



Version 1.0 Beta

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## Introduction

The Next-Gen Saber Transmit, Receive, Editing, and Management (X S.T.R.E.A.M.<sup>TM</sup>) software consists of two components: 1) A graphical user interface (GUI) which runs on a Windows PC, and 2) a firmware component which runs on an nRF52 microcontroller. The firmware is specifically designed to operate on the *DIYino Infinity*<sup>TM</sup> (version 1.1), FX prop boards produced by **Protowerkstatt** (<https://www.protowerkstatt.com/>) or home-brew equivalent using an Adafruit Feather nRF52 (<https://www.adafruit.com/product/3406>) .

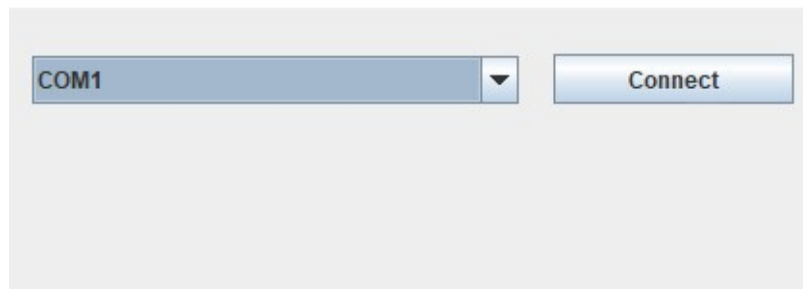
## Using X S.T.R.E.A.M. GUI

The X S.T.R.E.A.M. GUI consists of several screens that allow you to configure your saber's operating parameters.

Note: Before using the GUI, complete wiring your saber's speaker, power (if not capable of USB power), and activation button. **The activation button must be wired according to one of the wiring diagrams provided. See The section on wiring appropriate for your setup later in this document.**

Note: Instructions assume you have installed the Java Runtime Environment (JRE) and that Java is in your Windows path.

## Starting a Session



To connect the X S.T.R.E.A.M. GUI to your saber, follow these steps.

1. Remove kill key or turn on kill switch to enable battery power to your saber.
2. Connect USB cable to both the saber's microcontroller board and your PC.
3. Start the X S.T.R.E.A.M. GUI from the distribution directory by double-clicking on the **XStreamGUI.jar** file. This will bring up the **Connect Screen**.
4. Select the appropriate COM port from the pull-down menu then press the **Connect** button.

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*Note: Your saber may reboot at this time and play the boot sound. This is normal.*

5. If this is your first session, you should load default settings or your saber may not operate properly. To do this, see **Loading Default Settings** section of this document.



## Loading Default Settings

To load default settings, from the Home Screen, follow these steps:

1.  Click the **Load Factory Defaults** icon
2. Wait 5 seconds
3.  Click the **Save to Saber** button.

## Ending a Session

To end your session, follow these steps:

1.  If you want to save your changes, click the **Save to Saber** button, otherwise skip to the next step.
2.  Click the **Quit** button. The S.T.R.E.A.M GUI will vanish.
3. Wait for your saber to play the boot sound.
4. Disconnect the USB cable from your microcontroller board.

## Home Screen

*This section is under construction.*

## Profile Editor Screen

*This section is under construction.*

## Color Tune Screen

*This section is under construction.*

## Options Screen

This screen allows for adjustment of various global options.

