outputs,  
they are same for main blade and  
connector pixels

hooked up to Data 2 output

# MOUNTING OPTIONS



## Hilt and Blade pcb basic 3D-printed Holders

### HILT pcb

For LONG pins:

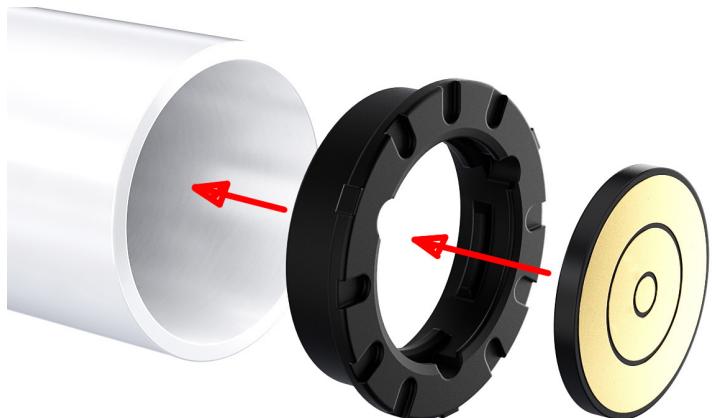
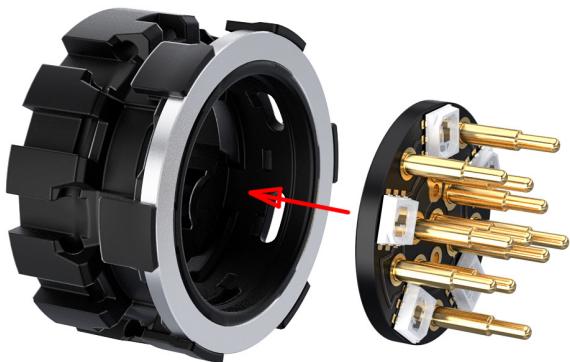
- [7/8 inch blade holder](#)
- [1 inch blade holder](#)

For SHORT pins:

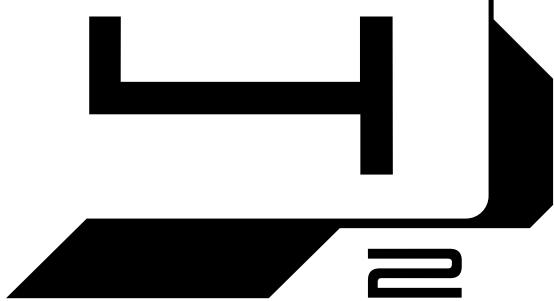
- [7/8 inch blade holder](#)
- [1 inch blade holder](#)
- [Thin-Neck blade holder](#)

### BLADE pcb

- [7/8 inch blade](#)
- [1 inch Thin-walled blade](#)
- [1 inch Thick-walled blade](#)
- [1 inch Thin-walled blade for "Thin-Necks" V1](#)
- [1 inch Thin-walled blade for "Thin-Necks" V2](#)



# MOUNTING OPTIONS



## Hilt and Blade pcb basic CNC-machined Holders

### HILT pcb

For LONG pins:

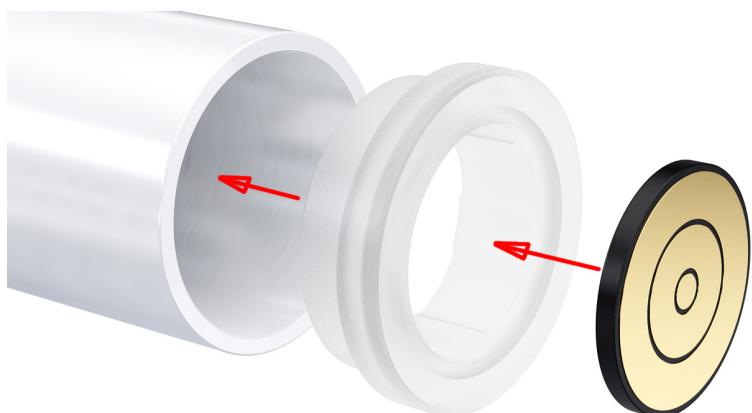
- [7/8 inch blade holder \(SaberBay USA\)](#)
- [7/8 inch blade holder \(KR-sabers UK\)](#)
- [1 inch blade holder \(SaberBay USA\)](#)
- [1 inch blade holder \(KR-sabers UK\)](#)
- [Transparent cover \(SaberBay USA\)](#)
- [Transparent cover \(KR-sabers UK\)](#)

