Magicians SOCD Cleaner

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Overview

Product Description

Enjoy the magic of choosing from 16 different cleaning rules with the Magicians SOCD Cleaner!

If you are a joystick player, you may not be familiar with a Simultaneous Opposite Cardinal Directions Cleaner (SOCD Cleaner for short). With a joystick it is generally not possible to press both left and right or up and down at the same time. However, with controllers that use buttons for all directions, this is entirely possible. Some games handle these simultaneous inputs oddly and sometimes can be used as an unfair advantage over players with joysticks. It also makes the results unpredictable when playing different games.

To fix this issue, the inputs on a controller that have buttons for directions must be "cleaned". This is required to gain entrance into a tournament. The Magicians SOCD Cleaner is truly in its own class as no other cleaner currently on the market has this kind of versatility. It is even compatible with Zero Delay USB boards. **Please Note**: This cleaner is not compatible with the current 8bitdo Arcade Stick.
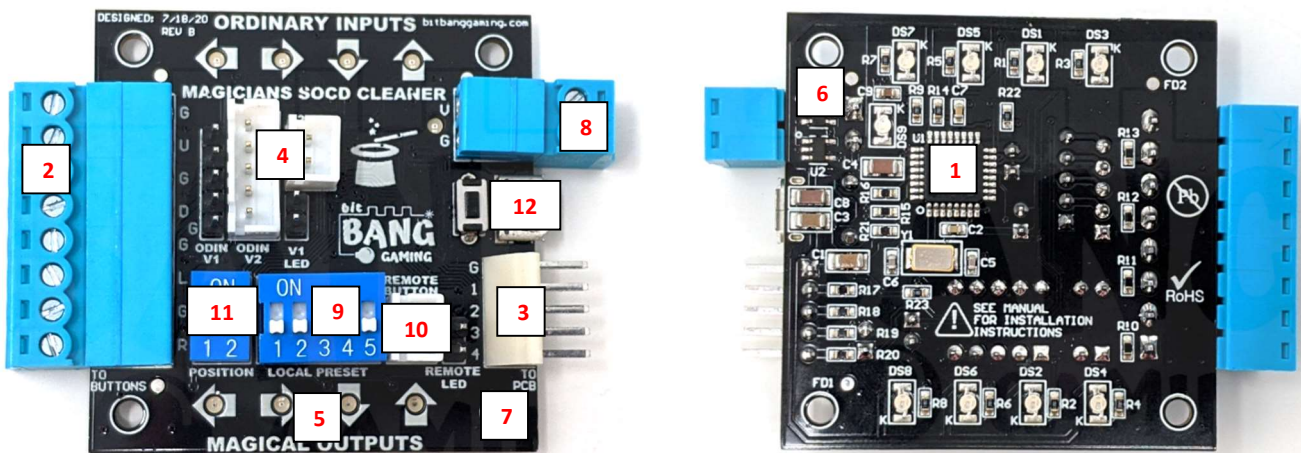
1. Microcontroller running on bare metal C code for fast processing. No detectable lag during gameplay. (Note: Though lag is still possible from other sources such as the arcade control board. However, no detectable lag is introduced by the Magicians SOCD Cleaner.)

2. Pluggable terminal block for an easy installation experience and custom wiring.

3. Standard 5 pin JLF (JST-NH) for easy connectivity to most control PCBs.

4. Special ports for direct compatibility with ODIN V1 and ODIN V2 (drop-in replacement for WASD style buttons). Ports can also be used to accommodate

custom wiring projects. For custom wiring projects, note that there are no embedded resistors to limit current. For ODIN V2, please use the white PCB included with the ODIN.

5. Low current indication LEDs for ordinary inputs and magic outputs, and power (each LED draws about 1mA) – perfect for showing tournament officials your PCB is legal when using a clear bottom panel and to confirm a successful installation.

6. Reverse polarity protection on the power input so that even the worst wiring mistakes are forgiven.

7. 3mm mounting holes on all corners for easy mounting.

8. Pluggable terminal block for power wires and T-tap connectors for V+ and ground to facilitate a solderless installation. (Note: Depending on your installation, soldering may still be required or even preferred.)

9. Inputs can be cleaned with different presets. This includes cleaning to neutral, either cardinal direction, and last input priority (also called second input priority or last input wins).

10. Presets can be chosen with DIP switches, remotely using a separate button, or remotely using the directional inputs themselves.

11. Works with up to three different wiring schemes used by the most controllers simply by flicking DIP switches.

12. USB port for firmware upgrades for new requested features / corrections. The reset button is next to it and is used to enter programming mode.

What's Included:
- (1) Magicians SOCD Cleaner
- (2) 26-24 AWG T-taps (0.250in)
- (1) Pair of power wires w/ 0.250in fully insulated quick disconnects pre-crimped

If desired, please visit our website for additional mounting hardware and cable accessories.

