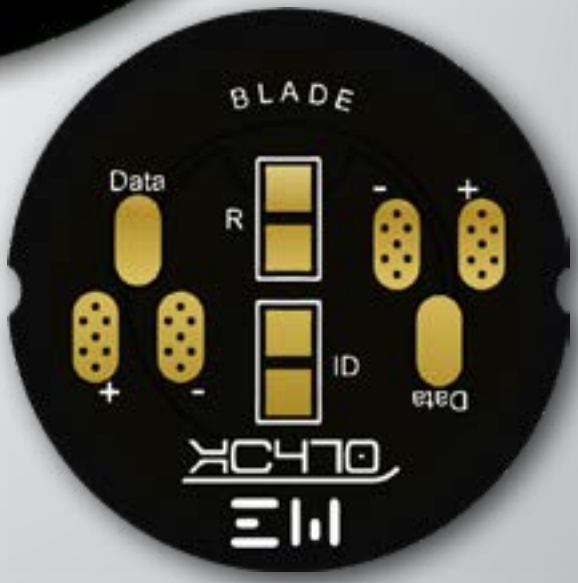
NEOPIXEL CONNECTOR SET

MANUAL



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I. INSTALLATION STEPS

In order to have an install process as smooth as possible, here is how we recommend you proceed with the different steps needed :

1. Read the full manual (a dozen pages is not that long) ;

2. Choose your configuration and proceed with the resistor(s) soldering first and then the wires. You can either use this manual or the online configurator (https://bcb.ew.fr) ;

3. Test the connector's pixel operatioin with your board, if possible, to facilitate any resoldering you might need to do ;

4. When the connector acts like you want, install the pogo pins and solder them ;

5. If need be, proceed with the blade installation according to your selected options and test the blade. If you encounter any strange behavior with the blade, try testing it with another saber or testing another blade with your connector to pinpoint where the pronlem might be located ;

6. Enjoy your saber and showcase it on any social media you'd like with #AK470 and #EW to share the fun !!!

This manual keeps being updated with all the latest ressources like Youtube videos, online tools, corrections, new precision, etc.

Always make sure you are using the latest version available on Elegant Weapons' website !

II. ONLINE RESSOURCES

Latest version of the manual : https://ak470.net/manual-connector/

EW Online configurator : https://bcb.ew.fr

AK470 website : https://www.ak470.net

Where to buy :

Elegant Weapons : https://www.ew.fr

Aleyan's Galactic Armory : http://www.sabers.ch

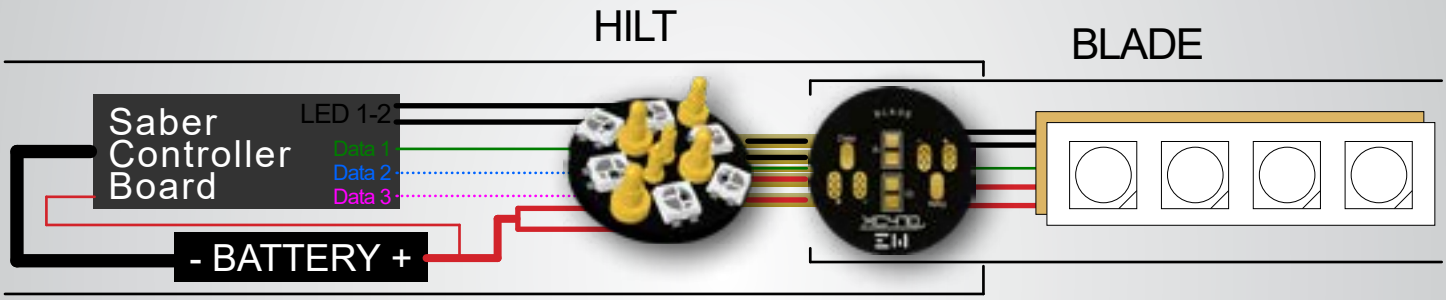
There are also community ressources you should join like The Rebel Armory forum or specific Facebook groups you can find with the proper keywords.

III. GENERAL OPERATION

In order to make a Neopixel blade removable, it needs a system to connect to and disconnect from the hilt. Over the years, the industry standard became the pogo-pin PCB because it offers the simplest way of handling the blade and establishing connection with its rotative pin alignment.