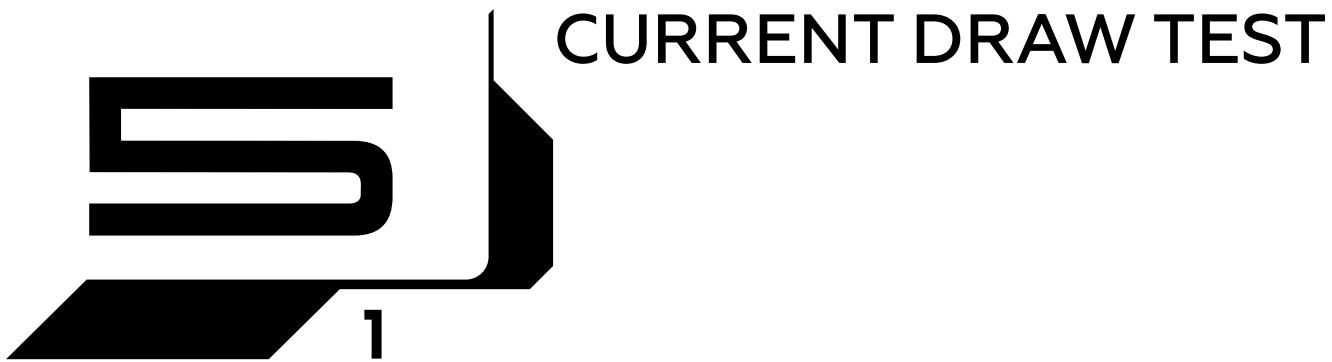
For SHORT pins:

- [7/8 inch blade holder \(SaberBay USA\)](#)
- [7/8 inch blade holder \(KR-sabers UK\)](#)
- [1 inch blade holder \(SaberBay USA\)](#)
- [1 inch blade holder \(KR-sabers UK\)](#)

### BLADE pcb

- [7/8 inch blade \(SaberBay USA\)](#)
- [7/8 inch blade \(KR-sabers UK\)](#)
- [1 inch Thin-walled blade \(SaberBay USA\)](#)
- [1 inch Thin-walled blade \(KR-sabers UK\)](#)
- [1 inch Thick-walled blade \(SaberBay USA\)](#)
- [1 inch Thick-walled blade \(KR-sabers UK\)](#)





# CURRENT DRAW TEST

## Neopixel WS2812B/SK6812 strips tested approximate current consumption chart

Tested at 3.7V, 143 leds per strip, at max brightness

Nº of strips	current	1 color without flicker / with flicker	2 colors mixed without flicker / with flicker	3 colors mixed for white without flicker / with flicker
1	Total	2 / 1.9 A	3.6 / 3.3 A	5.2 / 4.9 A
	Per LED	14 / 12.9 mA	12.6 / 11.5 mA	12.1 / 11.4 mA
2	Total	3.7 / 3.5 A	6.9 / 6.4 A	9.9 / 9.3 A
	Per LED	13 / 12.2 mA	12 / 11.1 mA	11.5 / 10.8 mA
3	Total	5.4 / 4.5 A	10.1 / 9.5 A	14.4 / 13.5 A
	Per LED	12.6 / 11.6 mA	11.8 / 11.1 mA	11.2 / 10.5 mA
4	Total	7.1 / 6.7 A	13 / 12.4 A	17.7 / 16.6 A
	Per LED	12.4 / 11.8 mA	11.4 / 10.8 mA	10.3 / 9.7 mA
5	Total	8.8 / 8.4 A	15.7 / 15 A	20.6 / 19.5 A
	Per LED	12.3 / 11.7 mA	11 / 10.5 mA	9.6 / 9.1 mA