Dimensions:
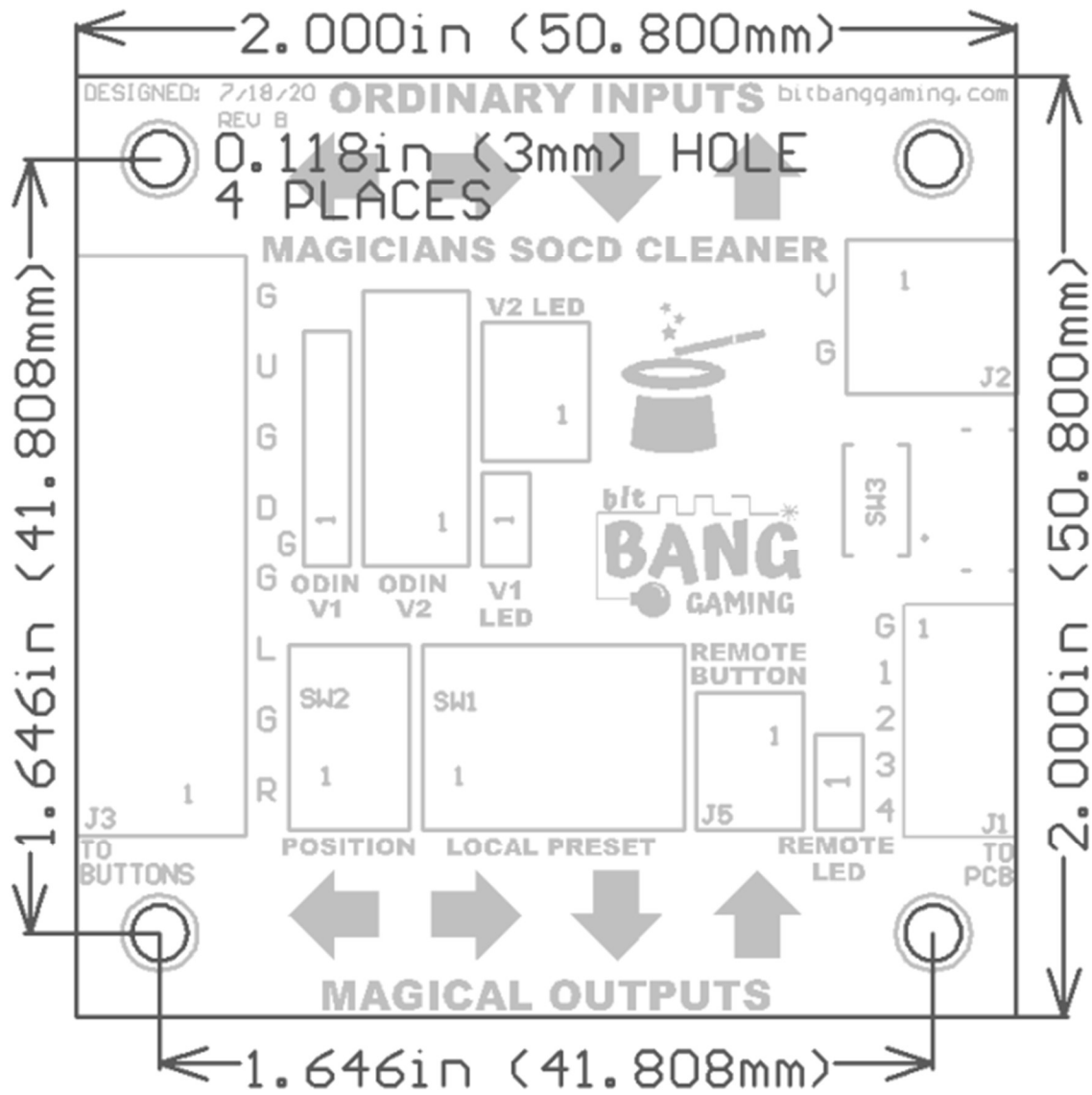
How to Use

We suggest reading over this manual once before attempting installation.

Connect the Buttons:

The Magicians SOCD Cleaner comes with an 8 pin pluggable terminal block for easy connectivity and custom cable creation. Take the wires from the controller directional buttons and wire them to the respective signal and ground terminals on the 8 pin pluggable terminal block. These are labeled by each pin on the board. If using a button harness that typically has the ground wire daisy chained, only one of the grounds are needed on the 8 pin pluggable terminal block as the Magicians SOCD Cleaner is also wired as common ground.
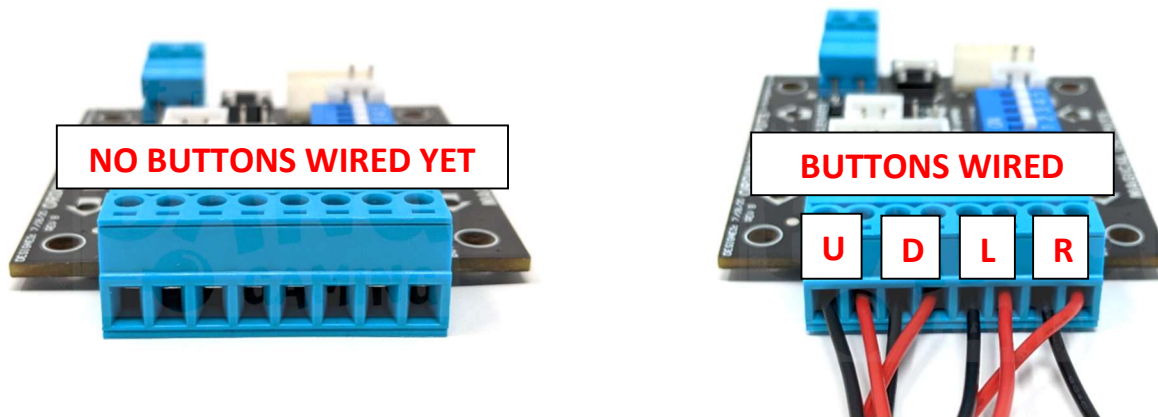
If using an ODIN V1, make sure it is wired in the order of BLACK, GREEN, YELLOW, BLUE, WHITE. Then simply plug into the ODIN V1 port. If using an ODIN V2, connect 5-pin harness from ODIN and plug into the ODIN V2 port.

Connect the Control PCB:

The Magicians SOCD Cleaner has a standard 5 pin JLF port (also known as a JST NH connector) commonly used in Japanese arcade controllers coming from the control board. If your arcade controller has the mating JLF plug, simply connect to this port.

If your arcade controller has the JST XH connector, common on many arcade controllers (such as the Mayflash F500), a 5 pin control board wire harness *(Part #: CONTROL-5P-WIRE-HARNESS)* can be used. If you require one, this can be purchased on our website.