Unlike other blade connectors on the market, both basic and lit ones, we use 2 different kinds of pogos to reduce the number of pins and optimize power flow. The BATT+ and LED- lines are both connected to two 9A* gold plated pins each, allowing for 18A* max Intensity going to the blade. For ease of use purposes though, we provide easy to solder pads next to each power pin. In the event of a very high drain blade with more than 2 strips, eventual bottleneck in power can be easily solved by bypassing the soldering pad and soldering the power wires directly to the pogo pin's base.

In addition to the power lines (+ / -) you must connect at least 1 Data signal to drive the pixels on board as well as the pixel strips in the blade. Several configurations are possible and explained in the next chapter. In all cases, the data signal usually needs to be resistored in order to be properly read by each pixel. We provide a set of 220Ω smd resistors which allows two of them in series to remain inside the 150Ω to 470Ω recommended range. Some new gen boards sometimes have an already resistored line for the main Data pad. If you are using such a board in your install, you can use one of the 0Ω smd resistors instead.



This diagram is a basic representation of the wiring you will have to do in order to use your connector in your saber. Detailes witing diagrams are located at the end of this manual. The summarised table in the next chapter helps you find the proper diagram for your actual saber install.

*Optional short pogo pins for tight installs such as thin-neck sabers are rated 7A each allowing for 14A max total Intensity to the blade.

IV. CONFIGURATION CHOICES

The connector requires 3 choices depending on your saber install and offers 2 optional features.**For any of those decisions, please refer to your specific board manual / wiki !**

1. Signal handling

The pixels on both your connector and blade need Power (BAT+ & LED-) and a Data signal (Data# or LS#) to be driven and work accordingly. The power lines are always shared between the connector and the blade (you might need to configure shared power pins on your board's configuration in some cases).

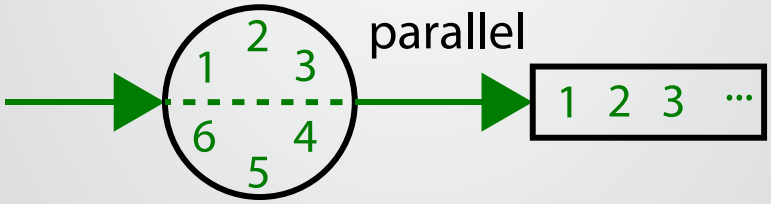
The connector can handle either **INDEPENDENT SIGNALS** or a **SHARED SIGNAL** between the connector and the blade. Each scenario offers different advantages that you need to choose according to your saber's specifications. When doing so, always keep in mind that the simplest way to a result is always the best. In this case, simplest means less wires, less work and less risk of doing something wrong.

Following that logic, **we recommend using a shared Data signal with serial pixel groups along the line in order to minimize the wiring**. We let the option to use two separate signals to make our connector as compatible as possible with all boards past, present and future.

2. Signal type

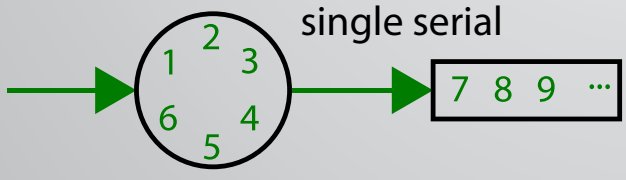
SEPARATE : 2 distinct signals, one for the blade, the other for the connector. It requires 2 Data lines from the board but both arrays share the same power pins.

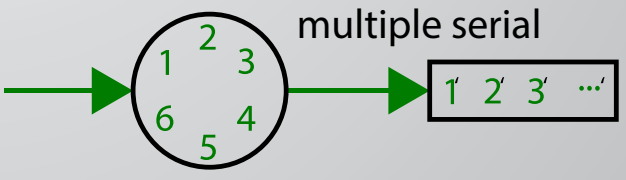
PARALLEL : the connector mimics the first pixels of the blade and is driven by the same Data line and power pins.



SERIAL : the connector is the first in line, then come the blade's pixels. This can be driven by the board either in 2 separate subBlades* (multiple serial) or a single one where the connector has the first pixels of the blade (single serial), all on 1 Data line and same power pins.

