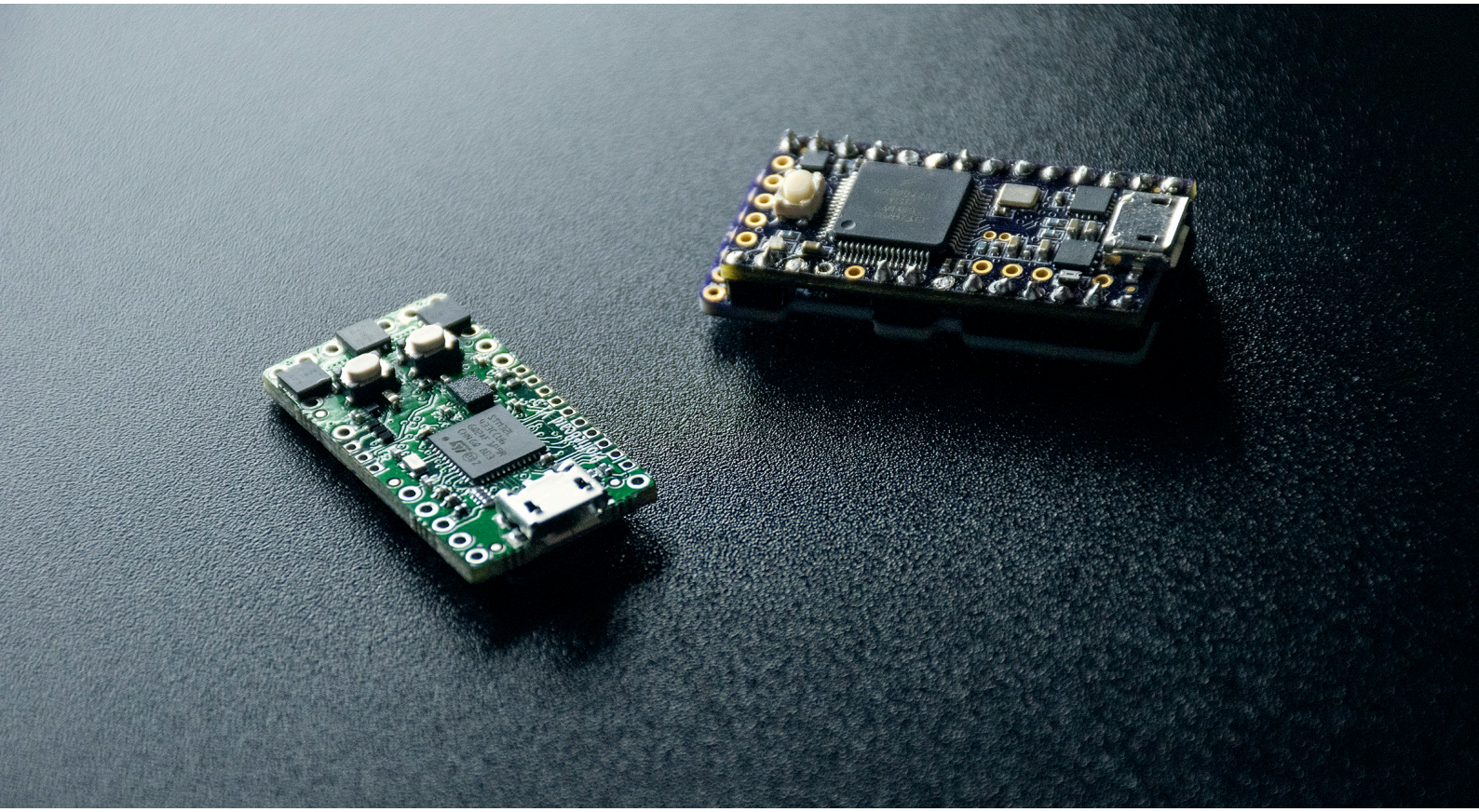
ProffieBoard and TeensySaber
Open-Source advanced saber sound boards



User Manual

by Fredrik Hubinette and Dmitry Shtok

2018

Contents

updated:
09.10.2019

INTRODUCTION

It really just started with a trip to Disneyland. I was really just disappointed with the cheap plastic lightsabers they had available. I had hoped to pick something more display-worthy, or at least in the "toys for grownups" category, but did not find anything. So when I got home, I went and ordered an FX "black series" Luke lightsaber, which looks quite nice, but the sound, light and interactivity was still pretty disappointing.

At this point I started to think about how I would make a lightsaber. I had already done things with neopixels before, so that was kind of a no-brainer for making a better blade, but I really wanted to do was to make the sound react fluidly to motion.

At this point I joined a bunch of forums and came across the NEC and Plecter boards, but there didn't seem to be a way to alter how they produced sounds, so I picked up a teensy and a PJRC prop shield and started building from there.

The Teensy 3.2 + PJRC prop + SD card reader + voltage booster + FETs I ended up with, was fairly large. Luckily, the Graflex lightsabers are also fairly large, so I purchased a Graflex 2.1 and barely managed to squeeze everything in there.

Around this time, I got kind of stuck with how to synthesize all the sounds a lightsaber makes, so I decided to implement support for Plecter and NEC sound fonts to get the saber I built make some sounds. There are some amazing sound fonts out there, but even so, the interactivity I craved was still missing.

Since I didn't really have a good idea for how to make that interactivity happen, I took on a different challenge instead: Make it smaller. For the TeensySaber V2, I decided to try to make my own circuit board. That meant integrating some components from the prop shield, the sd card reader, the voltage booster and the FETs into a single board. To make things interesting, I bought a Korbanth OWK, which has an inner diameter of 7/8 inches, and my goal was to fit everything in there. It took a while to do, but the result was the TeensySaber V2 board. The V2 fits really great inside an OWK, without cutting into the inner chassis parts, and was generally a great success, but the sound quality wasn't as good as I wanted it to be, so eventually I designed he TeensySaber V3, which is mostly the same as the V2, but uses a digital 3W amplifier.

As I was working on the TeensySaber V3, this guy Thexter showed up on a couple of forums, with some great videos showing off an algorithm for better swing sounds. Since this was what I wanted all along, I couldn't wait until he provided a description of his algorithm so that I could implement it. Lucky for me, he didn't mind describing his algorithm, so I implemented it. My implementation never really sounded as good as his videos though, but that's probably because I'm not really a font designer. Later, Thexter came back with an improved version, which is what we now call "SmoothSwing V2".

With SmoothSwing V3, TeensySaber V3 was getting some attention from people, but a lot of people still thought it was too big, since it's made out of two boards sandwiched together. The sandwiching also creates extra work for installers and extra complications for hobbyists, so it was time to try to put everything together into one board.

At first, I was thinking of using the same components that make up a Teensy to make the all-in-one board, but it turned out to be complicated and expensive. Instead I found another board called a "Butterfly", which had nearly identical capabilities and an already functional arduino plugin. Even better, the Butterfly was 100% open source (the teensy is only *mostly* open source).

I spent most of the Christmas vacation last year designing the Proffieboard, and it took another couple of months of testing to get a working prototype, but it's been a lot of fun.

- Fredrik Hubinette

Read full interview on SaberSourcing:

[Proffieboard lightsaber controller developer Fredrik Hubinette interview]

FEATURES

Specifications and features:

– ProffieBoard specific – Dimensions: 17.9x34.6x5.7mm (with micro USB port and micro SD card)
– ProffieBoard specific – Single pcb board design
– TeensySaber V3 specific – Dimensions: 18x39.5x9mm (with micro USB port and micro SD card)
– TeensySaber V3 specific – 2-pcb boards stack design
– 100% Open-Source, you may add any feature you like (GPLv3)
– Power supply: 2.6-4.5 Volts, up to 10A per LED output 1-6; single Li-Ion 3.6-3.7V (low 2.6V, full 4.2V) battery recommended
– Speaker: 4 ohm or 8 ohm, 2W (with lower volume) or 3-5W (recommended)
– Unlimited amount of sound banks/fonts, supports regular (Plecter, NEC) and "Smoothswing" sound fonts
– Sound FX (WAV sound files): boot, blaster blocking, lockup, hum, swing, clash, drag, font, force, ingnition, retraction
– Light FX: blade flickering, pulsing, flash on clash, drag, stab, blaster blocking, lockup and other
– Music tracks (WAV sound files) playback in idle mode and saber sound effects background
– Micro SD card: 4-16Gb Class 4-10 by SanDisk brand recommended
– Support for remote control via bluetooth (with external bluetooth module addon)
– Speedy 32-bit processor for advanced features like sound filters, synthesizing and mp3 playback
– 3 Watts sound amplifier, 16-bit digital output (12-bit for TeensySaber V1 and V2)
– Sample rate is 44kHz (default), 22kHz and 11kHz are supported and upsampled to 44kHz automatically
– Gapless playback, with 2.5ms cross-fade when you interrupt one sample to go to another
– Polyphonic playback, currently configured for up to 5 simultaneous samples
– "Smoothswing" algorithm support (a new more natural swing motion sounds playback)
– PL9823 (RGB), WS2812B (RGB), SK6812 (RGB, WWA, RGBW) Neopixel support
– 1/2/3/4-color LED stars (Tri-Cree and Quad (also RGBA) LED modules)
– Segmented (6 segments + Flash string) classic string blades support
– Multi-blade support for dual and crossguard setups
– Blade LED type, Presets and Blade Styles selection by different values of a resistor (Blade ID functions)
– Crystal chamber support
– Power-level indicator with neopixel blade
– OLED PLI and FONT, animations display
– sound files upload to SD card via USB cable directly from PC (only from firmware version 1.291 and up)
– POV (persistance of vision) mode support
– Accent LEDs support (also implemented as additional "blades")
– Spoken error and low battery messages
– Easy and free firmware updates by user

Demonstration videos:

Link to the demonstration video by K-Sith
Link to the demonstration video by Megtooth Sith Sabers
Link to the demonstration video by Zimmer Labs
Link to the demonstration video by ShtokCustomWorx

1 HELPFUL LINKS

Where to buy

TeensySaber V3 boards:

Send a message to this guy

ProffieBoards:

TheSaberArmory (KR-sabers) UK store
JQ-sabers UK store
SaberBay Etsy USA store
ShtokCustomWorx Etsy RUS store (not opened yet)

Other parts links:

RGB Neopixel strips (they are SK6812, though sellers list them as WS2812b)
WWA (White/White/Amber) Neopixel strips SK6812 Source 1
WWA (White/White/Amber) Neopixel strips SK6812 Source 2
Individual Neopixel LEDs
Neopixel strips/connectors/other supplies (UK) – TheSaberArmory
Tri-Cree high power LEDs (Canada/USA) – TheCustomSaberShop
Tri-Cree high power LEDs (UK) – TheSaberArmory
Various Accent LEDs (UK) – TheSaberArmory
Various Batteries (UK) – TheSaberArmory
Protected KeepPower 18650 10A 3500mAh battery
Protected KeepPower 18650 15A 3120mAh battery
Unprotected Vapcell 21700 15A 5000mAh battery – requires external PCM
Unprotected KeepPower 26650 15A 6000mAh battery – requires external PCM
15A Protection Circuit Module (PCM) (aliexpress)
18650 Protected Battery holder
High Power 1.3mm Recharge Port
Recharge Ports (UK) – TheSaberArmory
High Power Kill Switch
Various Switches (UK) – TheSaberArmory
SCW Neopixel blade Pogo connector
TCSS Neopixel blade Pogo connector
GX16 Neopixel/string blade connectors
Various speakers (UK) – TheSaberArmory
Various speakers (UK) – JQ-sabers
Various speakers (Canada/USA) – TheCustomSaberShop
3W speakers
4W (3W) TCS speaker (sounds the best!) - source 1
4W (3W) TCS speaker (sounds the best!) - source 2
FSC-BT630 bluetooth module (USA store)
FSC-BT909 bluetooth module (USA store)
FSC-BT630 bluetooth module (UK store)
FSC-BT909 bluetooth module (UK store)

3D-printed chassis links:

ShtokCustomWorx on Shapeways
GOTH-3Designs on Shapeways

1 HELPFUL LINKS

Tutorials and instructions

Video tutorials by Megtooth Sith Sabers:

Video tutorials by Megtooth Sith Sabers on youtube
LED Resistor Calculator

For more information please check these links:

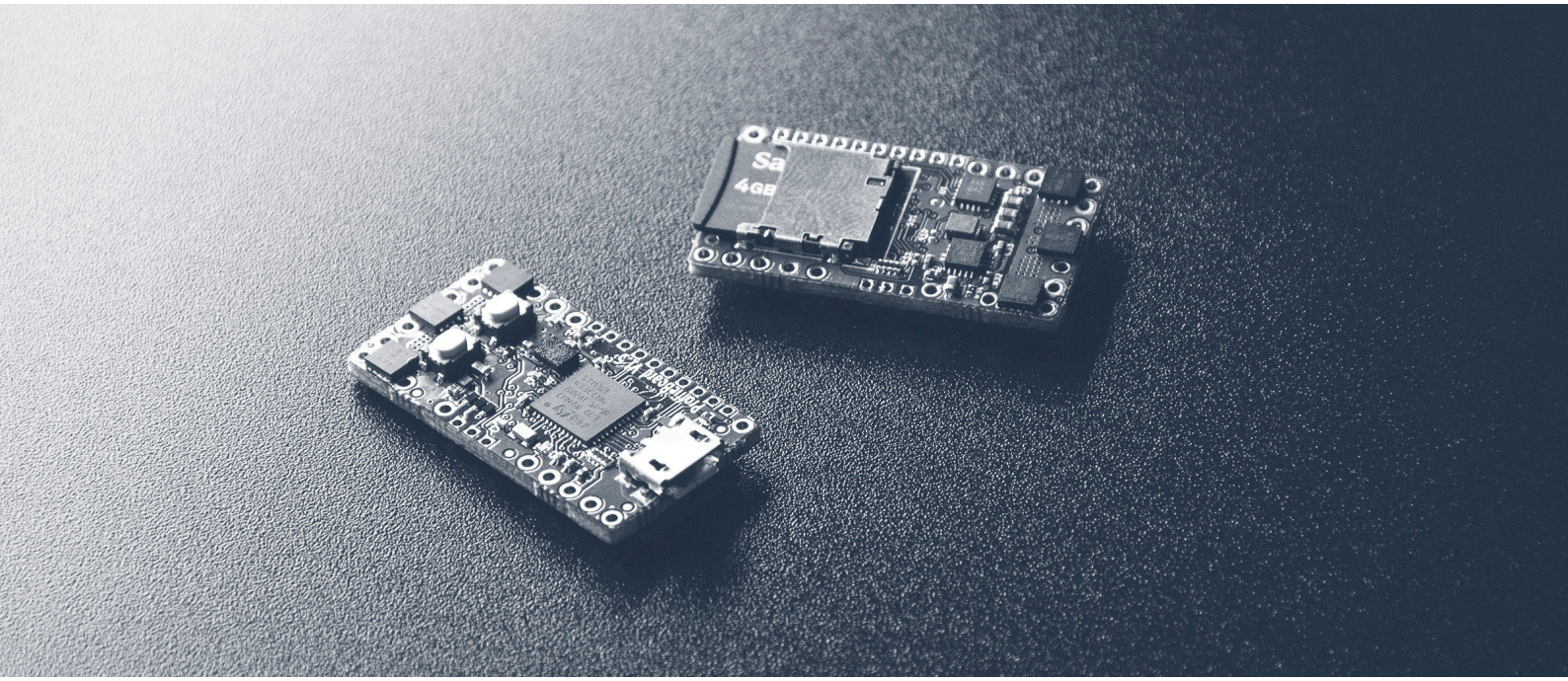
TeensySaber V3 sound board instructions
ProffieBoard sound board instructions
”Blade style sharing” - here you can find and share custom blade styles
Web Blade Style Editor 1 (default)
Web Blade Style Editor 2 (restyle)
Here you can get regular (Plecter, NEC) or “Smoothswing” sound fonts
ProffieOS/ProffieBoard/TeensySaber wiki on GitHub
Profezzorn’s Lab on The Rebel Armory forums
Profezzorn’s Lab on FX-sabers forums
Ask your question in facebook group