If your arcade controller has none of these, then you will need to create your own harness. In this case, a 5 pin JLF wire harness, *(Part #: JLF-5P-WIRE-HARNESS)* can be used. If you require one, this can be purchased at our shop.
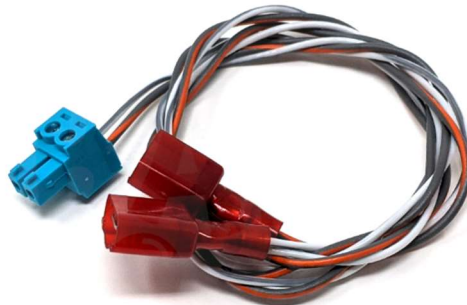
Connect the Power:

The Magicians SOCD Cleaner can use between +3.3V to +5V as its primary voltage source and connects to it with a 2 pin pluggable terminal block.
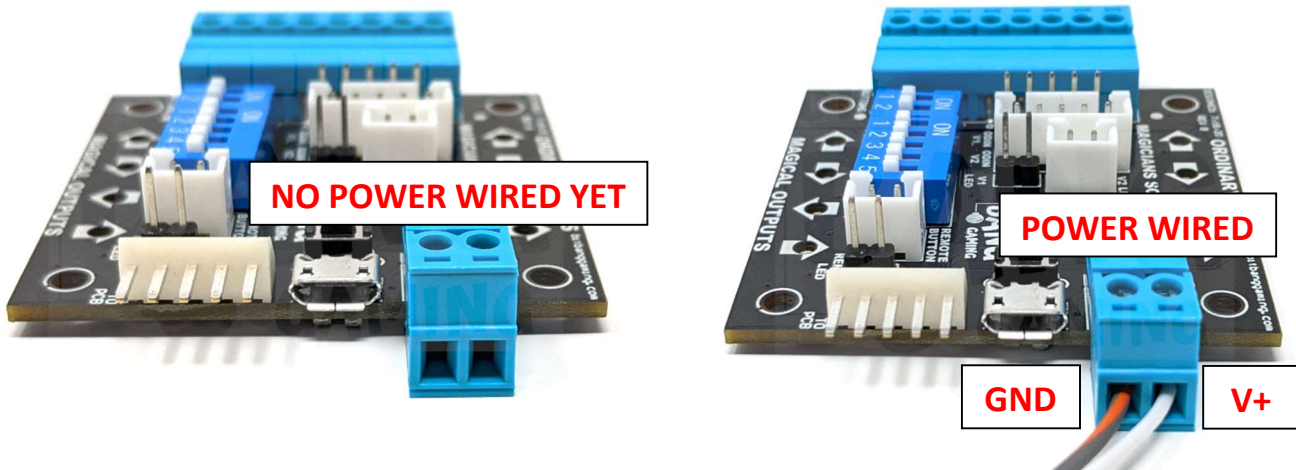

This 2 pin pluggable terminal block comes pre-wired and pre-crimped with 0.250 inch fully insulated male quick disconnects. If soldering is desired instead, then cut off these quick disconnects and proceed to solder. If a shorter length wire is desired, simply cut the wire shorter and re-strip.

For a solderless installation, t-taps have been included. Install these on the positive and ground power wires on the control board. These will usually be red and black (ground) on the USB cable connecting to the control board. Just position over the wire to tap into and squeeze shut with pliers (standard pliers, needle nose pliers, channel locks, your abnormally strong fingers, etc.). Try to be as far away from the control board as possible when doing this to eliminate strain on its plug. If there is not enough room to fit the t-tap, you may need to cut the cable insulation (not wire insulation) of the USB cable to expose more of the red and black wires.