In any Serial setup, the full pixel array will have a total value equal to the sum of those of the connector and blade. You will need to make sure the total number of pixels in your configuration is set accordingly.



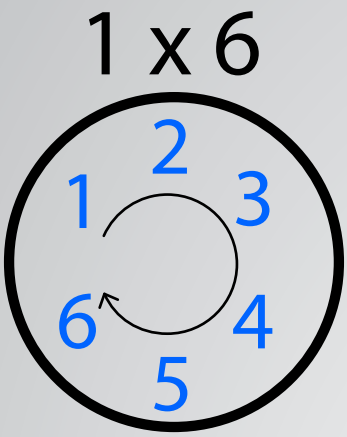


*Only available on ProffieOS

IV. CONFIGURATION CHOICES

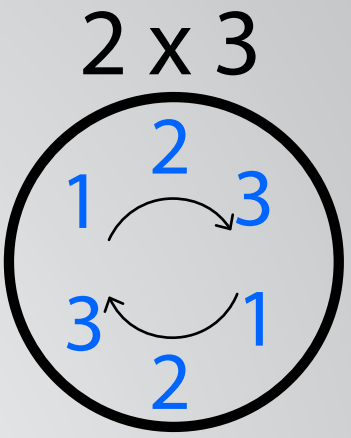
3. Pixel array(s)

The connector has 6 pixels that can be physically connected in a single array of six pixels (**1 x 6**) or two parallel arrays of three pixels (**2 x 3**).



A single array will give the ability to have circling effects all the way around whreas the double array option gives an axial symetry behavior to the connector.

If your board handles subBlades/serial logical arrays, you can achieve any pixel arrangement in your configuration. However, the simplest way to have 2 mimicking groups of 3 pixels on the connector is by doing so physically as it will then require only one “blade” to be styled in each preset.



4. Optional features

On top of any configuration above, the connector offers two additional features for compatible boards :

BLADE ID : it is a 2K Ω to 100K Ω resistor that allows a compatible board to “read” a value on the Data line and then select the designated configuration accordingly. An example of application is if you have a modular saber system where the connector might not always be connected to your board, for example with an internal pogo connector allowing you to showcase a crystal chamber by taking the upper part of the hilt off ; you might want your board to know if it must drive the connector and blade or not.

In any case, having the Blade ID while not needing it is not going to cause any problem. While this is not a necessary feature for the connector, **we highly recommend using one of the provided ID resistors on the blade PCB (if you are building your own blade) so it is compatible with the feature, even if your actual board or config does not yet use the function.**

BLADE DETECT : this function requires your board to actively listen on a dedicated pin to detect when a blade is actually in contact and ready to be driven. This feature allows for instant Preset change (Proffieboard) or Tangible Selection (CFX) based on the physical presence or not of your blade.

To use it, you will require the proper code in your configuration and you need to solder a dedicated Data wire to the correspondent pad on the connector. CFX also requires a set of resistors and aditional wiring on the board.

This pad will connect with the LED gnd line upon contact with the blade.

5. Summary

Below is a table containing all choices you must make and providing the pages of this manual containing the wiring diagrams for each scenario.

You will also find the pages conataining the diagrams for the optional features that can be added to any base configuration.

For the quickest and easiest access to the proper diagrams, we recommend using our online configurator located at www.ew.fr/connector

<table>
<tr><th rowspan="2">SIGNAL HANDLING</th><th rowspan="2">SIGNAL TYPE</th><th colspan="2">PIXEL ARRAY</th><th colspan="2">Optional features</th></tr>
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</table>

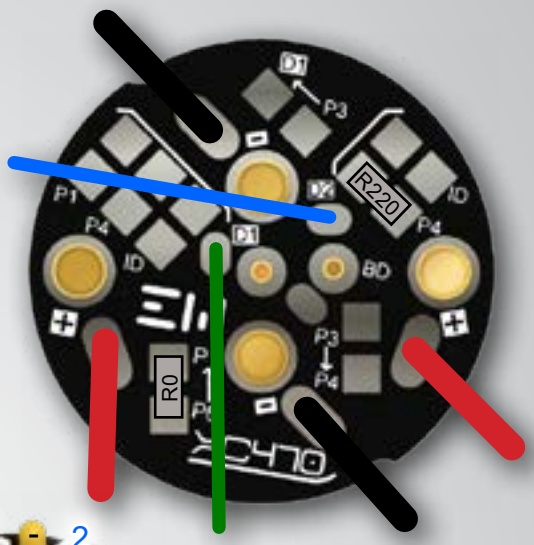
Blade side wiring diagram on page 12.