Get latest ProffieOS firmware here

PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

What's needed

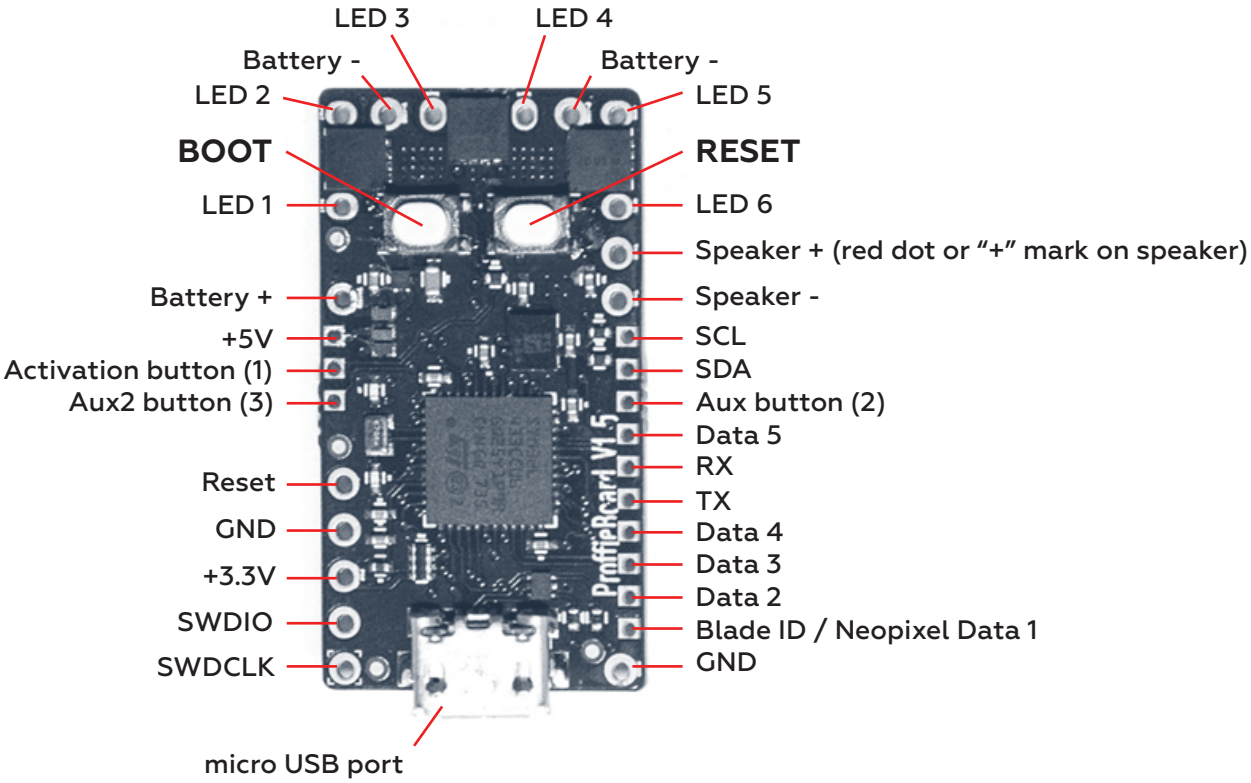


– ProffieBoard
– micro SD-card (see page 46 for recommendations)
– a USB micro SD-card reader (to load sound files from PC to micro SD card)
– micro USB data transfer cable (CABLES, THAT SUPPORT ONLY CHARGING, WON'T WORK!)
– wires of different gauges (32-20 AWG) (PTFE coated copper stranded wires recommended), heat shrink
– ESD safe soldering station, solder wire, flux etc..
– pliers, helping hands etc..
– isopropyl alcohol to clean pads before soldering (helps solder to stick better)
– Digital Multimeter (VERY USEFUL!)
– computer running Windows, Linux or Mac OS with internet access
– 3.7V Li-Ion Protected rechargeable battery, switches, recharge port, speaker, LEDs, resistors, chassis etc..
– Smart Li-Ion CC-CV (Constant Current - Constant Voltage mode) battery charger for 3.7V (4.2V) cells
– patience...

PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Board pinout



Battery + – 2.6 to 4.5 volt input, drives everything except the LEDs

Battery - – negative pad for LEDs, needs to be at same level as GND when both are connected. Both pads are internally connected

GND – ground for electronics except LEDs. Note that there are two GND pads on the board that are internally connected

Speaker +/- – hooks up to speaker

Activation (1) / Aux (2) / Aux2 button (3) – hook up to closing buttons, or potentially touch buttons

Blade ID / Neopixel Data 1 – normally used to measure the blade ID restor, and if it's a neopixel blade, feed out neopixel data

Data 2, 3, 4, 5 – additional neopixel data outputs, or free for other purposes

LED 1, 2, 3, 4, 5, 6 – hooks up to negative side of LED (positive side of LED hooks up directly to battery.) These pads can handle up to 30 volts

SDA, SCL – these pins are used to wire OLED display or to communicate with the gyro and accelerometer chip

RX, TX – these pins are used for wiring a bluetooth module for wireless control

SWDCLK, SWDIO – can be hooked up to a ST-LINK device and lets you debug programs running on the ProffieBoard

+5V – generated by the ProffieBoard, normally it's only ON when sound is playing

+3.3V – generated by the ProffieBoard for powering OLED display, Bluetooth module or some accent leds

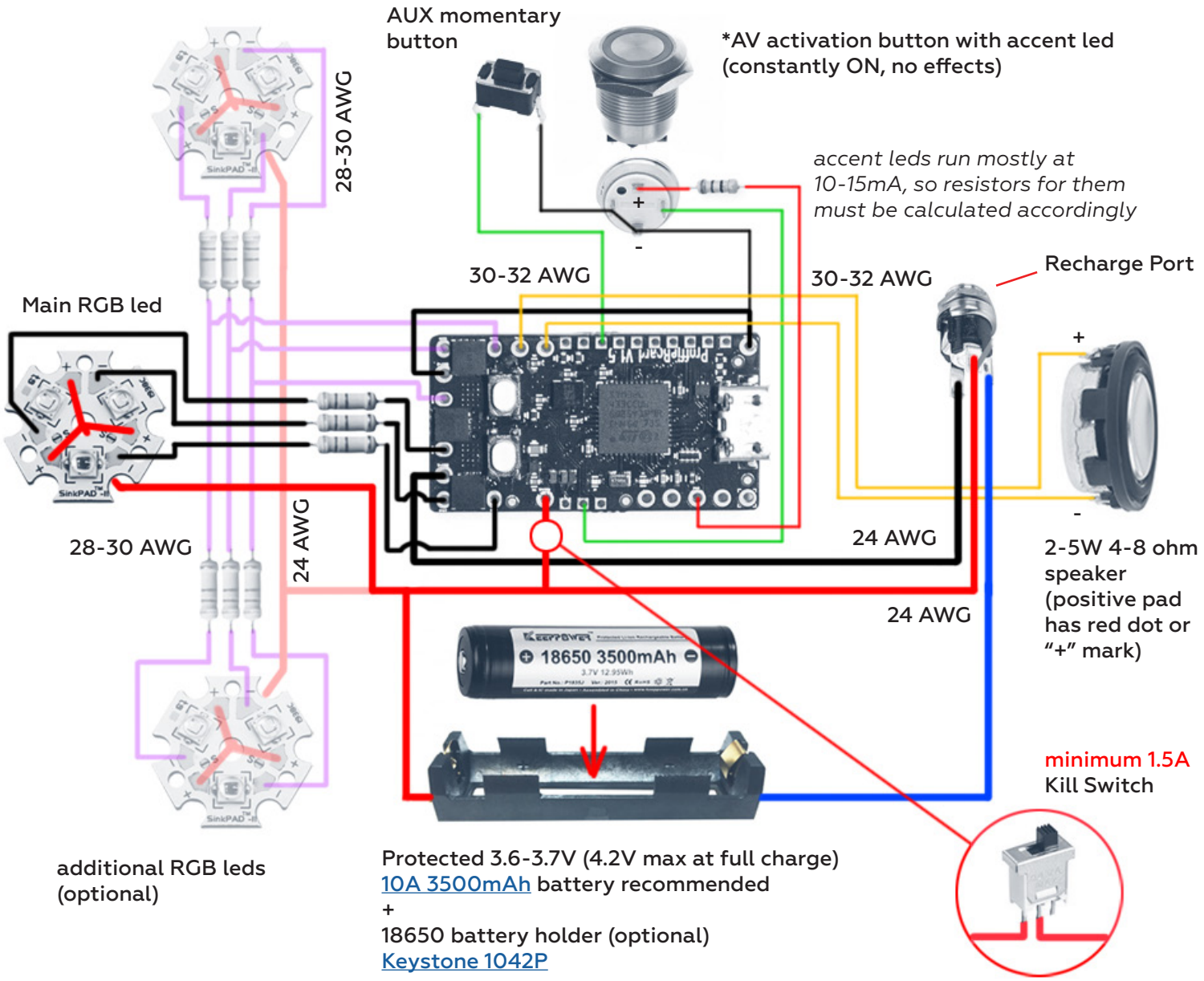
BOOT, RESET – buttons to put the ProffieBoard in bootloader mode if uploading doesn't work

micro USB port – micro USB port used only for firmware upload and can be used for sound files upload to SD card (from firmware version 1.291 and up). THIS PORT ISN'T USED FOR CHARGING THE BATTERY!

PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Basic Tri-Cree wiring diagram (In-hilt LED)



*

In case no additional high power leds are needed, LED channels 4, 5, 6 can be used for 3 controllable (programmable for different effects) accent leds. So AV switch led can be wired to one of these channels. Accent leds also can be wired to Data pads 1-5, please see "Accent LEDs wiring and setup" page.

[LED Resistor Calculator]

PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Basic Tri-Cree wiring (In-hilt LED) “config.h” file setup

Use a given or build your wiring diagram on **THIS PAGE**, then open any *..._config.h* file in the “.../ProffieOS/config” folder directory in any Text Editor (Notepad - *to see code correctly in Notepad, Cut-and-Paste it to WordPad, then Cut-and-Paste it back to Notepad, Save*), **Ctrl+A** (select all text) and **Delete** it, then **Copy-and-Paste (Ctrl+C, Ctrl+V)** your wiring diagram config code (example below) into empty *..._config.h* file and **Save** it under new name. Follow the instructions on page 42-43 to upload it to the board.

```
“proffieboard_v1_config.h”
NUM_BLADES 2
NUM_BUTTONS 2
VOLUME 1000
CLASH_THRESHOLD_G 1.0
StyleNormalPtr<CYAN, WHITE, 300, 800>()
StyleNormalPtr<CYAN, WHITE, 300, 800>()

CreeXPE2RedTemplate<1000>,
CreeXPE2GreenTemplate<0>,
CreeXPE2BlueTemplate<240>,
NoLED
```

where *1000* is 1 Ohm resistor, *0* is no resistor, *240* is 0.24 Ohm resistor, *NoLED* – no 4th led used