Please note that the gauge wire on the USB cable (or any other location) may be of smaller gauge. Even though these t-tap connectors are intended for 26-24AWG, they have also been reported to work on 22AWG. Using on 28AWG might may not work as intended.
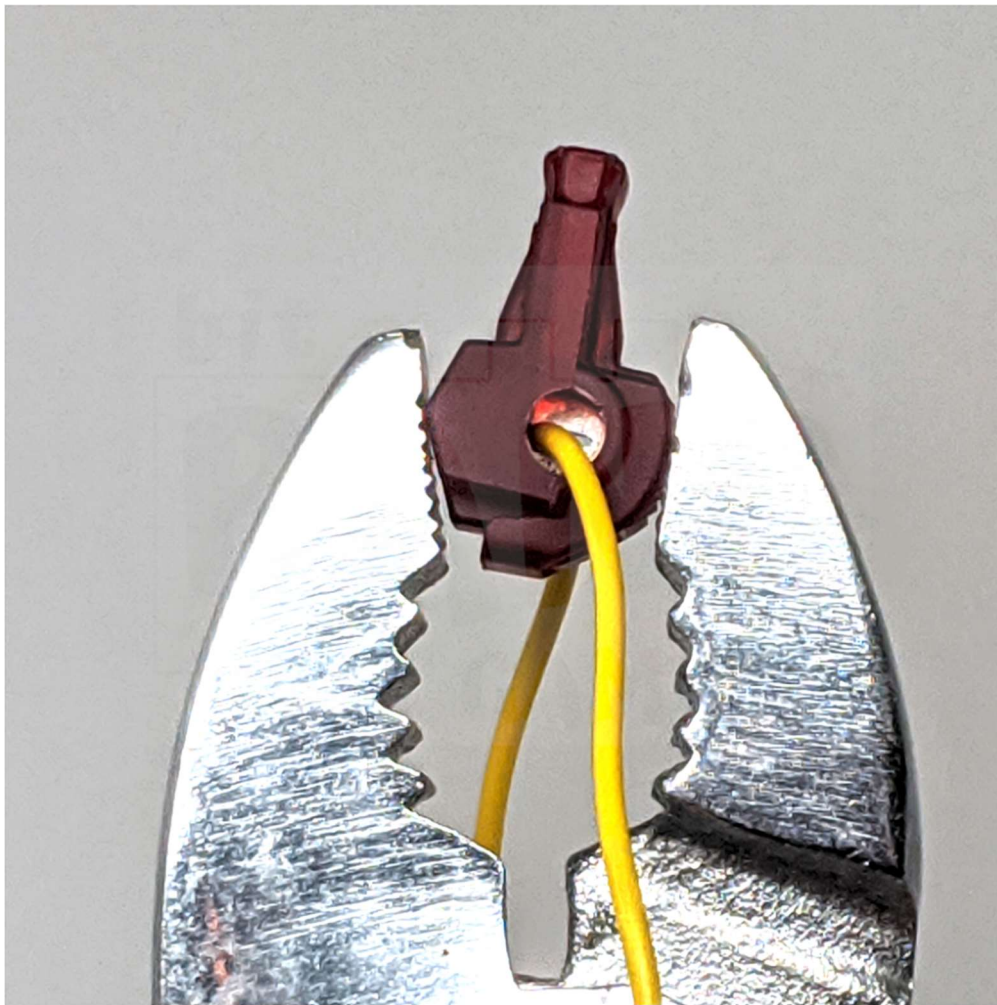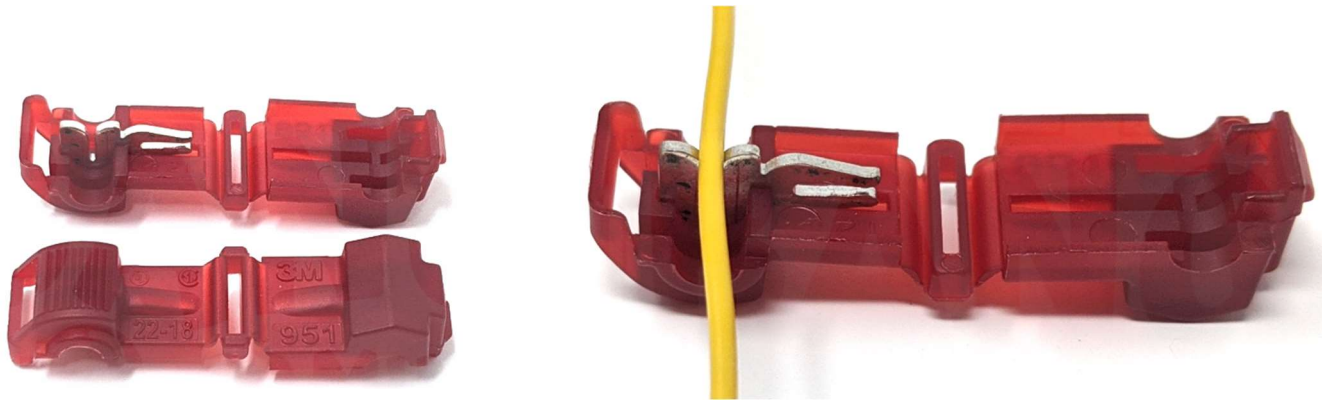
Once the t-taps are connected, simply plug in the quick disconnects. If you plug them in the wrong way, don't worry, the Magicians SOCD Cleaner will not get fried as it has a reverse polarity protection. Just switch the quick disconnects around and the power LED will turn on indicating power is properly applied. Always unplug by grabbing the plastic (not the wire) for ANY connector to reduce the risk of damage to the wire connection. Be aware that once the plugs are connected, they are extremely tight and may require pliers to unplug.
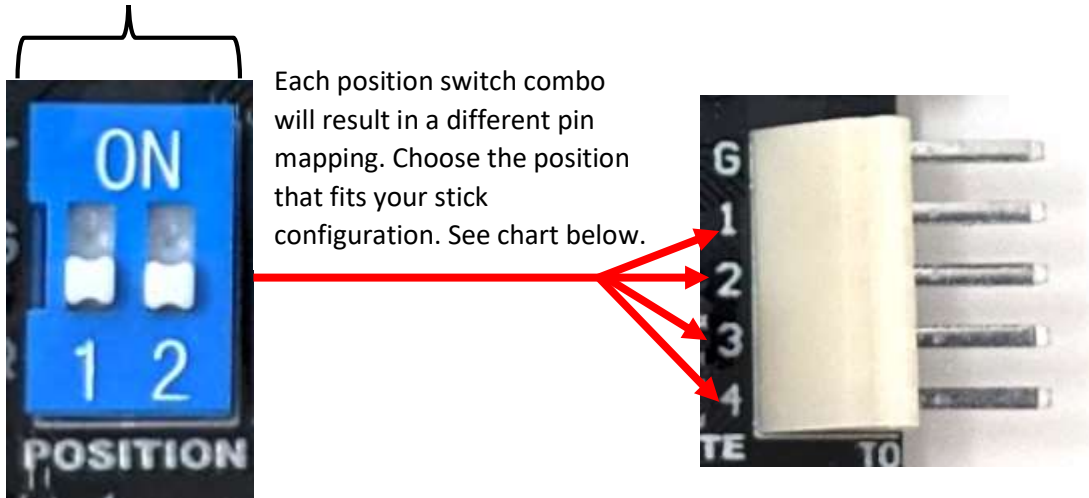
Choose the Pinout Configuration:

One of the features that makes the Magicians SOCD Cleaner unique is the ability adapt to the controller it's installed to with very little effort from the modder. Located on the board is a two position DIP switch labeled "POSITION". Please use the table below to configure to the correct pin orientation.

Controller	Position 1	Position 2	Comments
8bitdo N30	OFF	ON	
Brook UFB/WFB/Audio	OFF	OFF	Custom wiring required
Eightarch Fusion	OFF	ON	
Ettoki Omni K Lever	OFF	OFF	
Ettoki Omni Sanwa Edition	OFF	ON	
Hitbox Cross|Up	OFF	OFF	Custom wiring required
Hitbox PS3/4 Version	OFF	OFF	Custom wiring required
Hitbox UFB Version	OFF	OFF	Custom wiring required
Hori Fight Stick Mini 4	OFF	OFF	Custom wiring required
Hori Fighting Edge	OFF	OFF	
Hori Rap 4	OFF	OFF	
Hori Rap 4 Kai	OFF	OFF	
Hori Rap N	OFF	OFF	
Hori Rap V	OFF	OFF	
Hori VLX	OFF	OFF	
Madkatz Alpha	OFF	ON	
Madkatz TE	OFF	OFF	
Madkatz TE2	OFF	OFF	
Madkatz TE2+	OFF	OFF	
Madkatz TES	OFF	OFF	
Madkatz TES+	OFF	OFF	
Mayflash F300	OFF	ON	
Mayflash F500	OFF	ON	
Nacon Daija	OFF	ON	
PDP Injustice	OFF	OFF	
Qanba Carbon	OFF	ON	
Qanba Crystal	OFF	ON	
Qanba Dragon	OFF	ON	
Qanba Drone	OFF	ON	
Qanba Obsidian	OFF	ON	
Qanba Pearl	OFF	ON	
Qanba Q1	ON	OFF	
Qanba Q4 RAF	ON	OFF	
Razer Atrox	OFF	OFF	
Razer Panthera	OFF	OFF	
Razer Panthera EVO	OFF	OFF	
Victrix Pro	OFF	ON	

For custom wiring jobs, it is necessary to understand how exactly the DIP switches configure the Standard 5 pin JLF (JST-NH) connector. In the chart above OFF OFF was defined as the correct configuration. However, any position will work as long as it is wired accordingly. Please use the table below for the exact pinout configuration results.