**NOTE:** The options on this screen apply to ALL profiles.

**NOTE:** Settings do not take effect until they are saved to saber.

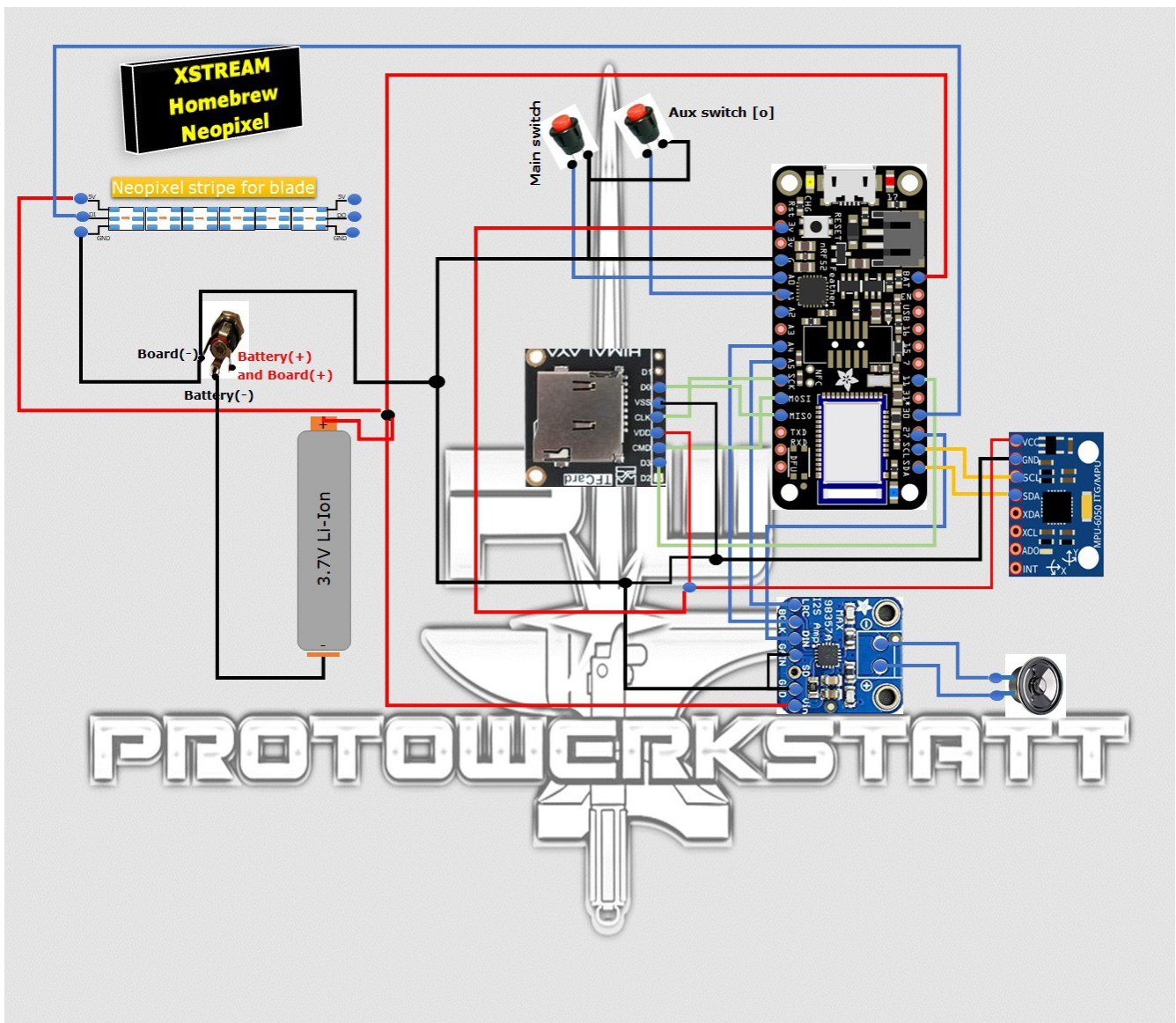
| Setting                                      | Meaning  |
|--|--|
| Power off after xx seconds of idle time      | When the saber is on, automatically power down the saber after no motion is detected for a certain amount of time. Setting can be disabled thereby allowing the saber to stay on forever or until the battery goes dead.   |
| Hold Switch for xx milliseconds to power off | Change the amount of time you must hold the activation button when the saber is on to power off the saber.   |
| Deep sleep after xx minutes                  | Optionally enter a power saving mode after being powered off for a period of time. <i>NOTE: The benefits of this power saving mode depend on your hardware. Consult your microcontroller board's documentation to see if it supports deep sleep power saving features.</i> |
| One-button blaster blocks                    | Enables or disables the motion-activated one-button blaster block mode that is entered by rapidly pressing the main activation button.   |
| One-button lockup                            | Enables or disables the one-button lockup mode entered by holding the main activation button then striking the saber.  |
| Blade Length                                 | Sets the number of pixels in the blade for pixel blades. Use this setting to ensure the firmware is configured for the length of your blade.<br><br><i>Note: This setting is ignored for RGB in-hilt LED sabers and has no effect in that case.</i>                        |

## ***Wiring and Pinouts***

The microcontroller pinout configuration depends on the hardware used. See the wiring diagrams below for more details.

Note that the **Activation Switch** pin is set with the internal pull-up resistor such that the switch is activated when pulled to ground. **A normally-open momentary switch should be wired between the Activation Switch pin and ground** to control saber functions such as turning on the saber.

A 220 Ohm resistor is typically recommended on the Pixel Data Pin when using pixel blades. Refer to your pixel strip and microcontroller board documentation for details.



## Wiring for Home Brew Neopixel Variant



## **Basic Operation**

This section assumes you have installed and configured the firmware making your saber ready for use.

## **Activation/Deactivation**

With the saber off (blade is dark, sound is not playing), quickly press and release the activation button. The blade will illuminate and the sound will start playing. When you are done using your saber, press and hold the activation button to turn it off.