- **ProffieBoard config setup**
- **number of “blades” used**
- **number of buttons used** *(1-3)*
- **Volume level** *(0-3000)*
- **Clash sensitivity** *(lower = more sensitive, higher = less)*
- **“Blade 1” style**
- **“Blade 2” style** *(in case only 1 blade is used, you don’t need this line)*
- **LED configuration** *(use these XP-E2 LED templates to define your LED. If other LED resistors are used, change these values to match: Ohm*1000=<value>)*

```
#ifdef CONFIG_TOP
#include "proffieboard_v1_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
#endif

#ifdef CONFIG_PRESETS
Preset presets[] = {
   { "TeensySF", "tracks/venus.wav",
    StyleNormalPtr<CYAN, WHITE, 300, 800>(),
    StyleNormalPtr<CYAN, WHITE, 300, 800>(), "cyan"},
   { "SmthJedi", "tracks/mars.wav",
    StylePtr<InOutSparkTip<EASYBLADE(BLUE, WHITE), 300, 800> >(),
    StylePtr<InOutSparkTip<EASYBLADE(BLUE, WHITE), 300, 800> >(), "blue"},
   { "SmthGrey", "tracks/mercury.wav",
    StyleNormalPtr<RED, WHITE, 300, 800>(),
    StyleNormalPtr<RED, WHITE, 300, 800>(), "red"},
   { "SmthFuzz", "tracks/uranus.wav",
    StylePtr<InOutHelper<EASYBLADE(OnSpark<GREEN>, WHITE), 300, 800> >(),
    StylePtr<InOutHelper<EASYBLADE(OnSpark<GREEN>, WHITE), 300, 800> >(), "green"},
   { "RgueCmdr", "tracks/venus.wav",
    StyleNormalPtr<WHITE, RED, 300, 800, RED>(),
    StyleNormalPtr<WHITE, RED, 300, 800, RED>(), "white"},
   { "TthCrstl", "tracks/mars.wav",
    StyleNormalPtr<AudioFlicker<YELLOW, WHITE>, BLUE, 300, 800>(),
    StyleNormalPtr<AudioFlicker<YELLOW, WHITE>, BLUE, 300, 800>(), "yellow"},
   { "TeensySF", "tracks/mercury.wav",
    StylePtr<InOutSparkTip<EASYBLADE(MAGENTA, WHITE), 300, 800> >(),
    StylePtr<InOutSparkTip<EASYBLADE(MAGENTA, WHITE), 300, 800> >(), "magenta"},
   { "SmthJedi", "tracks/uranus.wav",
    StyleStrobePtr<WHITE, Rainbow, 15, 300, 800>(),
    StyleStrobePtr<WHITE, Rainbow, 15, 300, 800>(), "strobe"}
};
BladeConfig blades[] = {
 { 0, SimpleBladePtr<CreeXPE2RedTemplate<1000>, CreeXPE2GreenTemplate<0>, CreeXPE2BlueTemplate<240>, NoLED>(),
    SimpleBladePtr<CreeXPE2RedTemplate<1000>, CreeXPE2GreenTemplate<0>, CreeXPE2BlueTemplate<240>, NoLED, bladePowerPin4, bladePowerPin5, bladePowerPin6, -1>(), CONFIGARRAY(presets) },
};
#endif

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

Preset 1

Preset 2, etc....

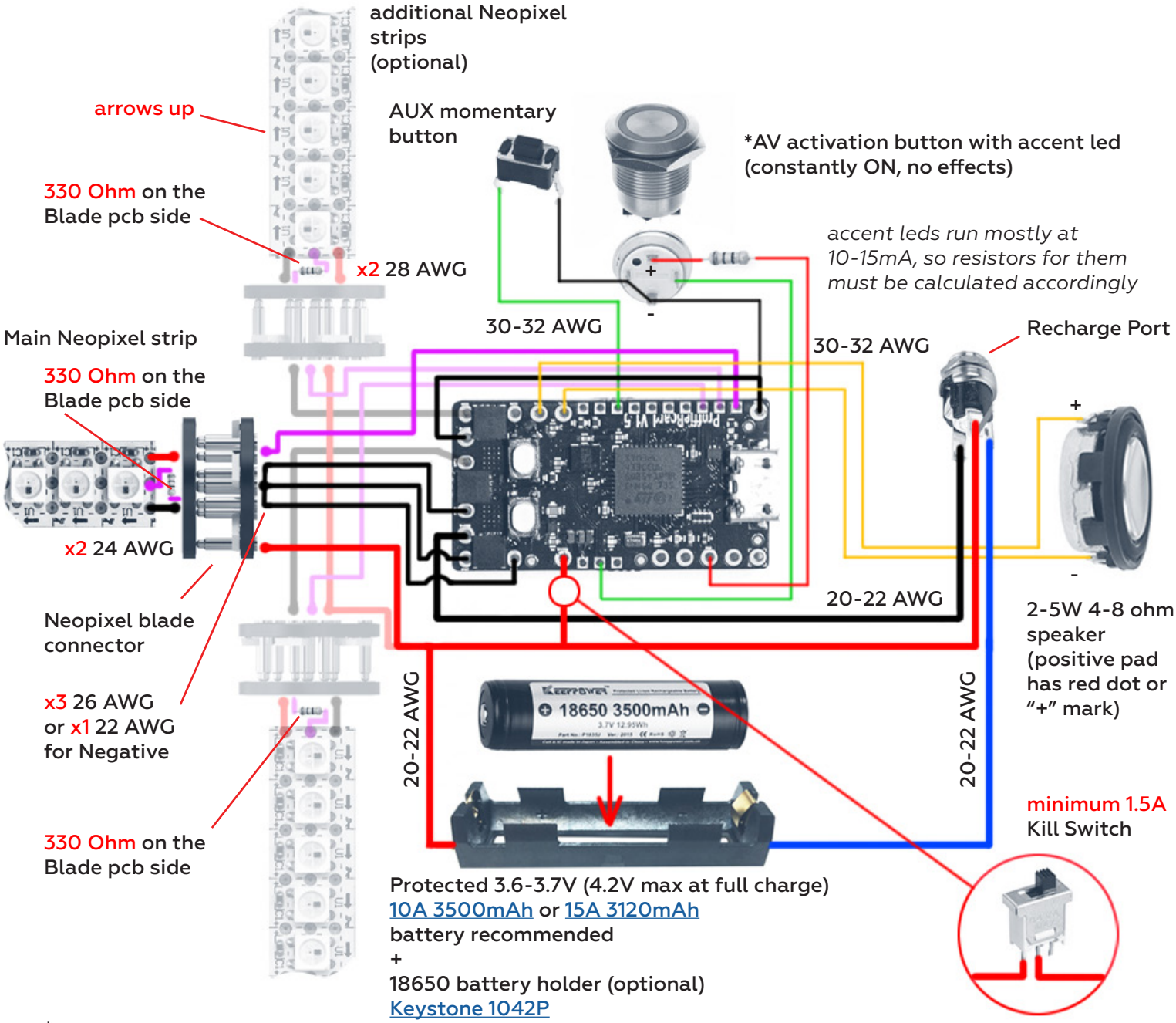
LED 1 configuration

LED 2 configuration

PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Basic Neopixel wiring diagram



*

In case no additional Neopixel strips are needed, LED channels 4, 5, 6 can be used for 3 controllable (programmable for different effects) accent leds. So AV switch led can be wired to one of these channels. Accent leds also can be wired to Data pads 2-5, please see "Accent LEDs wiring and setup" page.

Recommended power wire gauges (22 AWG) are given for 2-strip blade. For 3-strip blade you gonna need at least 20 AWG wires.

PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Basic Neopixel wiring
“config.h” file setup

Use a given or build your wiring diagram on **THIS PAGE**, then open any *..._config.h* file in the “.../ProffieOS/config” folder directory in any Text Editor (Notepad - *to see code correctly in Notepad, Cut-and-Paste it to WordPad, then Cut-and-Paste it back to Notepad, Save*), **Ctrl+A** (select all text) and **Delete** it, then **Copy-and-Paste (Ctrl+C, Ctrl+V)** your wiring diagram config code (example below) into empty *..._config.h* file and **Save** it under new name. Follow the instructions on page 42-43 to upload it to the board.

```
“proffieboard_v1_config.h”
NUM_BLADES 3
NUM_BUTTONS 2
VOLUME 1000
CLASH_THRESHOLD_G 1.0
IgnitionDelay<0, ..any blade style..>
IgnitionDelay<800, ..any blade style..>
IgnitionDelay<800, ..any blade style..>
WS2811BladePtr<118, WS2811 800kHz | WS2811 GRB>()
WS2811BladePtr<26, ... , blade2Pin, ...<bladePowerPin4>>()
WS2811BladePtr<26, ... , blade3Pin, ...<bladePowerPin5>>()
```

ProffieBoard config setup
number of “blades” used
number of buttons used *(1-3)*
Volume level *(0-3000)*
Clash sensitivity *(lower = more sensitive, higher = less)*
“Blade 1” style *(main blade, with IgnitionDelay 0)*
“Blade 2” style *(CG blade 1 with IgnitionDelay 800)*
“Blade 3” style *(CG blade 2 with IgnitionDelay 800)*
strip configuration *(defines how many pixels it has and to which LED output and pin is wired)*

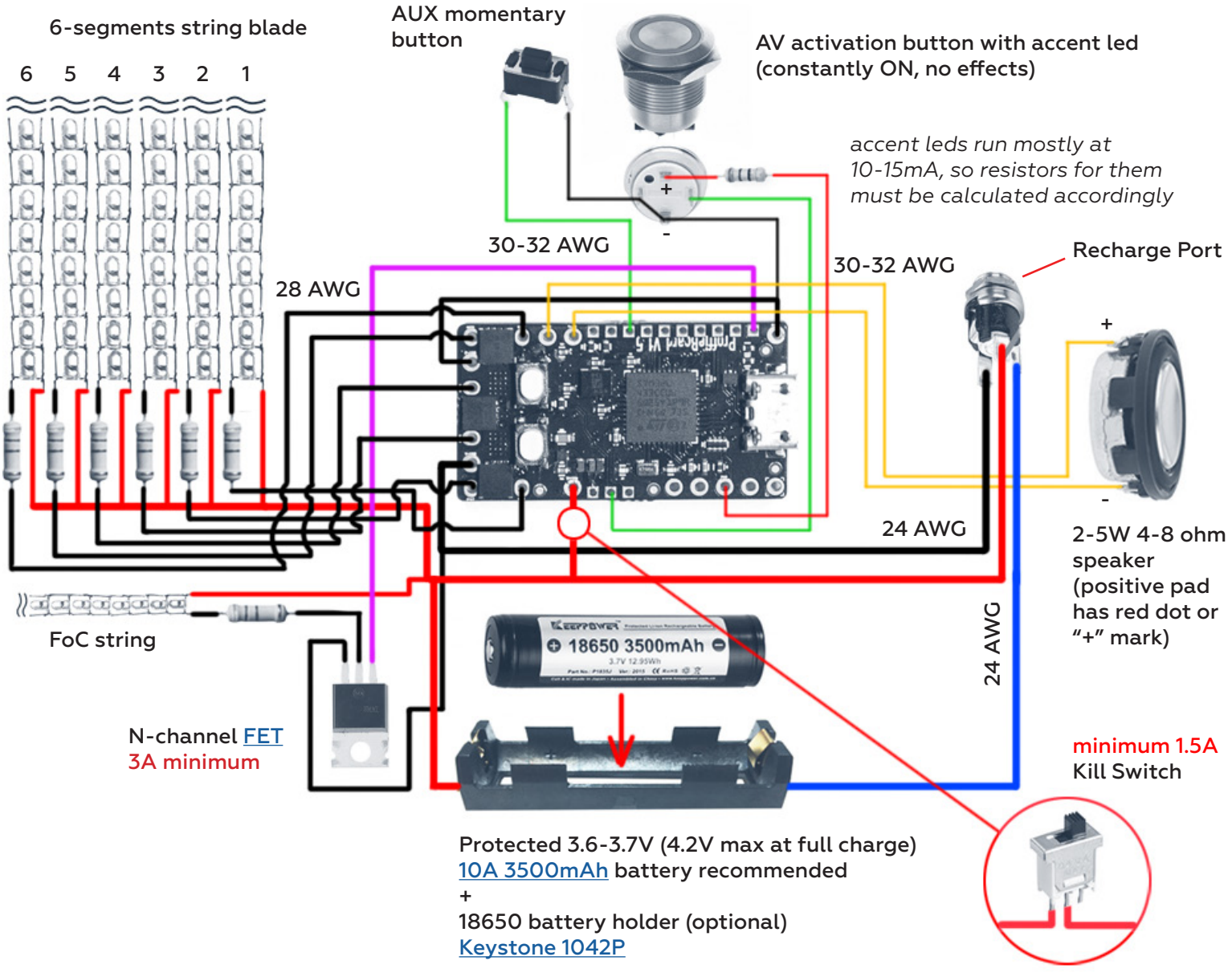
```
#ifdef CONFIG_TOP
#include "proffieboard_v1_config.h"
#define NUM_BLADES 3
#define NUM_BUTTONS 2
#define VOLUME 1000
const unsigned int maxLedsPerStrip = 144;
#define CLASH_THRESHOLD_G 1.0
#define ENABLE_AUDIO
#define ENABLE_MOTION
#define ENABLE_WS2811
#define ENABLE_SD
#endif

#ifdef CONFIG_PRESETS
Preset presets[] = {
  { "TeensySF", "tracks/mars.wav",
    StylePtr<IgnitionDelay<0, InOutHelper<SimpleClash<Lockup<Blast<Blue,White>,AudioFlicker<Blue,WHITE>>,White>, 300, 800>>>(),
    StylePtr<IgnitionDelay<800, InOutHelper<SimpleClash<Lockup<Blast<Blue,White>,AudioFlicker<Blue,WHITE>>,White>, 300, 800>>>(),
    StylePtr<IgnitionDelay<800, InOutHelper<SimpleClash<Lockup<Blast<Blue,White>,AudioFlicker<Blue,WHITE>>,White>, 300, 800>>>()
  },
  { "SmthJedi", "track..wav",
    StyleNormalPtr<RED, WHITE, 200, 300>(),
    StyleNormalPtr<RED, WHITE, 200, 300>(),
    StyleNormalPtr<RED, WHITE, 200, 300>()
  },
  { "SmthGrey", "tracks/venus.wav",
    StyleRainbowPtr<300, 800>(),
    StyleRainbowPtr<300, 800>(),
    StyleRainbowPtr<300, 800>()
  },
};

BladeConfig blades[] = {
  { 0, // blade ID resistor not used
    // Main blade, 118 LEDs
    WS2811BladePtr<118, WS2811 800kHz | WS2811 GRB>(),
    // First crossguard, 26 LEDS, power on LED4, data on pixel data 2
    WS2811BladePtr<26, WS2811 800kHz | WS2811 GRB, blade2Pin, PowerPINS<bladePowerPin4> >(),
    // First crossguard, 26 LEDS, power on LED5, data on pixel data 3
    WS2811BladePtr<26, WS2811 800kHz | WS2811 GRB, blade3Pin, PowerPINS<bladePowerPin5> >(),
    CONFIGARRAY(presets)
  },
};

#endif

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

any blade style
Preset 1
Preset 2, etc....
adjust this number to match your strips leds count
strip (blade) 1 configuration
strip (blade) 2 configuration
strip (blade) 3 configuration

3.1 PROFFIEBOARD INSTRUCTIONS

WIRING DIAGRAMS

Basic Segmented string wiring diagram



Calculate resistors for each led segment of the blade string depending on which leds are used. 5mm leds have max drive current around 25mA per led, when 10mm leds can be 100mA and 200mA per led.
So pay attention to your led max current and Forward Voltage (Vf) when calculating a segment resistor resistence as well as its wattage. Also choose wire gauges accordingly to meet segments and total blade max current draw level.