Switch Down = OFF
Switch Up = ON

Each position switch combo will result in a different pin mapping. Choose the position that fits your stick configuration. See chart below.

Position 1	Position 2	1	2	3	4
OFF	OFF	RIGHT	LEFT	UP	DOWN
OFF	ON	LEFT	RIGHT	DOWN	UP
ON	OFF	RIGHT	UP	LEFT	DOWN
ON	ON	FUTURE	FUTURE	FUTURE	FUTURE

List of Cleaning Operations:

The following is the current list of cleaning operations:

1. Clean to neutral.
2. Clean to either cardinal direction.
3. Clean to last input priority (also called second input priority or last input wins).

These cleaning operations can be applied to either the X-Axis or Y-Axis directions, in any combination. This results in 16 different configurations.

Local Choosing Method of Cleaning Operations:

Local refers to choosing cleaning operations by configuring the five position DIP switch labeled "LOCAL PRESET". To use local choosing, ensure that position 5 is set to OFF. Positions 1 and 2 will configure the X-Axis. Positions 3 and 4 will configure the Y-Axis. Please use the table below to choose the cleaning methods you would like to utilize.

X-Axis Cleaner	Y-Axis Cleaner	Local Preset 1	Local Preset 2	Local Preset 3	Local Preset 4
Neutral	Neutral	OFF	OFF	OFF	OFF
Neutral	Down	OFF	OFF	OFF	ON
Neutral	Up	OFF	OFF	ON	OFF
Neutral	Last Input	OFF	OFF	ON	ON
Left	Neutral	OFF	ON	OFF	OFF
Left	Down	OFF	ON	OFF	ON
Left	Up	OFF	ON	ON	OFF
Left	Last Input	OFF	ON	ON	ON
Right	Neutral	ON	OFF	OFF	OFF
Right	Down	ON	OFF	OFF	ON
Right	Up	ON	OFF	ON	OFF
Right	Last Input	ON	OFF	ON	ON
Last Input	Neutral	ON	ON	OFF	OFF
Last Input	Down	ON	ON	OFF	ON
Last Input	Up	ON	ON	ON	OFF
Last Input	Last Input	ON	ON	ON	ON

Remote Choosing Method of Cleaning Operations:

Remote refers to choosing cleaning operations by using either the directional buttons themselves or by wiring a dedicated button to the "REMOTE PRESET" jack (2 pin JST-XH). To use remote choosing, ensure that position 5 is set to ON. To remotely enter configuration setting by the directional buttons, ensure that position 1 is set to ON. To remotely enter configuration setting by the dedicated button, ensure that position 1 is set to OFF.

The Magicians SOCD Cleaner will default to cleaning to neutral on the X-Axis and Y-Axis from the factory. To remotely change the cleaning operations, hold down all the directional buttons (or dedicated button if that was chosen) for a little over five seconds. The cleaner will now be in a state for the next five seconds where it will scan the directional inputs for a particular cleaning operation combination. Choose the combination and hold for a little over 5 seconds. Once time is up, the new cleaning operations will now be set. After cycling the power, the Magicians SOCD Cleaner will remember the last remote choice.

To visually see when you are in the remote choosing state (after around 5 seconds) the Remote LED header can be used. The top terminal is ground and the bottom is signal. For PCB Revs A, B, and C, there is no series resistor so the external LED will require

one. For Rev D, a 330Ω series resistor has been included so the external LED will not require it.

Please use the table below to choose the cleaning methods you would like to utilize.

X-Axis Cleaner	Y-Axis Cleaner	LEFT	RIGHT	DOWN	UP
Neutral	Neutral	PRESS	PRESS	PRESS	PRESS
Neutral	Down	PRESS	PRESS	PRESS	RELEASE
Neutral	Up	PRESS	PRESS	RELEASE	PRESS
Neutral	Last Input	PRESS	PRESS	RELEASE	RELEASE
Left	Neutral	PRESS	RELEASE	PRESS	PRESS
Left	Down	PRESS	RELEASE	PRESS	RELEASE
Left	Up	PRESS	RELEASE	RELEASE	PRESS
Left	Last Input	PRESS	RELEASE	RELEASE	RELEASE
Right	Neutral	RELEASE	PRESS	PRESS	PRESS
Right	Down	RELEASE	PRESS	PRESS	RELEASE
Right	Up	RELEASE	PRESS	RELEASE	PRESS
Right	Last Input	RELEASE	PRESS	RELEASE	RELEASE
Last Input	Neutral	RELEASE	RELEASE	PRESS	PRESS
Last Input	Down	RELEASE	RELEASE	PRESS	RELEASE
Last Input	Up	RELEASE	RELEASE	RELEASE	PRESS
Last Input	Last Input	RELEASE	RELEASE	RELEASE	RELEASE

Configuring Logic Levels:

The Magicians SOCD Cleaner can output logic for common ground or common rail control boards. Nearly all control boards use common ground, and this is how the Magicians SOCD Cleaner is shipped. This can be recognized when powering up the cleaner. Upon power up, the DOWN LED will stay lit for two seconds before continuing normal operation. To switch to common rail, which would be necessary for control boards, first disconnect power from the Magicians SOCD Cleaner. Now hold RIGHT and DOWN directional inputs while re-powering the cleaner. The UP LED will now instead be lit for two seconds before continuing to normal operation.