V . HILT SIDE ESSENTIAL WIRING

Separate Data signals

1 x 6 pixel array

BATTERY + (20-22AWG)
LED - (20-22 AWG)
DATA pad to Blade pixels
DATA pad to Connector pixels



R220 220 Ω smd 0805 or 0603 resistor for Connector pixels signal

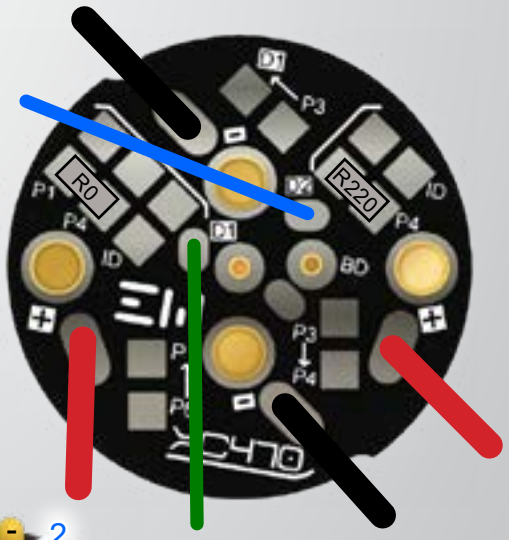
R0 0 Ω smd 0805 or 0603 resistor to bridge Connector pixels in series

Blade on D1 (# of pixels in your blade : 0 to #)

Connector on D2 (6 pixels : 0 to 5)

2 x 3 pixels array

BATTERY + (20-22AWG)
LED - (20-22 AWG)
DATA pad to Blade pixels
DATA pad to Connector pixels



R220 220 Ω smd 0805 or 0603 resistor for Connector pixels signal

R0 0 Ω smd 0805 or 0603 resistor to bridge Connector pixels in parallel

Blade on D1 (# of pixels in your blade : 0 to #)

Connector on D2 (3 pixels : 0 to 2)

V . HILT SIDE ESSENTIAL WIRING

Shared parallel Data signal

1 x 6 pixel array

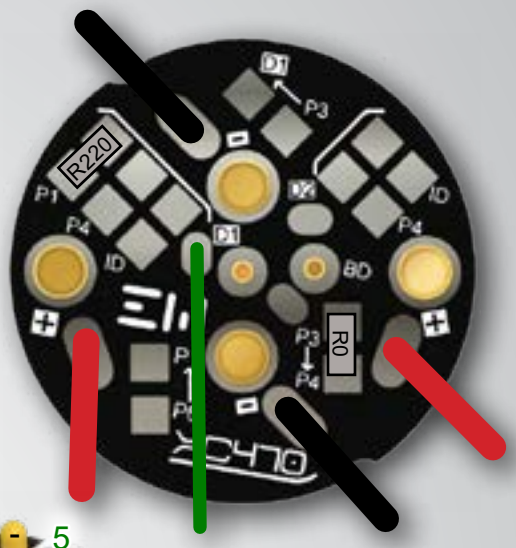
BATTERY + (20-22AWG)

LED - (20-22 AWG)

DATA pad to Blade and Connector pixels

R220 — 220 Ω smd 0805 or 0603 resistor for Connector pixels signal

R0 — 0 Ω smd 0805 or 0603 resistor to bridge Connector pixels in series



Blade on D1 (# of pixels in your blade : 0 to #)

Connector on D1 (6 pixels : 0 to 5) mimicking first 6 pixels of Blade

2 x 3 pixels array

BATTERY + (20-22AWG)

LED - (20-22 AWG)