[LED Resistor Calculator]

PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Basic Segmented string wiring “config.h” file setup

Use a given or build your wiring diagram on **THIS PAGE**, then open any *..._config.h* file in the “.../ProffieOS/config” folder directory in any Text Editor (Notepad - *to see code correctly in Notepad, Cut-and-Paste it to WordPad, then Cut-and-Paste it back to Notepad, Save*), **Ctrl+A** (select all text) and **Delete** it, then **Copy-and-Paste (Ctrl+C, Ctrl+V)** your wiring diagram config code (example below) into empty *..._config.h* file and **Save** it under new name. Follow the instructions on page 42-43 to upload it to the board.

```
“proffieboard_v1_config.h”
NUM_BLADES 1
NUM_BUTTONS 2
VOLUME 1000
CLASH_THRESHOLD_G 1.0
StyleNormalPtr<CYAN, WHITE, 300, 800>()
<Blue3mmLED, BladePin, White3mmLED>
```

— ProffieBoard config setup
— number of “blades” used
— number of buttons used *(1-3)*
— Volume level *(0-3000)*
— Clash sensitivity *(lower = more sensitive, higher = less)*
— Blade style
— LED string configuration
(here you mention the color and type of leds used in the main blade string segments and FoC string. BladePin is the FoC signal pin (Blade ID pin))

```
#ifdef CONFIG_TOP
#include "proffieboard_v1_config.h"
#define NUM_BLADES 1
#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
#endif

#ifdef CONFIG_PRESETS
Preset presets[] = {
  { "TeensySF", "tracks/venus.wav", StyleNormalPtr<CYAN, WHITE, 300, 800>(), "Ignition" }
};
BladeConfig blades[] = {
 { 0, StringBladePtr<Blue3mmLED, BladePin, White3mmLED>(), CONFIGARRAY(presets) },
};
#endif

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

— Preset
— LED string configuration

PROFFIEBOARD INSTRUCTIONS

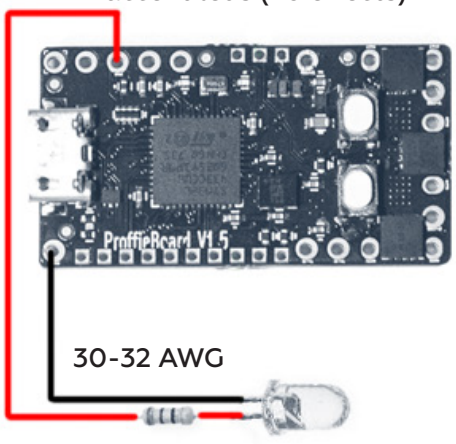
1 WIRING DIAGRAMS

Accent LEDs wiring diagram (optional)

Accent LEDs work with ProffieBoard as additional "blades" when powered by LED outputs 4, 5, 6 or Data pads 1, 2, 3, 5 as PWM. So they can have any effect that blade can have. If no effects needed, accent led can be powered just by a 3.3V output pad (power-on led indication).

a)

"Power-on" indication accent leds (no effects)

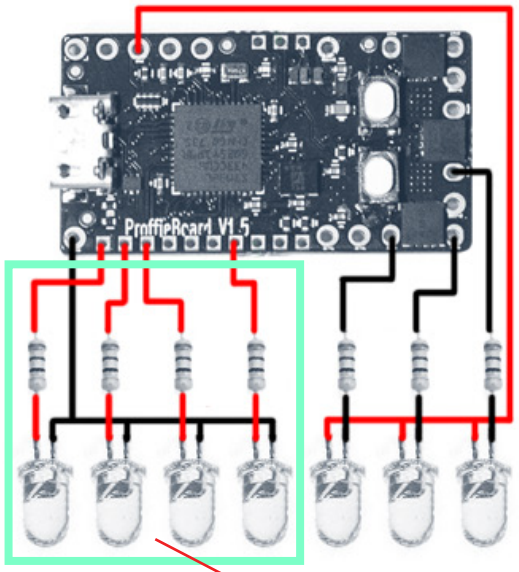


Recommended resistors to use for accent leds at 3.3V power source and 15mA drive:

- 100 Ohm for Red (<100000> value in the code)
- 13 Ohm for Green (<13000> value in the code)
- 13 Ohm for Blue (<13000> value in the code)
- 100 Ohm for Yellow (<100000> value in the code)
- 20 Ohm for White (<20000> value in the code)

b)

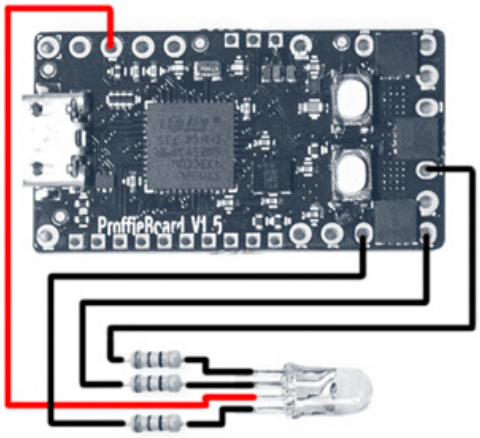
7 accent leds with independent effects



with Neopixel blade setup these 4 outputs don't work for regular accent leds

c)

RGB accent led



RGB led common-anode

b)

8 "blades": 1 main and 7 accent leds

```
#ifdef CONFIG_TOP
#include "proffieboard_v1_config.h"
#define NUM_BLADES 8
#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
#endif

#ifdef CONFIG_PRESETS
Preset presets[] = {
   { "TeensySF", "tracks/venus.wav",
    StyleNormalPtr<CYAN, WHITE, 300, 800>(),
    StyleNormalPtr<WHITE, WHITE, 300, 800>(),
    StyleNormalPtr<RED, WHITE, 300, 800>(),
    StyleNormalPtr<BLUE, WHITE, 300, 800>(),
    StyleNormalPtr<WHITE, WHITE, 300, 800>(),
    StyleNormalPtr<GREEN, WHITE, 300, 800>(),
    StyleNormalPtr<RED, WHITE, 300, 800>(), "cyan"}
};
BladeConfig blades[] = {
 { 0, SimpleBladePtr<CreeXPE2RedTemplate<1000>, CreeXPE2GreenTemplate<0>, CreeXPE2BlueTemplate<240>, NoLED>(),
    SimpleBladePtr<CreeXPE2WhiteTemplate<20000>, NoLED, NoLED, NoLED, bladePowerPin4, -1, -1, -1>(),
    SimpleBladePtr<CreeXPE2RedTemplate<100000>, NoLED, NoLED, NoLED, bladePowerPin5, -1, -1, -1>(),
    SimpleBladePtr<CreeXPE2BlueTemplate<13000>, NoLED, NoLED, NoLED, bladePowerPin6, -1, -1, -1>(),
    SimpleBladePtr<CreeXPE2WhiteTemplate<20000>, NoLED, NoLED, NoLED, bladePin, -1, -1, -1>(),
    SimpleBladePtr<CreeXPE2GreenTemplate<13000>, NoLED, NoLED, NoLED, blade2Pin, -1, -1, -1>(),
    SimpleBladePtr<CreeXPE2RedTemplate<100000>, NoLED, NoLED, NoLED, blade3Pin, -1, -1, -1>(),
    SimpleBladePtr<CreeXPE2RedTemplate<100000>, NoLED, NoLED, NoLED, blade5Pin, -1, -1, -1>(),
CONFIGARRAY(presets) },
};
#endif

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

main blade style (effects)

7 accent leds style (effects)

7 accent leds configurations

c)

2 "blades": 1 main and 1 RGB accent led

```
#ifdef CONFIG_TOP
#include "proffieboard_v1_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
#endif

#ifdef CONFIG_PRESETS
Preset presets[] = {
   { "TeensySF", "tracks/venus.wav",
    StyleNormalPtr<CYAN, WHITE, 300, 800>(),
    StyleNormalPtr<CYAN, WHITE, 300, 800>(), "cyan"}
};
BladeConfig blades[] = {
 { 0, WS2811BladePtr<144, WS2811_ACTUALLY_800kHz | WS2811_GRB>(),
    SimpleBladePtr<CreeXPE2RedTemplate<100000>, CreeXPE2GreenTemplate<13000>,
CreeXPE2BlueTemplate<13000>, NoLED, bladePowerPin4, bladePowerPin5, bladePowerPin6, -1>()
   , CONFIGARRAY(presets) },
};
#endif

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

main blade style (effects)

accent led style (effects)

RGB accent led configuration

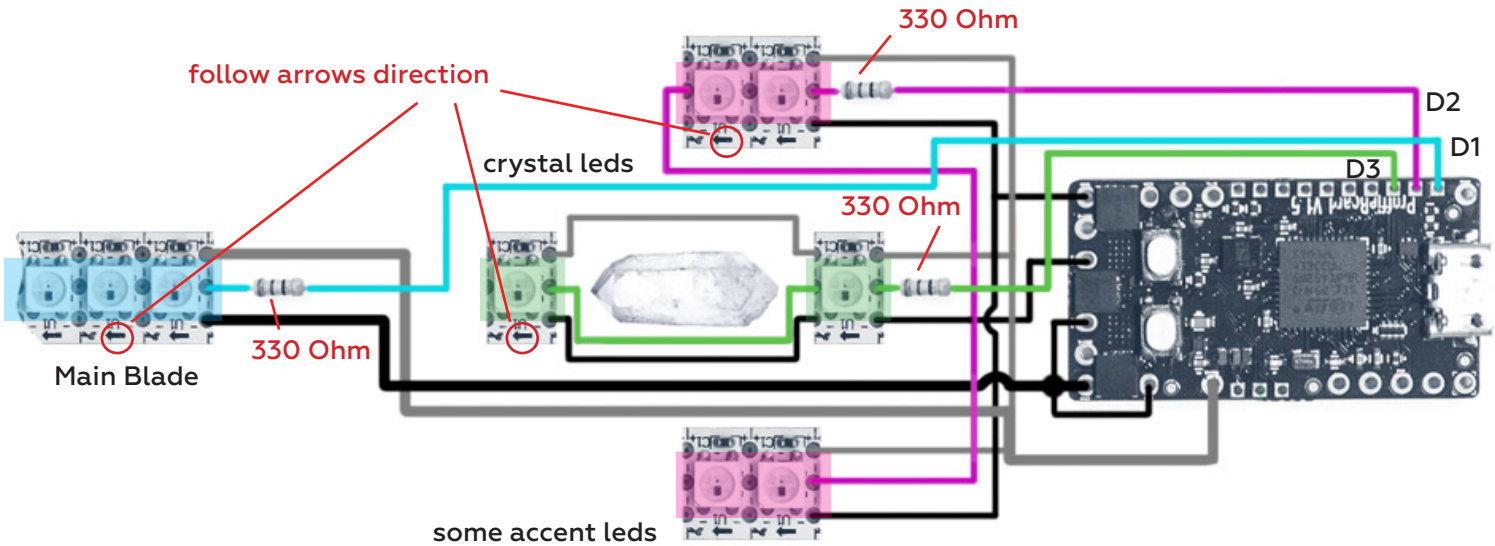
PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Neopixel Accent LEDs wiring diagram (optional)

With Neopixel setup additional neopixel leds or arrays can be used as accent leds. There are 2 ways to wire them: using additional Data pins 2, 3, 4, 5 or "Sub-blades" wiring with just 1 Data output pin. Same way Neopixel connectors with on-board pixels can be wired.

Option 1 – with extra Data pins




```
#ifdef CONFIG_TOP
#include "proffieboard_v1_config.h"
#define NUM_BLADES 3
#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
#endif

#ifdef CONFIG_PRESETS
Preset presets[] = {
   { "TeensySF", "tracks/venus.wav",
    StyleNormalPtr<CYAN, WHITE, 300, 800>(),
    StyleNormalPtr<RED, WHITE, 350, 500>(),
    StyleNormalPtr<BLUE, WHITE, 200, 300>(), "cyan"}
};
BladeConfig blades[] = {
 { 0, WS2811BladePtr<144, WS2811_ACTUALLY_800kHz | WS2811_GRB>(),
    WS2811BladePtr<4, WS2811_ACTUALLY_800kHz | WS2811_GRB, blade2Pin, PowerPINS<bladePowerPin5> >(),
    WS2811BladePtr<2, WS2811_ACTUALLY_800kHz | WS2811_GRB, blade3Pin, PowerPINS<bladePowerPin4> >(),
    CONFIGARRAY(presets) },
};
#endif