For PCB Revs A, B & C (rev letter found on top left of PCB):

To use the cleaner's outputs for a common rail board, it is necessary to NEVER connect the ground signal from the cleaner to the rail connection (such as +5V) of the control board. This can lead to a short that may cause damage to the control board and/or cleaner. If powering from a USB port, the computer may issue a warning informing that the port malfunctioned and is now in protection mode to eliminate the failure. See pictures below for an example connection scheme for common rail control boards. The Zero Delay PCB is used as an example.
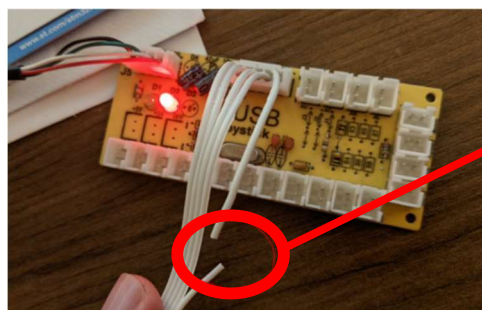
Ground connection isolated from common rail board

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For PCB Rev D (rev letter found on top left of PCB)**:**

This revision has the ground terminal for the 5-pin port disconnected by default and means that accidentally reversing the connection to a common rail board will have no negative consequences. There is no need to ensure that a wire is isolated.

Disabling SOCD Cleaning:

Sometimes it might be favorable to disable the cleaning operations altogether for certain games if the end behavior is known. Please note that doing this in a tournament will likely result in a ban. It is heavily advised to NEVER activate this setting in a tournament atmosphere, even for a friendlies match or button check. To use the controller with no cleaning, disconnect power from the Magicians SOCD Cleaner. Now hold LEFT and UP inputs while re-powering the cleaner. All output LEDs will be lit for two seconds before continuing to normal operation. When power is cycled again without pressing LEFT and UP, the Magicians SOCD Cleaner will resume its cleaning operations. Bypassing the cleaner is never saved by default. The local preset DIP switches will also cease to work when bypassing the Magicians SOCD Cleaner. But the position DIP switches will still work along with the ability to configure the logic levels.

Final Testing:

With the Magicians SOCD Cleaner fully installed, desired modes configured, and the arcade controller powered, press each directional input and you will see the ordinary input LEDs turn on and off. Verify proper cleaning (once chosen) by pressing both left and right, the corresponding clean outputs will be off. Finally, try playing a few rounds for final validation.

Ground Isolation and Factory Jumpers
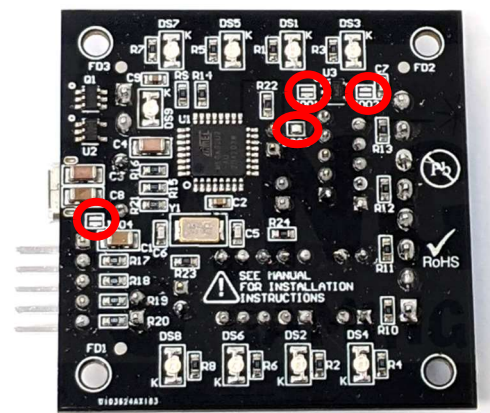
On the bottom of the PCB, there is a solder jumper labeled J004. This jumper is the ground connection for the 5-pin port. Since just about every control board in an arcade stick is common ground, the power port is where this common connection occurs to the SOCD cleaner. This means having the ground on the 5-pin port is not necessary. However, if there is a technical need for a ground on that port, all that is required is a solder spot between the pads on J004. Please only do this if you are 100% sure you require it. Other PCB solder jumpers (J003, J001, and J002) are not intended for the end user and are currently intended for internal use. Please do not interfere with the default state of these jumpers or permanent damage may result.

A Note on Output Signals:

Just like all other SOCD cleaners on the market, a released button is signaled with positive voltage (in our case +5V) and a pressed button is signaled with a ground (of course this will be opposite if the option for reversing the logic levels is enabled). But real buttons do not do this, they either give a ground or nothing at all. What happens is that the control board will sense a released button (no positive voltage or a ground) and will pull up the voltage to whatever is the control board's positive voltage. For +5V, this is no big deal, but for +3.3V, there might be a problem. This is because the IC on the control board may not be able to handle the +5V signals coming from a typical SOCD. Most can since they have some form of protection. However, for any Bit Bang Gaming SOCD cleaners, a series resistor is included with the output. That means that if the control board did not have protection and short circuited, the built-in resistor should do its job of mitigating any damage. Out of all the Bit Bang Gaming SOCD cleaners installed in various sticks, there have not been any reports of damage due to this type of failure. This is more of just an FYI for users with a background in technical electronics!

Device Troubleshooting:

In the event there is strange directional behavior, it is very likely that the stock control PCB is not mapped how the Magicians SOCD Cleaner is chosen to be configured by the two position DIP switches. Ensure that the DIP switches are configured properly for your controller.

If there is still strange behavior, the only other option is to reverse the plug on the Standard 5 pin JLF (JST-NH) which connects the Magicians SOCD Cleaner to the control board. Note this is only applicable for 5 pin control board wire harness since it can be easily reversed, as opposed to the 5 pin JLF wire harness which makes it clear that only one direction is possible.

If you are still experiencing problems, please contact us for assistance. You can message us on any of our social media sites or shoot us an email at bitbanggaming@gmail.com.