## **Blaster Mode**

To enter one-button blaster mode, with the saber on, quickly press and release the activation button. The blaster sound will play and the blade will flash. The saber is now in blaster mode. Swing the saber to hear the blaster sound and see blaster effects on the blade. To exit blaster mode, quickly press and release the activation button. *Note: Some of these behaviors are influenced by settings and may change according to your selections.*

If your saber is equipped with an axillary button, quick press it to trigger a single blaster-block with each press. If the saber is in blaster-block mode as triggered by the above paragraph, a quick press of the axillary button will end blaster block mode after triggering final a blaster sound.

## **Lockup Mode**

To enter one-button lockup mode, press and hold the activation button then strike the saber. The lockup sound will play and the blade color will change. The saber is now in lockup mode. To exit lockup mode, release the activation button. *Note: Some these behaviors are influenced by settings and may change according to your selections.*

If your saber is equipped with an axillary button, hold it in to trigger lockup. Release the axillary button to end the lockup.

## **Menu Mode**

The firmware supports the ability to change some settings without connecting to the S.T.R.E.A.M. GUI. You may change things like motion sensitivity and select from configured blade colors in this way.

### **Entering Menu Mode**

To enter the in-hilt menu, press and hold the activation button. Wait until the voice prompt “Menu Mode” is announced, then release the button. The saber is now in menu mode.

### **Changing Settings**

Once in Menu mode, voice prompts will announce what setting is currently being altered. To accept a setting, press and hold the activation button until the next voice prompt is announced. To change a setting, quickly press and release the activation button. The available settings are accessed in a ring fashion so if the desired setting is accidentally scrolled past, keep quickly pressing and releasing the button and it will come around again.

If your saber is equipped with an axillary button, pressing this button will cycle through available menu options in reverse order.

### **Exiting Menu Mode**

Once all settings have been accepted, Menu mode will automatically exit. The boot sound will play and the saber will return to the normal off state and be ready for use.

### **Switching Profiles (Sound Fonts)**

To switch to an alternate profile, with the saber powered but off (blade is off, no sound is playing), hold the activation button then strike the saber hard enough to trigger a clash. The name of the newly selected sound font will play and the settings for the corresponding profile will be loaded.

If your saber is equipped with an axillary button, a quick press of the axillary button will advance to the next sound font.

## **Firmware Features**

- ⌚ 3-channel LED color-change support
- ⌚ Power on/off blade ramp
- ⌚ Impact flash
- ⌚ Swing and Clash response
- ⌚ One-button motion-activated blaster-block mode
- ⌚ One-button impact-activated lockup-mode
- ⌚ Aux-button blaster-block (quick press)
- ⌚ Aux-button lockup (press and hold)
- ⌚ 10 Sound Fonts
- ⌚ Smashswitch™ profile (sound font) selection
- ⌚ Aux-button profile (sound font) selection
- ⌚ 12 blade profiles
- ⌚ Deep sleep (effectiveness depends on hardware)
- ⌚ Accent LED
- ⌚ Configuration menu
  - Sound volume
  - Main blade color
  - Flash blade color
  - 9 Swing sensitivity settings
  - 9 Clash sensitivity settings
- ⌚ XSTREAM configuration via USB

## Sound Files (SD Card)

The SD card should be formatted FAT. The SD card is loaded with the menu sounds in a folder named “menu”. The sound fonts are in directories named “font<X>” where <X> is replaced with an integer from 1 to 10.

For example, the top level SD folder struture might look like this:

```
menu
font1
font2
font3
font4
```

*Note: The default menu sounds are included in the XSTREAM distribution at **distro/sd\_card/menu**.*

Within each font directory, the table below shows the expected file names and meanings. Note that high and low swing sounds are optional and used for dynamic swings (“SmoothSwing” or “OmniSwing”). If no high or low swing sounds are detected by the XSTREAM firmware then playback will default to “classic” mode with no dynamic swings.

| Sound Meaning | File Name Prefix | Min Index | Max Index | Example      |
|---------------|------------------|-----------|-----------|--------------|
| Font ID       | font             | 01        | 01        | font01.wav   |
| Power-up      | out              | 01        | 16        | out01.wav    |
| Swing         | swng             | 01        | 16        | swng01.wav   |
| Clash         | clsh             | 01        | 16        | clsh01.wav   |
| Lockup        | lock             | 01        | 16        | lock01.wav   |
| Blaster-block | blst             | 01        | 16        | blst01.wav   |
| Hum           | hum              | 01        | 01        | hum01.wav    |
| Power-down    | in               | 01        | 16        | in01.wav     |
| Boot          | boot             | 01        | 01        | boot01.wav   |
| High Swing    | swingh           | 01        | 16        | swingh01.wav |
| Low Swing     | swingl           | 01        | 16        | swingl01.wav |

## Sound File Format

The XSTREAM firmware uses in internal audio processing rate of 22.05 kHz. For best performance, sounds should be at this native sample rate. Sounds should be in 16-bits per sample, mono, wave (.wav) format **with NO metadata**.

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