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

3 "blades":
1 main, 1 accent leds array and 1 crystal leds array

main blade style (effects)

accent leds blade style (effects)

crystal leds blade style (effects)

main blade: 144 leds, Data pin 1

accent leds "blade": 4 leds, Data pin 2

crystal leds "blade": 2 leds, Data pin 3

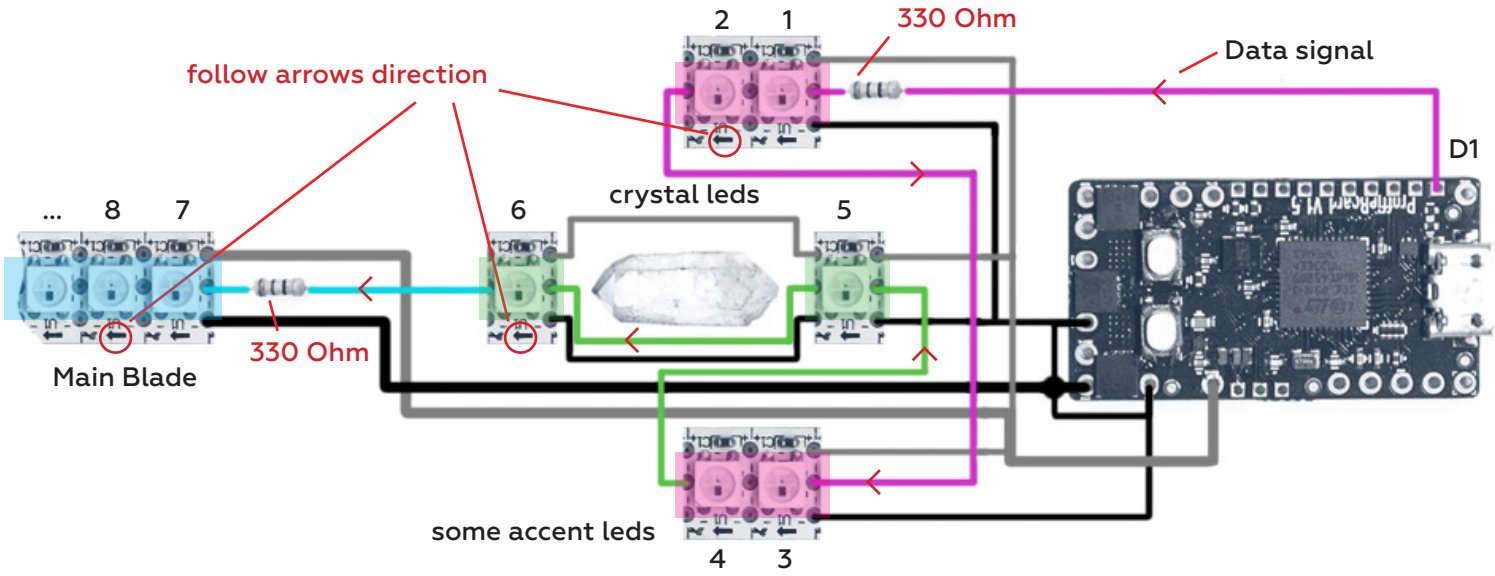
PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Neopixel Accent LEDs wiring diagram (optional)

With this setup a single array of neopixel leds is separated into a couple of sub-blades with their own style configuration and behaviour. This is really usefull, when you want to use only one Data pin. More about "Sub-blades" on ProffieOS wiki page

Option 2 – with "Sub-blades"




```
#ifdef CONFIG_TOP
#include "proffieboard_v1_config.h"
#define NUM_BLADES 3
#define NUM_BUTTONS 2
#define VOLUME 1000
const unsigned int maxLedsPerStrip = 146;
#define CLASH_THRESHOLD_G 1.0
#define ENABLE_AUDIO
#define ENABLE_MOTION
#define ENABLE_WS2811
#define ENABLE_SD
#endif

#ifdef CONFIG_PRESETS
Preset presets[] = {
   { "TeensySF", "tracks/venus.wav",
    StyleNormalPtr<CYAN, WHITE, 300, 800>(),
    StyleNormalPtr<RED, WHITE, 350, 500>(),
    StyleNormalPtr<BLUE, WHITE, 200, 300>(), "cyan"}
};
BladeConfig blades[] = {
 { 0,
    SubBlade(0, 3, WS2811BladePtr<146, WS2811_800kHz>()),
    SubBlade(4, 5, NULL),
    SubBlade(6, 145, NULL),
    CONFIGARRAY(presets) },
};
#endif

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

3 "blades": 1 main, 1 accent leds array and 1 crystal leds array

update default 144 to a higher total value if you get *all accent leds + Main blade > 144. Example: update to* **146** *if you have 2 crystal leds + 4 accent leds + 140 Main blade leds =* **146**

accent leds blade style (effects)

crystal leds blade style (effects)

main blade style (effects)

146 leds total used

accent leds sub-blade: 4 leds (1-4); *but from 0 to 3 in the code*

crystal leds sub-blade: 2 leds (5-6); *but from 4 to 5 in the code*

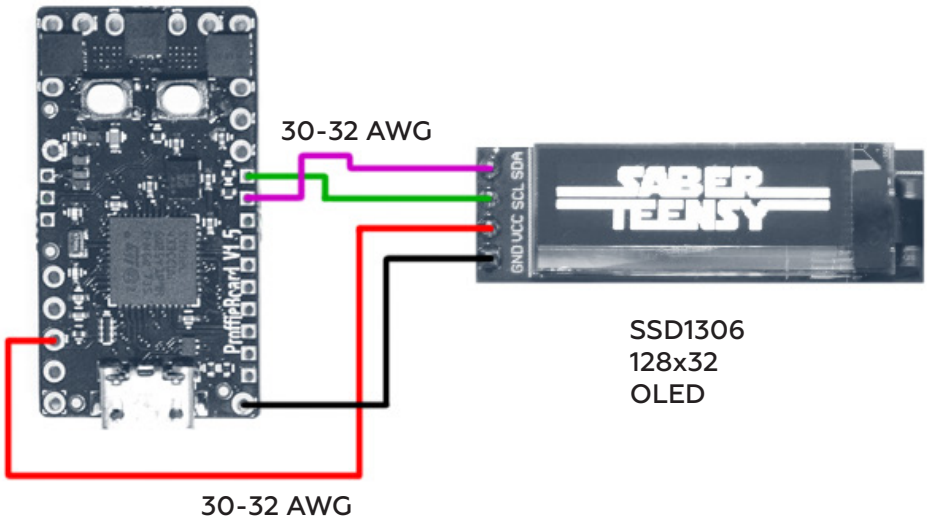
main blade sub-blade: 140 leds (7-146); *but from 6 to 145 in the code*

PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

OLED display wiring diagram (optional)

SSD1306 128x32 pixels OLED display allows to show battery level, current preset name, play different animations and even simple games. It can be wired to any blade configuration and requires just one additional line in the code to work. You can get monochrome display in white or blue color.



SSD1306 – with blue or white display color select
SSD1306 – cheaper price
SSD1306 just screen – blue or white select

```
#ifdef CONFIG_TOP
#include "proffieboard_v1_config.h"
#define NUM_BLADES 1
#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 ENABLE_SSD1306      —— add this line to enable OLED display
#endif

#ifdef CONFIG_PRESETS
Preset presets[] = {
   { "TeensySF", "tracks/venus.wav",
    StyleNormalPtr<CYAN, WHITE, 300, 800>(), "cyan"},      —— display shows a preset name written in these quotes "..."
   { "SmthJedi", "tracks/mars.wav",
    StylePtr<InOutSparkTip<EASYBLADE(BLUE, WHITE), 300, 800> >(), "blue"},
   { "SmthGrey", "tracks/mercury.wav",
    StyleFirePtr<RED, YELLOW>(), "fire"},
   { "SmthFuzz", "tracks/uranus.wav",
    StyleNormalPtr<RED, WHITE, 300, 800>(), "red"},
   { "RgueCmdr", "tracks/venus.wav",
    StyleFirePtr<BLUE, CYAN>(), "blue fire"},
   { "TthCrstl", "tracks/mars.wav",
```

PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Bluetooth module wiring diagram (optional)

Bluetooth modules **FSC-BT630** and **FSC-BT909** from Feasycom have been chosen over other modules on the market because of the best pcb size, quality, functionality and price point.

FSC-BT630 has same functionality as **FSC-BT909** but twice smaller size, lower signal strength and only BLE protocol support (no SPP).

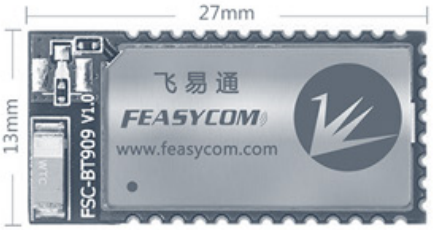
Both modules are recommended for use with ***ForceSync*** mobile app (currently in development) from ShtokCustomWorx.

FSC-BT630

Features:

- Nordic nRF52832 chipset
- Bluetooth 5.0/4.2/4.1/4.0 support
- Class 1.5 (signal power up to +4dBm)
- Profiles including GAP, ATT/GATT, SMP, L2CAP
- Built-in ceramic chip antenna, external antenna optional
- Current consumption: 7mA connected, 10mA max
- Connection status LED indication
- PIN code security
- Size: 10x11.9x1.7mm
- Works with: Android - YES; iOS - YES

FSC-BT909

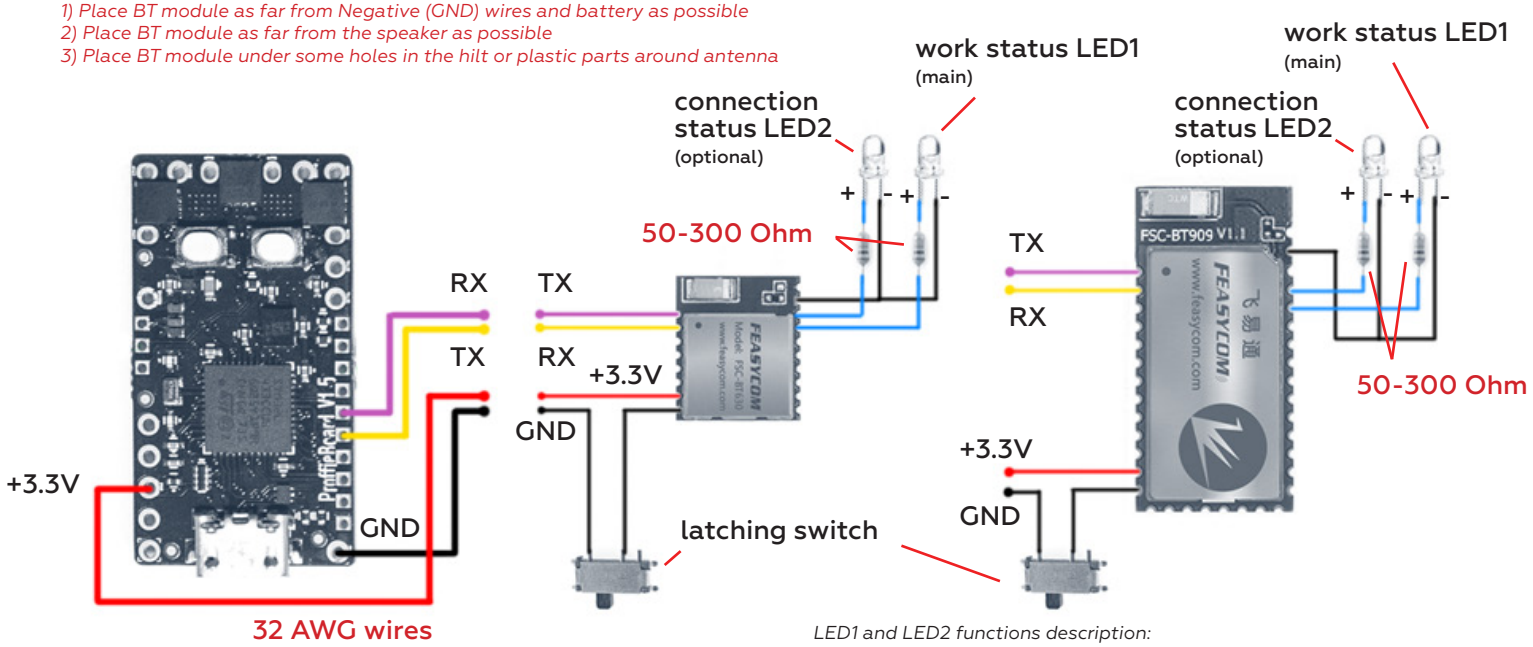


Features:

- CSR8811 chipset
- Bluetooth 4.2/4.1/4.0/3.0/2.1/2.0/1.2/1.1 support
- Class 1 (signal power up to +18dBm)
- Profiles including A2DP, AVRCP, HFP/HSP, SPP, GATT
- Built-in ceramic chip antenna, external antenna optional
- Current consumption: 30mA connected, 50mA max
- Connection status LED indication
- PIN code security
- Size: 13x26.9x2mm
- Works with: Android - YES; iOS - YES

For maximum bluetooth signal efficiency for both modules follow these rules:

1) Place BT module as far from Negative (GND) wires and battery as possible
2) Place BT module as far from the speaker as possible
3) Place BT module under some holes in the hilt or plastic parts around antenna



LED1 and LED2 functions description:
– LED1: blinks when not connected, always ON when connected
– LED2: always OFF when not connected, always ON when connected

PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Bluetooth module setup

Bluetooth Remote Control video Demo link

FSC-BT630 and **FSC-BT909** bluetooth modules are programmed by AT commands using any serial terminal software. But from some vendors (**TCSS** and **KR-sabers**) they come already pre-programmed, so can be wired and installed straight out of the box. Then you just need to connect to one of these two modules and set bluetooth name and pin code via ***FeasyBlue app*** (download on Google Play or App Store) on Android or iOS smartphone/tablet device.

Add *#define ENABLE_SERIAL* line to your Proffieboard config.h file:

```
#define ENABLE_WS2811
#define ENABLE_SD
#define ENABLE_SERIAL

#endif
```

If you buy directly from **Feasycom** manufacturer on alibaba, make sure to ask seller to pre-program ***FSC-BT909*** modules with these AT commands, or you need to program them yourself via any Serial Terminal software on PC (like **YAT** or **Serial Monitor** in Arduino IDE):

AT+PROFILE=3
AT+COD=00050C
AT+TPMODE=1
AT+AUTOCONN=0
AT+PAIR=1
AT+SSP=0
AT+BAUD=115200
AT+BTEN=1

For how to connect any bluetooth module to PC using a USB-to-TTL cable please read this thread - LINK. Follow the specific module pinout for connecting wires.

FSC-BT630 modules have no settings to program, they work straight out of the box.
Then you just can change ***passcode*** and ***name*** for both modules via ***FeasyBlue app*** using your smartphone (Android app will ask for a Passcode: 20138888).
Both modules support **OTA firmware upgrade** (Over The Air) via bluetooth SPP connection (with Android smartphones only at the moment), so if new features are added to the bluetooth module firmware in the future by Feasycom, modules can be easily updated inside the saber without rewiring. BT630 module firmware can be updated also from iPhone via the ***nRF Connect app***, you will need a new firmware ZIP archive file (contact ShtokCustomWorx to get this file).

– iOS:

ForceSync app download link

– Android:

in development...

PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Blade ID resistor functions (optional)

– makes ProffieBoard/TeensySaber identify the type of the blade is used (Tri-Cree LED, led string blade, charging adaptor, Pixel strip blade etc...)

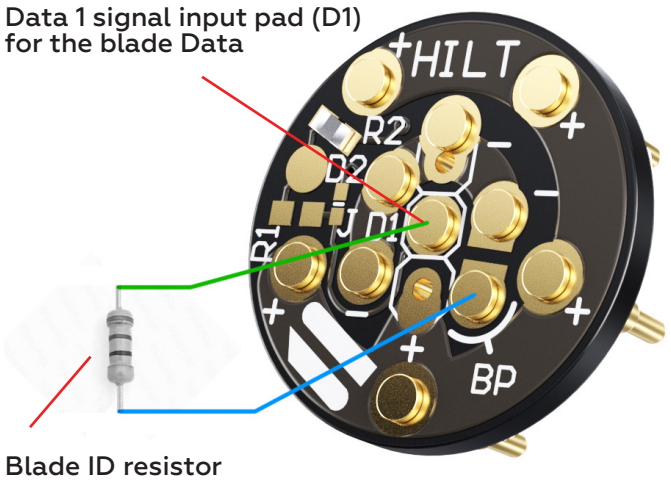
– makes ProffieBoard/TeensySaber automatically switch to a specific Preset (blade style, sound font...) when blade is inserted or removed

"Blade ID" resistor must be soldered between Negative and Data 1 signal pads (only Data pad #1 can read the "Blade ID", please see the ProffieBoard/TeensySaber board pinout diagram) and before the Data resistor that goes to pixel strips Data IN pad (Din). "Blade ID" resistor must be 2-100 kOhm, any wattage (use the smallest you can work with).

NPXL blade connector from ShtokCustomWorx

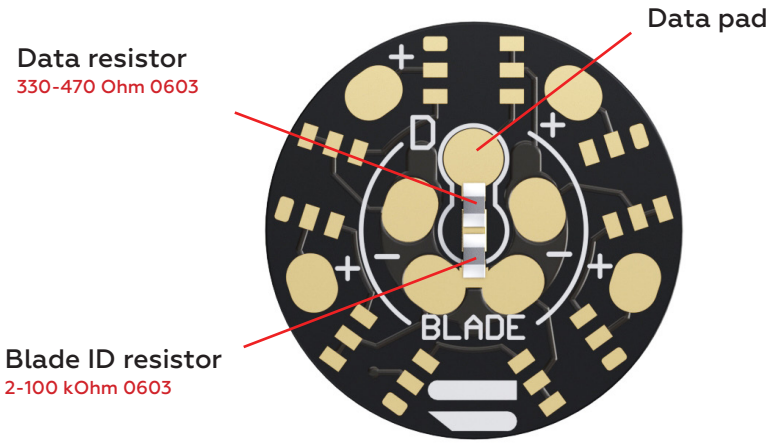
A "Blade ID" resistor is located in the saber hilt.

Using a SCW NPXL connector, "Blade ID" resistor must be wired between the "BP" pad and a center pad Data 1 input for the blade, as shown.
"BP" pin is free by default, not connected to anything, but once it makes contact with the Blade side pcb, it gets shorted to Negative line. This way board knows that resistence is changed and switches to a defined Preset.



B "Blade ID" resistor is located in the blade.

Using a SCW NPXL connector Blade side pcb or any other, solder "Blade ID" resistor between Data pad and any Negative pad.
This ID resistor will tell the board what type of the blade is inserted. Different blade types must have different "Blade ID" resistor values: 10 kOhm, 20 kOhm etc. This way board can automatically adjust leds number in different length Pixelblades, switch between different types of "Blade Configurations": Tri-Cree LED, led string blade, charging adaptor, Pixel strip blade etc.



PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Blade ID resistor functions
“config.h” file setup

A “Blade ID” resistor is located in the saber hilt (Blade Present feature).

```
#ifdef CONFIG_TOP
#include “proffieboard_v1_config.h”
#define NUM_BLADES 5
#define NUM_BUTTONS 2
#define VOLUME 1500
const unsigned int maxLedsPerStrip = 144;
#define CLASH_THRESHOLD_G 1.0
#define ENABLE_AUDIO
#define ENABLE_MOTION
#define ENABLE_WS2811
#define ENABLE_SD
#define ENABLE_SERIAL
#define SHARED_POWER_PINS
#define ENABLE_POWER_FOR_ID PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3>
#endif
```

5 “blades”

define in case different blades use same MOSFETS in 1 blade config

define to enable “Blade ID” reading for PowerPins, to which the Main blade is connected (Negative wires)

```
#ifdef CONFIG_PRESETS
Preset chassis[] = {

  { “Yoda”, “tracks/YvsD.wav”,
&style_charging,
StyleNormalPtr<Green, WHITE, 300, 800>(),
&style_charging,
StyleNormalPtr<Green, WHITE, 300, 800>(),
StylePtr<Blinking<Red,Black,3000,800>>(),
“Green”},

};

Preset blade[] = {

  { “Yoda”, “tracks/YvsD.wav”,
StyleNormalPtr<Green, WHITE, 300, 800>(),
StylePtr<Black>(),
&style_charging,
StylePtr<Black>(),
StylePtr<Blinking<Red,Black,3000,800>>(),
“Green”},

};
```

Presets for “chassis” mode (blade is disconnected)

Presets names for different Blade Configs

Presets for “blade” mode (blade is connected)

resistance value when blade is connected

```
BladeConfig blades[] = {
{ 150,
   WS2811BladePtr<89, WS2811_ACTUALLY_800kHz | WS2811_GRB, bladePin, PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3> >(),  //Main Blade
   WS2811BladePtr<5, WS2811_ACTUALLY_800kHz | WS2811_GRB, blade3Pin, PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3> >(),  //Connector Pixels
   SubBlade(0, 0, WS2811BladePtr<6, WS2811_800kHz | WS2811_GRB, blade2Pin, PowerPINS<bladePowerPin4> >() ),  //Battery Level (PLI) Pixel
   SubBlade(1, 5, NULL),  //Side accent Pixels
   SimpleBladePtr<Red3mmLED, NoLED, NoLED, NoLED, bladePowerPin5, -1, -1, -1>(),  //Red accent LED
CONFIGARRAY(blade) },

{ 23600,
   WS2811BladePtr<89, WS2811_ACTUALLY_800kHz | WS2811_GRB, bladePin, PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3> >(),  //Main Blade
   WS2811BladePtr<5, WS2811_ACTUALLY_800kHz | WS2811_GRB, blade3Pin, PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3> >(),  //Connector Pixels
   SubBlade(0, 0, WS2811BladePtr<6, WS2811_800kHz | WS2811_GRB, blade2Pin, PowerPINS<bladePowerPin4> >() ),  //Battery Level (PLI) Pixel
   SubBlade(1, 5, NULL),  //Side accent Pixels
   SimpleBladePtr<Red3mmLED, NoLED, NoLED, NoLED, bladePowerPin5, -1, -1, -1>(),  //Red accent LED
CONFIGARRAY(chassis) },
};
#endif

#ifdef CONFIG_BUTTONS
Button PowerButton(BUTTON_POWER, powerButtonPin, “pow”);
Button AuxButton(BUTTON_AUX, auxPin, “aux”);
#endif
```

(20 kOhm Blade ID resistor on the connector Hilt pcb)
Put a value here that you see in Serial Monitor when Proffieboard is powered up by battery and you connect a USB cable to PC. It shows something like this right after firmware upload:
Power for ID enabled. Turning on FETs
ID: 448 volts 1.44 resistance= 23666.67

PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

Blade ID resistor functions “config.h” file setup

B “Blade ID” resistor is located in the blade.

```
#ifdef CONFIG_TOP
#include “proffieboard_v1_config.h”
#define NUM_BLADES 5
#define NUM_BUTTONS 2
#define VOLUME 1500
const unsigned int maxLedsPerStrip = 144;
#define CLASH_THRESHOLD_G 1.0
#define ENABLE_AUDIO
#define ENABLE_MOTION
#define ENABLE_WS2811
#define ENABLE_SD
#define ENABLE_SERIAL
#define SHARED_POWER_PINS
#define ENABLE_POWER_FOR_ID PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3>
#endif

#ifdef CONFIG_PRESETS
Preset presets[] = {

  { “Yoda”, “tracks/YvsD.wav”,
StyleNormalPtr<Green, WHITE, 300, 800>(),
StyleNormalPtr<Green, WHITE, 300, 800>(),
&style_charging,
StyleNormalPtr<Green, WHITE, 300, 800>(),
StylePtr<Blinking<Red,Black,3000,800>>(),
“Green”},

};

BladeConfig blades[] = {
{ 13000,
   WS2811BladePtr<89, WS2811_ACTUALLY_800kHz | WS2811_GRB, bladePin, PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3> >(),  //Main Blade with 89 pixels
   WS2811BladePtr<5, WS2811_ACTUALLY_800kHz | WS2811_GRB, blade3Pin, PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3> >(),  //Connector Pixels
   SubBlade(0, 0, WS2811BladePtr<6, WS2811_800kHz | WS2811_GRB, blade2Pin, PowerPINS<bladePowerPin4> >() ),  //Battery Level (PLI) Pixel
   SubBlade(1, 5, NULL),  //Side accent Pixels
   SimpleBladePtr<Red3mmLED, NoLED, NoLED, NoLED, bladePowerPin5, -1, -1, -1>(),  //Red accent LED
 CONFIGARRAY(presets) },

{ 23600,
   WS2811BladePtr<136, WS2811_ACTUALLY_800kHz | WS2811_GRB, bladePin, PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3> >(),  //Main Blade with 136 pixels
   WS2811BladePtr<5, WS2811_ACTUALLY_800kHz | WS2811_GRB, blade3Pin, PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3> >(),  //Connector Pixels
   SubBlade(0, 0, WS2811BladePtr<6, WS2811_800kHz | WS2811_GRB, blade2Pin, PowerPINS<bladePowerPin4> >() ),  //Battery Level (PLI) Pixel
   SubBlade(1, 5, NULL),  //Side accent Pixels
   SimpleBladePtr<Red3mmLED, NoLED, NoLED, NoLED, bladePowerPin5, -1, -1, -1>(),  //Red accent LED
 CONFIGARRAY(presets) },

{ 54000,
   SimpleBladePtr<CreeXPE2RedTemplate<1000>, CreeXPE2GreenTemplate<0>, CreeXPE2BlueTemplate<250>, NoLED>(),  //Main Blade using Tri-Cree RGB LED module
   WS2811BladePtr<5, WS2811_ACTUALLY_800kHz | WS2811_GRB, blade3Pin, PowerPINS<bladePowerPin1, bladePowerPin2, bladePowerPin3> >(),  //Connector Pixels
   SubBlade(0, 0, WS2811BladePtr<6, WS2811_800kHz | WS2811_GRB, blade2Pin, PowerPINS<bladePowerPin4> >() ),  //Battery Level (PLI) Pixel
   SubBlade(1, 5, NULL),  //Side accent Pixels
   SimpleBladePtr<Red3mmLED, NoLED, NoLED, NoLED, bladePowerPin5, -1, -1, -1>(),  //Red accent LED
 CONFIGARRAY(presets) },
};
#endif