Updating Firmware:

The Magicians SOCD Cleaner uses an Atmel ATmega32U2 as the microcontroller. This microcontroller can be updated through the USB-MICRO port on the board. Atmel has software that makes updating the firmware very convenient. This software is called Atmel FLIP (v3.4.7). It can be downloaded via this link:

https://www.microchip.com/developmenttools/ProductDetails/FLIP

Follow the below step-by-step instructions to update the firmware on the Magicians SOCD Cleaner:

1. Disconnect the Magicians SOCD Cleaner from the control PCB and power. The button inputs can remain plugged in.
2. Connect the Magicians SOCD Cleaner via the USB-MICRO port to a PC.
3. Open Atmel FLIP.
4. Click on the "Select a Target Device" icon.
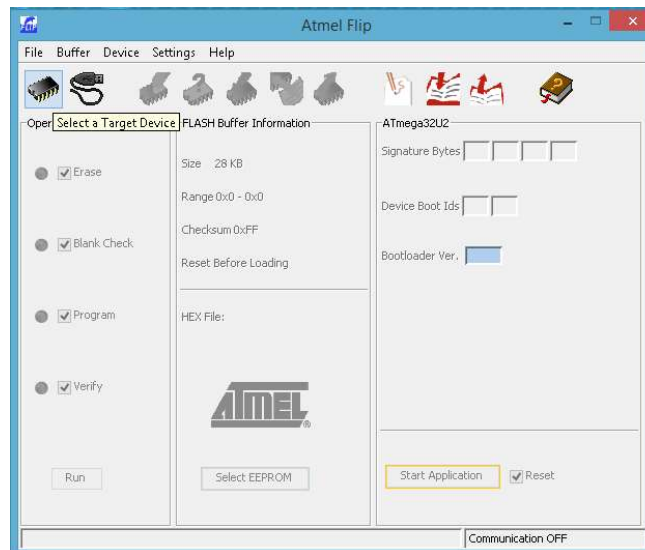

5. Select "ATmega32U2" and then click OK.

6. Make sure you have the latest HEX file saved somewhere on your computer (the .hex file is the firmware update for the Magicians SOCD Cleaner). The latest HEX file can be found on our discord server and/or website. Click on the "Load HEX File" icon.
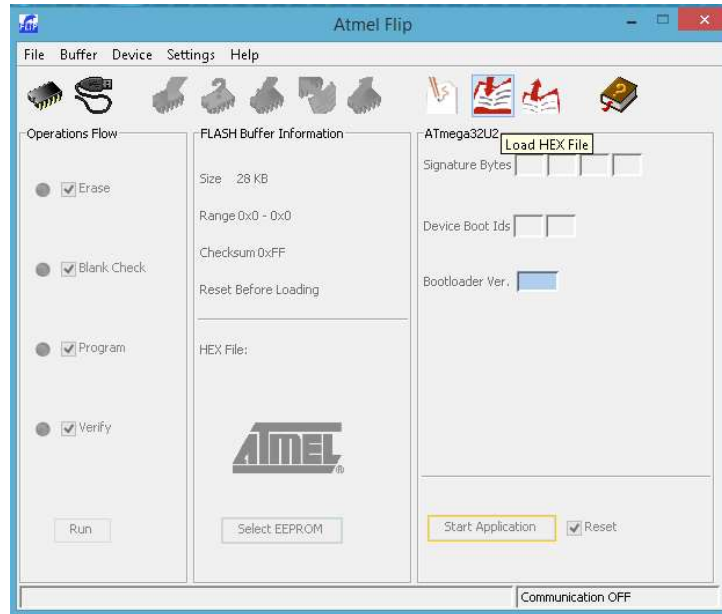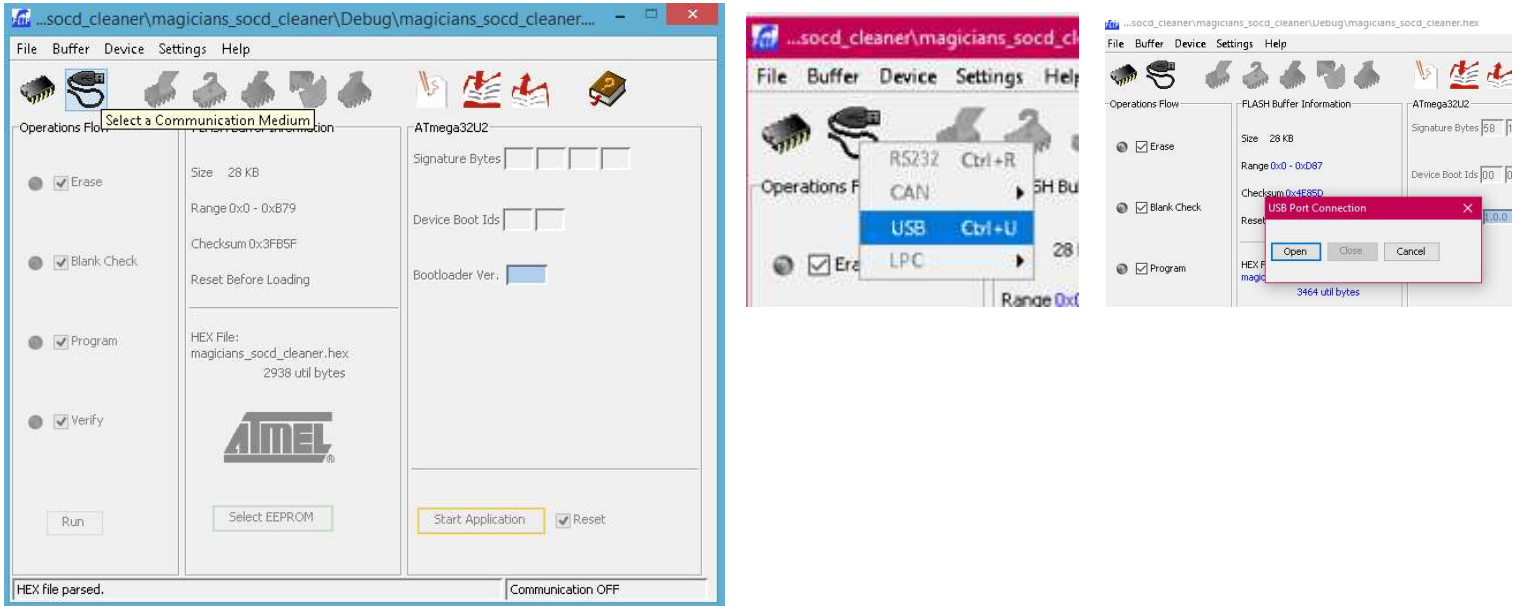