DATA pad to Blade and Connector pixels

R220 — 220 Ω smd 0805 or 0603 resistor for Connector pixels signal in parallel

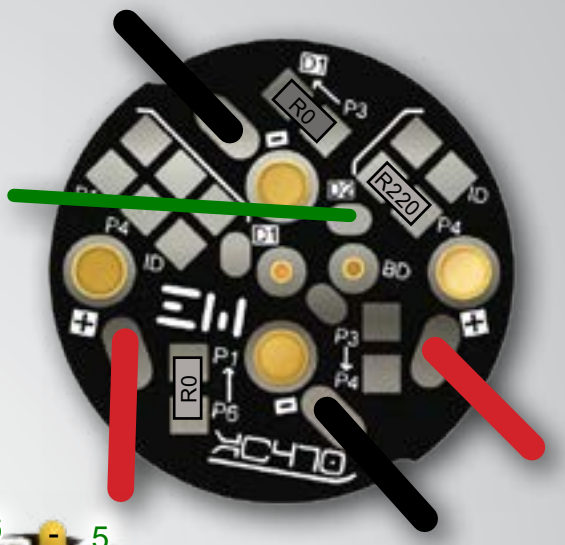
Blade on D1 (# of pixels in your blade : 0 to #)

Connector on D1 (3 pixels : 0 to 2) mimicking first 3 pixels of Blad

V . HILT SIDE ESSENTIAL WIRING

Shared serial Data signal

1 x 6 pixel array



BATTERY + (20-22AWG)

LED - (20-22 AWG)

DATA pad to Connector then Blade pixels

R220 220 Ω smd 0805 or 0603 resistor for Connector pixels signal

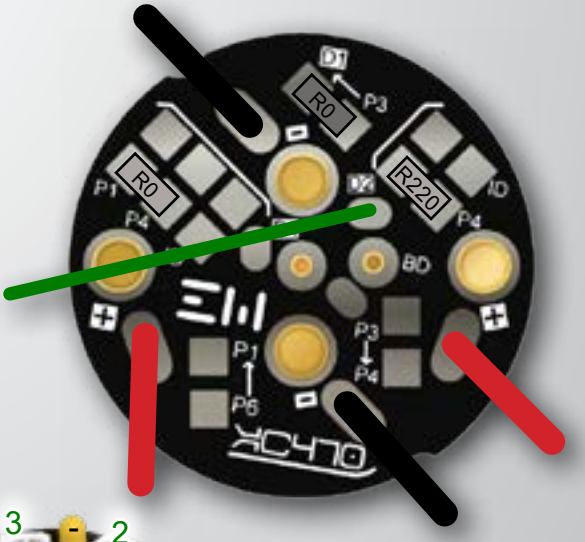
R0 0 Ω smd 0805 or 0603 resistor to bridge Connector pixels in series

R0 0 Ω smd 0805 or 0603 resistor to bridge Connector data signal and Blade signal

Connector on D1 (6 pixels : 0 to 5)

Blade in series on D1 (# of pixels in your blade : 6 to #+5)

2 x 3 pixels array



BATTERY + (20-22AWG)

LED - (20-22 AWG)

DATA pad to Connector then Blade pixels

R220 220 Ω smd 0805 or 0603 resistor for Connector pixels signal

R0 0 Ω smd 0805 or 0603 resistor to bridge Connector pixels in parallel

R0 0 Ω smd 0805 or 0603 resistor to bridge Connector data signal and Blade signal

Connector on D1 (3 pixels : 0 to 2)

Blade in series on D1 (# of pixels in your blade : 4 to #+2)

VI. POGO PINS INSTALLATION

Whether you are installing long or short pogo pins, the procedure is the same. In terms of choice, we only recommend using the short pins in installs incompatible with the long ones such as thin-neck sabers (like Luke's Episode 6 or Obi-wan's Episodes III and IV sabers). In those sabers, the blade holder has a very short height and depth forcing the installator to reduce any lost depth for the blade to be held tight enough. Thus the short pins.

In any other case where the blade holder of the saber allows for enough room to fit the blade and the pin's height, the long pins are the best option because they will allow room for the pixel's light to be diffused, giving you a nice glow instead of points of color.

In any case, you should always use a connector casing to protect the integrity of both the pins (the blade will actually rest on the casing and not the pin's body) and the pixels.