#ifdef CONFIG_BUTTONS
Button PowerButton(BUTTON_POWER, powerButtonPin, “pow”);
Button AuxButton(BUTTON_AUX, auxPin, “aux”);
#endif
```

5 “blades”

define in case different blades use same MOSFETS in 1 blade config

define to enable “Blade ID” reading for PowerPins, to which the Main blade is connected (Negative wires)

1 Presets Block (with name “presets”) for all Blade Configs

(but can be more Presets Blocks with different names, see page 38)

(20 kOhm Blade ID resistor in the Blade)
Put a value here that you see in Serial Monitor when Proffieboard is powered up by battery and you connect a USB cable to PC.
It shows something like this right after firmware upload:
Power for ID enabled. Turning on FETs
ID: 448 volts 1.44 resistance= 23666.67

Same way to set other Blade IDs.

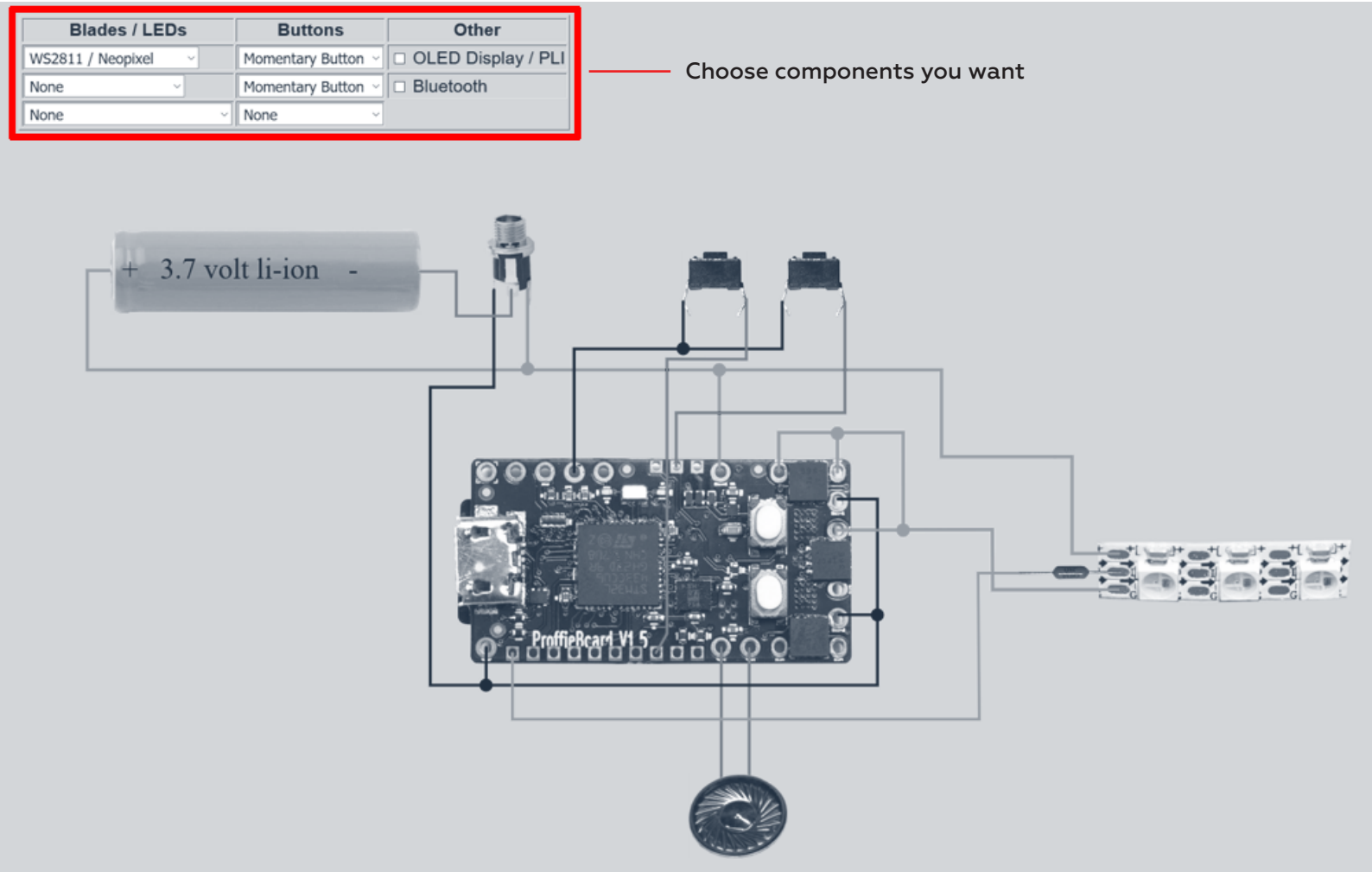
PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

More wiring diagrams

[website ProffieBoard FULL wiring diagrams link]

Scroll the page down till you see the interactive diagram. Above the diagram there are components selection options. Build your saber setup with it and follow diagram to wire your board. Then you need to copy the configuration code below and paste it into your *..._config.h* file.



PROFFIEBOARD INSTRUCTIONS

1 WIRING DIAGRAMS

How to use it

Blade ignition/retraction – assuming you have at least one button, pressing it briefly should turn the saber on or off. If you have an AUX button, pressing it briefly should also turn the saber on and off. If you have no buttons, you can turn the saber on and off by twisting your wrist back and forth. Note that the motion has to be done long enough to count, so a very quick flick of the wrist will not work
Turn On muted – double-click power button
Next preset – while saber is off, click the AUX button
Previous preset – hold AUX button and click the Activation button
Trigger Clash – while saber is on, hit the blade
Trigger Lockup – while saber is on, hold Activation button, then trigger a clash. Lockup releases when you let go of the Activation button
Trigger Drag – like lockup, but point saber mostly down before holding Activation button
Trigger Force – long-click AUX button
Start soundtrack – long-click the Activation button
Trigger Blaster Block – while saber is on, short-click AUX button

Serial Monitor commands:

battery_voltage – get current battery voltage value
get_volume – get current volume value
pow – power On/Off the saber
on – power On the saber
off – power Off the saber
set_volume <0-3000> – set volume value (example: *set_volume 500*)
play – play the default preset track, stop playing track while it's playing
play_track tracks/<track name>.wav – play a specific track from tracks folder (example: *play_track tracks/venus.wav*)
stop_track tracks/<track name>.wav – stop a playing track from tracks folder (example: *stop_track tracks/venus.wav*)
force – play "force" sound effects
drag – play "drag" sound effects
blast – play "blaster" sound effects
lock – play "lockup" sound effects
clash – play "clash" sound effects
reset – reboot the board
n – switch to next preset
p – switch to previous preset
list_presets – show all presets
sdtest – test SD card speed

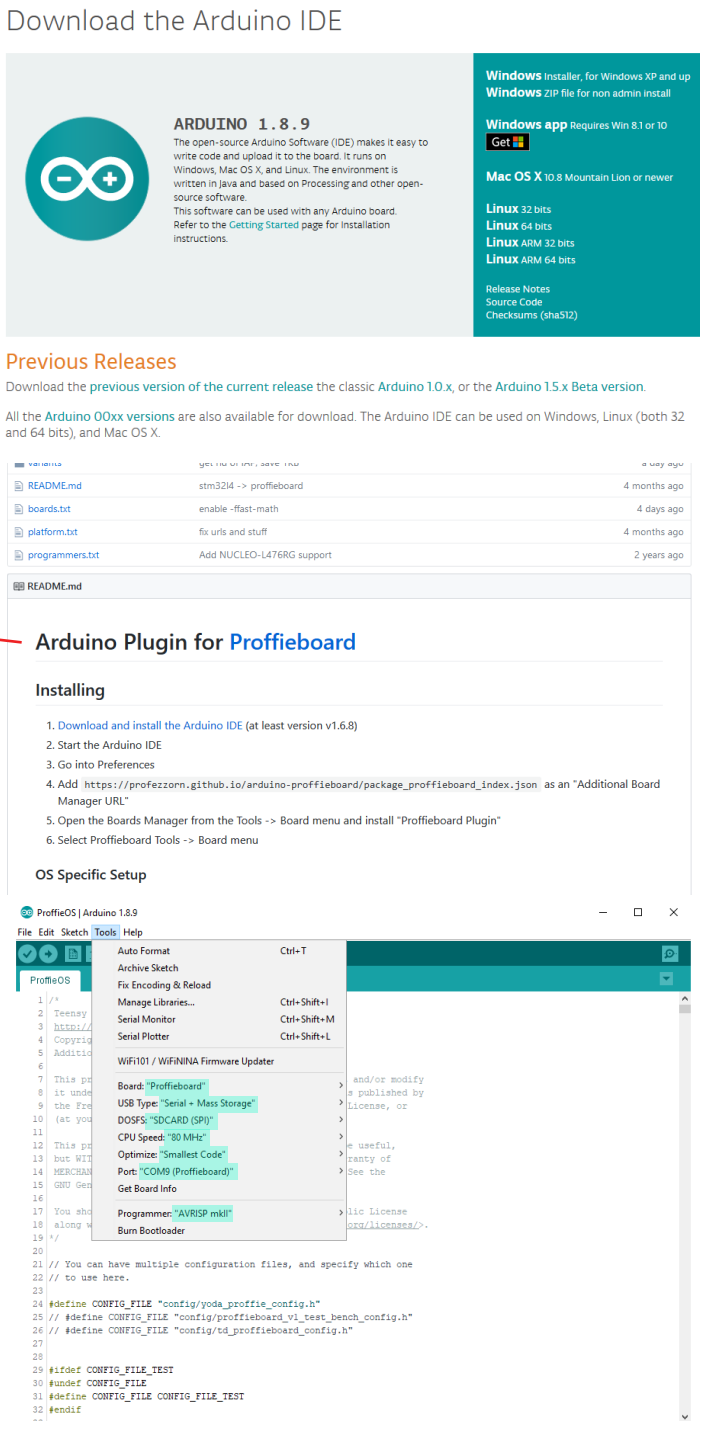
PROFFIEBOARD INSTRUCTIONS

FIRMWARE UPLOAD AND UPDATE

Software installation and setup

To upload firmware to ProffieBoard **Arduino IDE** program is required. Follow these steps to install it to your PC:

1 Install latest Arduino IDE software (don't use BETA). Installing as Windows app also is not recommended, because it will be installed in a specific protected folder that won't allow you to install any additional software/plugin in it. If ProffieBoard won't show up in COM port, use a previous Arduino IDE version.



2 Install the Proffieboard Arduino Plugin and Zadig program. Follow installation instructions on this page.

3 Select **Proffieboard** in *Tools -> Board*
USB Type – **Serial + Mass Storage (or + WebUSB)**
CPU Speed – **80 MHz**
Optimize – **Smallest Code (or Fast/Faster/Fastest)**
DOSFS – **SDCARD (SPI)**
Port – **COM***(the number your PC assigned)* **(Proffieboard)**

Connect Proffieboard via USB cable to PC to be able to select the Port.

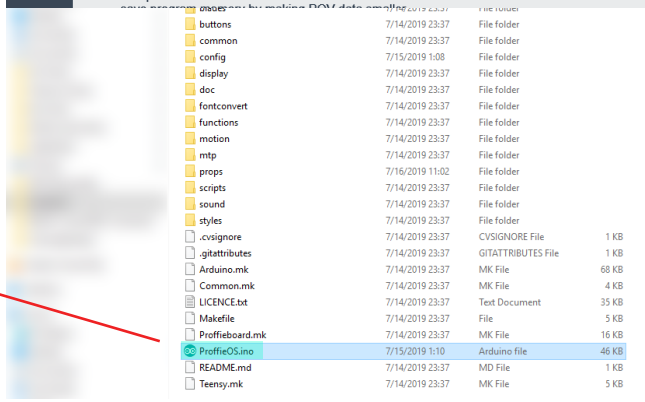
PROFFIEBOARD INSTRUCTIONS

FIRMWARE UPLOAD AND UPDATE

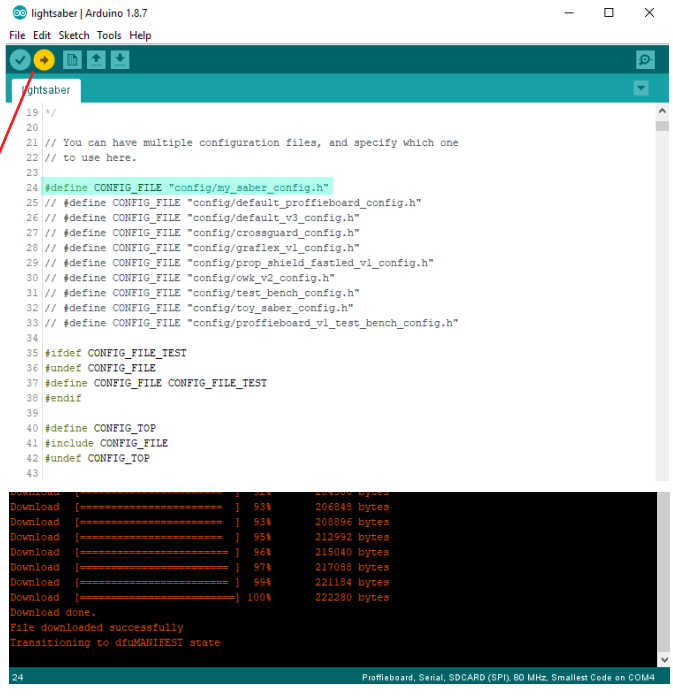
Uploading firmware

1 Download the Proffieboard firmware and SD card content. Unzip *ProffieOS-v2.2.zip* to your **Documents** directory or to **Desktop**, but not to Arduino program folder or anywhere in **Programs** directory! You will see a *ProffieOS-v2.2* folder and *ProffieOS* folder inside it: ...*ProffieOS-v2.2**ProffieOS*. Don't rename or move any of these folders and files inside them to any other location outside the *ProffieOS* folder! Unzip *ProffieOS_SD_Card.zip* to the directory where you keep *ProffieOS-v2.2* folder. Copy all files from *ProffieOS_SD_Card* folder to your SD card.

2 Unhide file extensions in File Explorer settings to see ***.h*** ending of config files. **Don't add ".h" to the config file name!** Go to **config** folder and create you own *config.h* file (see page 44 for how-to). Double-click the *ProffieOS.ino* file.



3 Add the name of your *config.h* file as shown and **Save** this *ProffieOS.ino* file. Make sure the other config files are commented out, there should be only one *CONFIG_FILE* without by "//". You can have multiple config files in **ProffieOS>config** folder and just define the one you need in *ProffieOS.ino* file and upload it again to ProffieBoard.



4 Connect ProffieBoard to your PC by a data transfer micro-USB to-USB cable. Press **arrow button**, it will compile and upload firmware to the board. Wait for red text progress bars to stop at 100%, ProffieBoard will play boot sound if speaker is connected. Properly eject the SD card if "Serial + Mass Storage" is used. Now you can unplug the USB cable. Done! If it gives an error instead, this means your *config.h* file has issues, #define CONFIG_FILE name has mistakes, *config.h* file is out of **config** folder, your PC user name is non-latin...

PROFFIEBOARD INSTRUCTIONS

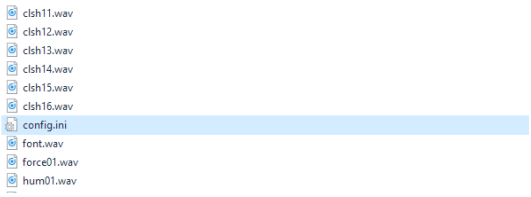
CHANGING PARAMETERS

config.h file structure, editing

All sound files (sound fonts, music tracks) are stored on the micro SD card. Add required sound fonts folders (Plecter, NEC and Smoothswing fonts are supported, no need to change WAV files names, just copy and paste) to SD card root directory as it's done in the default *ProffieOS_SD_Card* content folder and music tracks to the *tracks* folder.

Make sure to name all music tracks and sound fonts folders with latin characters and only up to 8 characters long, without using any special characters (like ?,.|\}{[/- etc.).

Make sure you have a *config.ini and smoothsw.ini* files in each sound font folder, if there is none - copy one from some default TeensySaber/ ProffieBoard sound font and paste into newly added sound font folder.



All blade effects, LED configuration, volume level, clash sensitivity etc. are changed in the *config.h* file located in **lightsaber>config** folder. To do that open any ..._*config.h* file in the "lightsaber>config" folder directory in any Text Editor (Notepad - *to see code correctly in Notepad, Cut-and-Paste it to WordPad, then Cut-and-Paste it back to Notepad, Save*), **Ctrl+A** (select all text) and **Delete** it, then **Copy-and-Paste (Ctrl+C, Ctrl+V)** your wiring diagram config code into empty ..._*config.h* file and **Save** it under new name. Follow the instructions on page 42-43 to upload it to the board.

Proffieboard config setup
number of "blades" used
number of buttons used *(1-3)*
volume level *(0-3000)*
Clash sensitivity *(lower = more sensitive, higher = less sensitive, try with 0.5 step)*

sound font folder name
track name
Blade style
Preset 1
Preset name

LED configuration *(use these XP-E2 LED templates to define your LED)*

for Red use 1 Ohm resistor, *for Green* - no resistor, *for Blue use* 0.24 Ohm, *NoLED* – no 4th led used

```
#ifdef CONFIG_TOP
#include "proffieboard_v1_config.h"
#define NUM_BLADES 1
#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
#endif

#ifdef CONFIG_PRESETS
Preset presets[] = {
  { "TeensySF", "tracks/venus.wav",
    StyleNormalPtr<CYAN, WHITE, 300, 800>(), "cyan"},
  { "SmthJedi", "tracks/mars.wav",
    StylePtr<InOutSparkTip<EASYBLADE(BLUE, WHITE), 300, 800> >(), "blue"},
  { "SmthGrey", "tracks/mercury.wav",
    StyleNormalPtr<RED, WHITE, 300, 800>(), "red"},
  { "SmthFuzz", "tracks/uranus.wav",
    StylePtr<InOutHelper<EASYBLADE(OnSpark<GREEN>, WHITE), 300, 800> >(), "green"},
  { "RgueCmdr", "tracks/venus.wav",
    StyleNormalPtr<WHITE, RED, 300, 800, RED>(), "white"},
  { "TthCrstl", "tracks/mars.wav",
    StyleNormalPtr<AudioFlicker<YELLOW, WHITE>, BLUE, 300, 800>(), "yellow"},
  { "TeensySF", "tracks/mercury.wav",
    StylePtr<InOutSparkTip<EASYBLADE(MAGENTA, WHITE), 300, 800> >(), "magenta"},
  { "SmthJedi", "tracks/uranus.wav",
    StyleStrobePtr<WHITE, Rainbow, 15, 300, 800>(), "strobe"}
};
BladeConfig blades[] = {
 { 0, SimpleBladePtr<CreeXPE2RedTemplate<1000>, CreeXPE2GreenTemplate<0>, CreeXPE2BlueTemplate<240>, NoLED>(), CONFIGARRAY(presets) },
};
#endif

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

PROFFIEBOARD INSTRUCTIONS

CHANGING PARAMETERS

Blade Styles

ProffieBoard and TeensySaber use Blade Styles for the main saber blade and any other accent leds to define all light effects (color changing, flashes, flickering, delays, ignition/retraction timing etc...).
Use Blade Style Editor to create and adjust Blade Styles. **Megtooth Sith Sabers** did a great video tutorial where he shows and explains how to use Blade Style Editor. Also you can grab some pre-made Blade Styles or share yours here on TRA forums.