# MAX RATINGS TEST

52

## Neopixel Connectors tested continuous current max ratings chart

Brand/Name	Time	at 8A	at 10A	at 15A	at 20A
ShtokCustomWorx 	after 5 minutes	26 °C 100% efficiency <b>OK</b>	29 °C 100% efficiency <b>OK</b>	40 °C 100% efficiency <b>OK</b>	55 °C 98% efficiency <b>OK</b>
	after 15+ minutes	26 °C 100% efficiency <b>OK</b>	29 °C 100% efficiency <b>OK</b>	45 °C 100% efficiency <b>OK</b>	60+ °C 98% efficiency <b>OK</b>
6.3mm gold plated stereo jack 	after 5 minutes	50 °C 97% efficiency <b>OK</b>	60 °C 95% efficiency <b>NOT OK</b>	115 °C 56% efficiency connector melted <b>BAD</b>	<b>X</b>
	after 15+ minutes	50 °C 97% efficiency <b>OK</b>	70+ °C 94% efficiency <b>NOT OK</b>	<b>X</b>	<b>X</b>
GX16-3pin Aviation Plug 	after 5 minutes	28 °C 100% efficiency <b>OK</b>	30 °C 100% efficiency <b>OK</b>	40 °C 97% efficiency <b>OK</b>	55 °C 92% efficiency <b>NOT OK</b>
	after 15+ minutes	28 °C 100% efficiency <b>OK</b>	30 °C 100% efficiency <b>OK</b>	45 °C 97% efficiency <b>OK</b>	60+ °C <92% efficiency <b>NOT OK</b>

# Which wire gauge is recommended to use for Positive and Negative power leads for maximum blade brightness efficiency

AWG gauge	Conductor Diameter Inches	Conductor Diameter mm	Conductor cross section in mm <sup>2</sup>	Ohms per 1000 ft.	Ohms per km	Maximum amps for chassis wiring
14	0.0641	1.62814	2.08	2.525	8.282	32
15	0.0571	1.45034	1.65	3.184	10.44352	28
16	0.0508	1.29032	1.31	4.016	13.17248	22
17	0.0453	1.15062	1.04	5.064	16.60992	19
18	0.0403	1.02362	0.823	6.385	20.9428	16
19	0.0359	0.91186	0.653	8.051	26.40728	14
20	0.032	0.8128	0.519	10.15	33.292	11
21	0.0285	0.7239	0.412	12.8	41.984	9
22	0.0253	0.64516	0.327	16.14	52.9392	7
23	0.0226	0.57404	0.259	20.36	66.7808	4.7
24	0.0201	0.51054	0.205	25.67	84.1976	3.5
25	0.0179	0.45466	0.162	32.37	106.1736	2.7
26	0.0159	0.40386	0.128	40.81	133.8568	2.2
27	0.0142	0.36068	0.102	51.47	168.8216	1.7
28	0.0126	0.32004	0.080	64.9	212.872	1.4
29	0.0113	0.28702	0.0647	81.83	268.4024	1.2
30	0.01	0.254	0.0507	103.2	338.496	0.86
31	0.0089	0.22606	0.0401	130.1	426.728	0.7
32	0.008	0.2032	0.0324	164.1	538.248	0.53

Chart from PowerStream.com

Neopixel strips  
Battery  
Recharge Port  
Kill Switch

Tri-Cree LED  
Battery  
Recharge Port  
Kill Switch

Everything else

Neopixel strips build  
(3-17 amperes load)

Tri-Cree LED build  
(1-4 amperes load)

2-strip	3-strip	4-strip	28-24 AWG recommended for battery wiring, choose regarding particular build 30 AWG possible for single 3W Cree LED wiring (one wire per die)
22 AWG single or 24 AWG dual in parallel	20 AWG single or 23 AWG dual in parallel	18 AWG single or 22 AWG dual in parallel	28-24 AWG recommended for battery wiring, choose regarding particular build 30 AWG possible for single 3W Cree LED wiring (one wire per die)

For all other components except Neopixel blade strips, high power Tri-Cree LEDs, battery and recharge port/Kill Switch – a 30-32 AWG wire can be used because they are low current circuits (5-500mA) (accent leds, activation and AUX switches, speaker, bluetooth module, RICE port etc.).