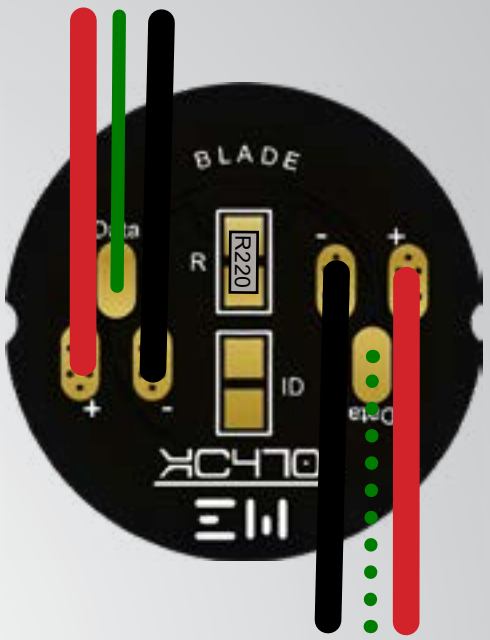
VII. BLADE SIDE WIRING

Neopixel strip + (20-22AWG)

Neopixel strip - (20-22 AWG)

DA Neopixel strip Data in

R220 220 Ω smd 0805 or 0603 resistor



If you are making a ZigZag blade to run with ProffieOS, only one Data wire must go to the first pixel of the strip.

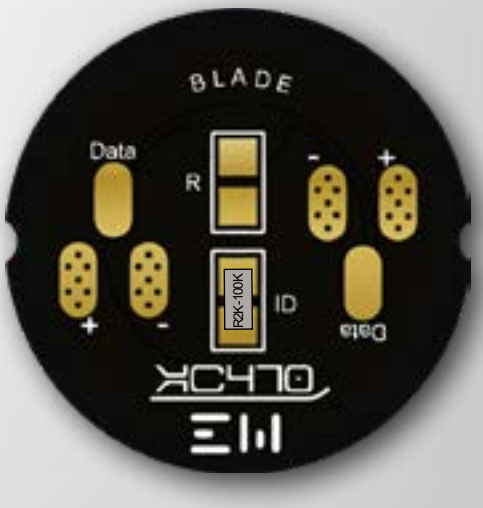
For classic Blade building, the strips are un parallel, so you can either wire one cable and bridge all Data input for each strip's first pixel or use the two provided pads.

The pads are purposely oriented perpendicularily to the final strip's resting position to allow twisting of the wires with minimal stress on the soldering and PCB traces. Once you have soldered everything, you can make sure the strips are resting directly on the PCB so your first pixel is really at the base of your blade.

Blade ID (optional)

R2K-100K 2K Ω to 100K Ω smd 0850 to 0603 resistor

High value resistor between Data line and LED GND to identify the blade



VIII. OPTIONAL FEATURES WIRING

Whichever configuration you choose for the essential wiring, you can always add any and all optional functionalities supported by your board.

In any case, these functionalities will require additional settings in your configuration.

Blade Present / Blade Detect

dedicated DATA pad to Blade detect

Blade detect on dedicated Data pad

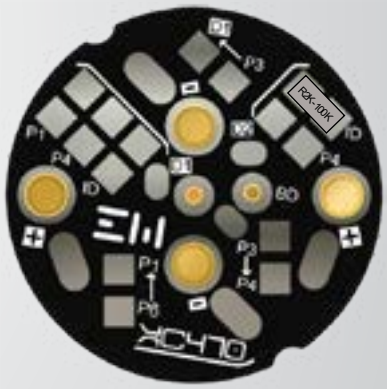
signal return on LED GND

For CFX, you will need to add a specific resistor between this line and the GPIO #1 pad as well as the fixed 10K Ω resistor between your specific resistor and the 3.3V pad as specified in the Tangible selection chapter.

Connector Blade ID for separate signals

R2K-100K 2K Ω to 100K Ω smd 0850 to 0603 resistor

High value resistor between Data line and LED GND to identify the connector



Connector Blade ID for shared signal

R2K-100K 2K Ω to 100K Ω smd 0850 to 0603 resistor

High value resistor between Data line and LED GND to identify the connector