A Blade Style example of simple **flickering** **Green** blade with **Spark on start**, **Clash**, **Blaster**, **Lockup** and **Drag**, **Ignition/Retraction** effects:

```
StylePtr<InOutHelper<SimpleClash<Lockup<Blast<OnSpark<AudioFlicker<Rgb<0,255,0>,Rgb<50,100,0>>,Rgb<255,255,0>,150>,Rgb<255,50,0>>,AudioFlicker<Rgb<100,255,0>,Rgb<255,0,150>>>,Rgb<255,100,150>,40>,200,300,Black>>
```

– this is how the Blade Style code looks pasted in the *config.h* file Preset (it sits inside a StylePtr<...> container)

```
InOutHelper<SimpleClash<Lockup<Blast<OnSpark<AudioFlicker<Rgb<0,255,0>,Rgb<50,100,0>>,Rgb<255,255,0>,150>,Rgb<255,50,0>>,AudioFlicker<Rgb<100,255,0>,Rgb<255,0,150>>>,Rgb<255,100,150>,40>,200,300,Black>
```

– this is how the Blade Style code looks when editing it inside a Blade Style Editor
Each Blade Style is made of a variety of **Effects**, each added effect goes instead of a *base color* in the previous effect:

InOutHelper<*base color*,200,300,Black> – *base color* can be defined by words (WHITE, RED, GREEN, PURPLE etc..) or by *Rgb<0-255,0-255,0-255>* values for more custom shades; *200* is extension length in milliseconds; *300* is retraction length in milliseconds; *Black* is color when retracted (also can be any other color)
SimpleClash<*base color*,*clash color*,40> – clash effect; *40* is clash duration in milliseconds
Lockup<*base color*,*lockup color*> – lockup effect
Blast<*base color*,*blast color*> – blaster effect
OnSpark<*base color*,*spark color*,*150*> – spark on ignition effect; *150* is spark duration in milliseconds
AudioFlicker<*"A" color*,*"B" color*> – flickering effect (blade flickers to the actual saber hum sound); the more difference between "A" and "B" colors - the more abrupt is flickering
Rgb<255,50,0> – actual color in RGB format (*0* is no light; *255* is the maximum brightness value for Red, Green or Blue channel)

PROFFIEBOARD INSTRUCTIONS

SD CARD RECOMMENDATIONS

Recommended micro SD cards

Here is a list of tested micro SD cards speed with TeensySaber V3 and ProffieBoard. Any card with speed over 900 kb/s is recommended, the higher the speed is – the better. Memory size of 4-16Gb is more than enough. Cards were tested with a default firmware (1.291) compiled with "Smallest Code" under Optimize, "default_proffieboard_config.h" file and default ProffieOS SD card sound files (7 folders).
To test your SD card speed simply hook up ProffieBoard to PC, open **Arduino IDE**, go to **Tools** and open **Serial Monitor**, make sure you have New Line and 9600 baud rate selected on the bottom of Serial Monitor window, type and send ***sdtest*** command, wait for the test result.

	TEENSYSABER	PROFFIEBOARD	
BEST	– Patriot LX Series 16GB microSDHC UHS-I/U1 Class 10	– Patriot LX Series 16GB microSDHC UHS-I/U1 Class 10 *1330.05 kb/s = 15.08 simultaneous audio streams*	
	– G.Skill 16GB microSDHC UHS-I/U1 Class 10	– G.Skill 16GB microSDHC UHS-I/U1 Class 10 *1295.34 kb/s = 14.69 simultaneous audio streams*	
	– Kingston 16GB microSDHC UHS-I/U1 Class 10 *1026.76 kb/s = 11.64 simultaneous audio streams*	– Kingston 16GB microSDHC UHS-I/U1 Class 10 *1280.90 kb/s = 14.52 simultaneous audio streams*	
	– SanDisk Ultra 16GB microSDHC UHS-I/U1 A1 Class 10 *1026.63 kb/s = 11.64 simultaneous audio streams*	– SanDisk Ultra 16GB microSDHC UHS-I/U1 A1 Class 10 *1112.4 kb/s = 12.61 simultaneous audio streams*	
GOOD	– SanDisk 8GB microSDHC Class 4 (Genuine) *1003.18 kb/s = 11.37 simultaneous audio streams*	– SanDisk 8GB microSDHC Class 4 (Genuine) *1085.06 kb/s = 12.30 simultaneous audio streams*	
	– SanDisk 16GB microSDHC Class 4 *1026.63 kb/s = 11.64 simultaneous audio streams*	– SanDisk 16GB microSDHC Class 4 *1069.57 kb/s = 12.13 simultaneous audio streams*	
	– SanDisk Ultra 16GB microSDHC UHS-I/U1 Class 10 *1026.63 kb/s = 11.64 simultaneous audio streams*	– SanDisk Ultra 16GB microSDHC UHS-I/U1 Class 10 *1039.09 kb/s = 11.78 simultaneous audio streams*	
BAD	– Smartbuy 4GB microSDHC Class 4 *754.24 kb/s = 8.55 simultaneous audio streams*	– Smartbuy 4GB microSDHC Class 4 *754.37 kb/s = 8.55 simultaneous audio streams*	
	– Kingston 8GB microSDHC Class 4	– Kingston 8GB microSDHC Class 4 *752.09 kb/s = 8.22 simultaneous audio streams*	
	– SanDisk 4GB microSDHC Class 4 (Fake) *767.77 kb/s = 8.70 simultaneous audio streams*	– SanDisk 4GB microSDHC Class 4 (Fake) *677 kb/s = 7.69 simultaneous audio streams*	

WIRE GAUGE GUIDE

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^2	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	

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.).

RECHARGE PORTS AND KILL SWITCHES

	3 Amps	5 Amps	6 Amps	7 Amps	8 Amps	11 Amps
 2.1mm Switchcraft 721A Recharge port	OK	OK	OK	OK	OK	96%
 1.3mm Recharge port CUI PJ-013D Martin Beyer 1.3mm Recharge port	OK	OK	OK	98%	97%	95.5%
 Martin Beyer Kill Switch	OK	OK	OK	OK	OK	98%
 1.3mm Recharge port CUI PJ-075DH	OK	OK	OK	97%	95%	94%
 regular cheap 1.3mm Recharge port	75%	melted	melted	melted	melted	melted
 3A Kill Switch CK TS01CQE	OK	OK	OK	OK	OK	98%
 Mini 6pin SMD Slide Switch MSS22D18	OK	OK	70%	melted	melted	melted

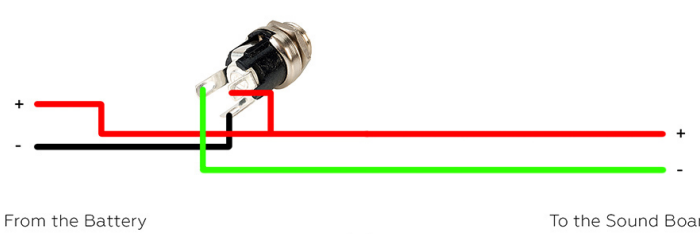
OK — safe to use

1-96% — efficiency (less than 95% not recommended!)

SHTOK CUSTOM WORX

How to wire Recharge Ports

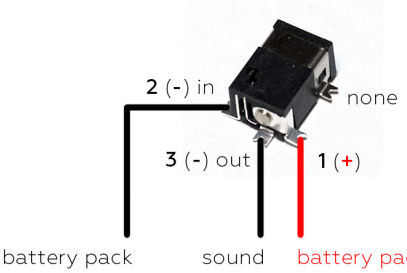
High power Recharge Port

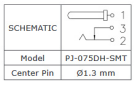


From the Battery

To the Sound Board

CUI PJ-075DH-SMT
High power 1.3mm recharge port
wiring diagram





] tested at 6 Amps

2 and 3 are
the so-called
"Kill Switch"

battery pack

sound
board

battery pack
and sound board

NEOPIXEL STRIPS CURRENT DRAW

Neopixel WS2812B/SK6812 strips
tested approximate current consumption chart

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

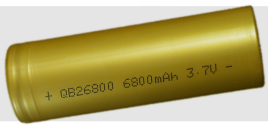
№ of strips	current	1 color without flicker / with flicker	2 colors mixed without flicker / with flicker	3 colors mixed for white without flicker / with flicker
1	Total	2 / 1.9 A	3.6 / 3.3 A	5.2 / 4.9 A
	Per LED	14 / 12.9 mA	12.6 / 11.5 mA	12.1 / 11.4 mA
2	Total	3.7 / 3.5 A	6.9 / 6.4 A	9.9 / 9.3 A
	Per 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

RECOMMENDED BATTERIES CHART

SHTOK CUSTOM WORX

Best batteries for sabers

2019

SIZE	BRAND/MODEL	
18350	Keeppower 1200mAh 8A Protected 	Keeppower 1200mAh 10A Unprotected (requires external protection pcb) 
14650	Efest IMR 950mAh 5A Unprotected (requires external protection pcb) 	Keeppower 1100mAh 2-3A Protected 
16650	Keeppower 2500mAh 5A Protected 	Sanyo UR16650ZTA 2500mAh 5A Unprotected (requires external protection pcb) 
18650	Keeppower 3500mAh 10A Protected 	Keeppower 3120mAh 15A Protected 
21700	Acebeam 5100mAh 20A Protected 	Keeppower 5000mAh 10A Protected 
26650	Keeppower 6000mAh 10-15A Protected 	Keeppower 5500mAh 10A Protected 
26800	QueenBattery 6800mAh 30A Unprotected (requires external protection pcb) 	

9 TROUBLESHOOTING

Quick troubleshooting tips

How to solve most common issues

"Font directory not found. SD card not found" spoken error...
– Check if sound fonts folders names on SD card exactly match the font names in each Preset in your config.h file. Reformat SD card in FAT32 and try again.

TeensySaber board or Proffieboard is not recognized by computer (nothing under Port selection in Arduino IDE)...
– Make sure a charged 3.7V battery is connected to the board, micro-USB cable is a data transfer cable, all plugins and drivers are installed – check again pages 20-21 for TeensySaber or 42-43 for Proffieboard. Try a different USB port on your computer.

Proffieboard is recognized by computer always only as "STM32 BOOTLOADER" (nothing under Port selection in Arduino IDE)...
– If **Zadig** driver is installed properly but Proffieboard is still recognized by PC always as "STM32 BOOTLOADER" instead of "Proffieboard" and only after pressing RESET button while holding BOOT button – open Arduino IDE, make sure you use latest ProffieOS and Proffieboard plugin version, without selecting the Port under Tools tab click the **Verify** code button and after it's finished click the **Upload** button. Firmware must now update on Proffieboard and it will be recognized correctly next time you plug it into USB port.

Sketch (code) compile error in Arduino IDE...
– Check your *#define CONFIG_FILE "config/..._config.h"* line in opened ProffieOS.ino file if it's written correctly with *config/* in it.

Sketch (code) compile error in Arduino IDE...
– Check if the *..._config.h* file you defined in the ProffieOS.ino sketch file is same name as in the **ProffieOS-"firmware version"/ProffieOS/config** folder and is located in this folder.

Sketch (code) compile error in Arduino IDE...
– Check your settings under **Tools** tab in Arduino IDE program. Check again pages 20-21 for TeensySaber or 42-43 for Proffieboard.

Sketch (code) compile error in Arduino IDE...
– Check if your *..._config.h* file is correct: Blade Styles; Presets; *const unsigned int maxLedsPerStrip = 144*; if *BladeConfig blades[]* = is correct...

Sound doesn't play...
– Remove SD card and insert again, check speaker wiring. Make sure all sound files on SD card are correctly named (8 characters max long). Re-format SD card in FAT32, load sound files and try again, try another SD card.

Board says "LOW POWER"...
– Charge the battery.

Serial Monitor shows info sent by the board but your commands don't work...
– In the bottom right corner of Serial Monitor window make sure the Line Ending drop down is set to New Line.

Sound is weird and distorted...
– Check your SD card speed (see page 46). Check speaker wiring, try another good speaker.
...

For more help please check these links:

ProffieOS/ProffieBoard/TeensySaber wiki on GitHub
Ask your question on The Rebel Armory forums
Ask your question on FX-sabers forums
Ask your question in facebook group