7. Navigate to where the HEX file is saved, choose it, and then click OK.

8. Press and hold the reset button on the Magicians SOCD Cleaner for one second. Then release. The microcontroller should now be read as a USB device by the PC.
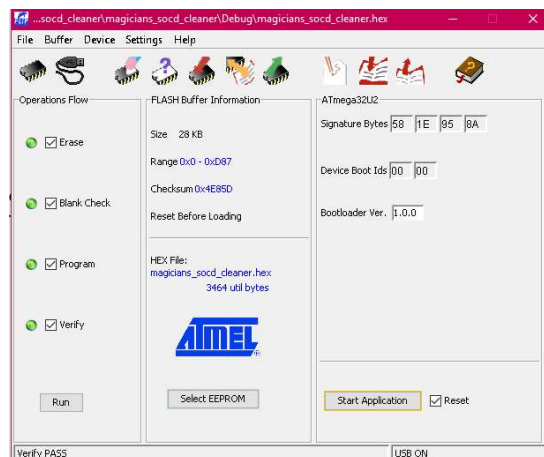

Reset Button
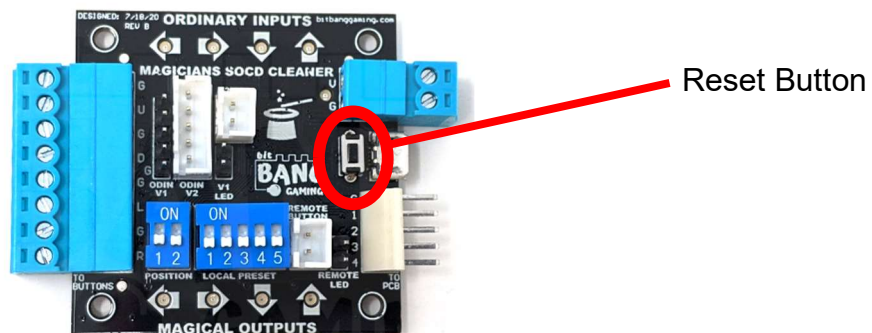
9. Click on the "Select a Communication Medium" icon. Choose USB and click Open.

10. The connection to the Magicians SOCD Cleaner should now be established. Click on Run and Atmel FLIP will proceed to erase the old firmware and re-flash with the new one. This process might take a few seconds.
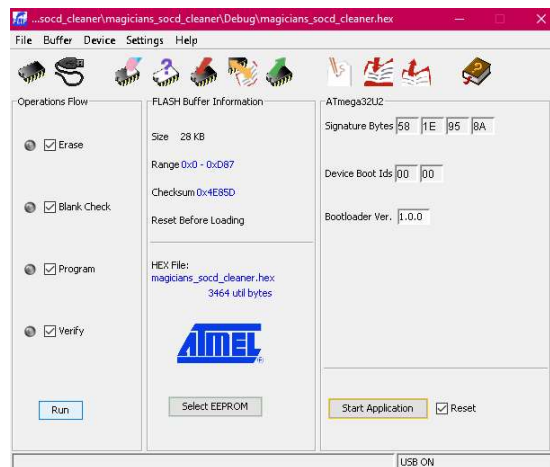
11. The Operation Flow buttons will turn green when complete. Once Atmel FLIP has finished, unplug the Magicians SOCD Cleaner from USB power. Re-connect it to the control PCB and re-connect it to power. It should now be functioning as is described in this manual.


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Firmware Troubleshooting:

Reset button not connecting

If you are having issues connecting after pressing the reset button, make sure the USB cable you are using is not just a charging cable. It must be a fully functional USB cable that has the D+ and D- data lines. If you are still having issues at this step, please contact Bit Bang Gaming (bitbanggaming@gmail.com).

Error Message

If you receive an error (see below) when trying to connect to the Magicians SOCD Cleaner, try this: uninstall Atmel FLIP and then reinstall it. After reinstallation, you will want to install the drivers manually.
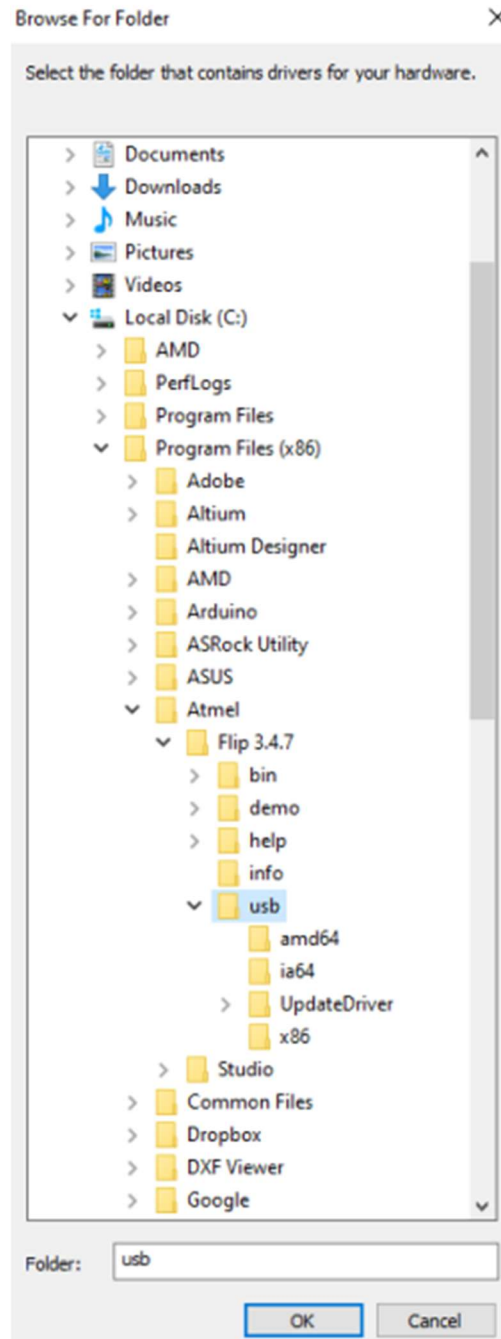
Typical error message:
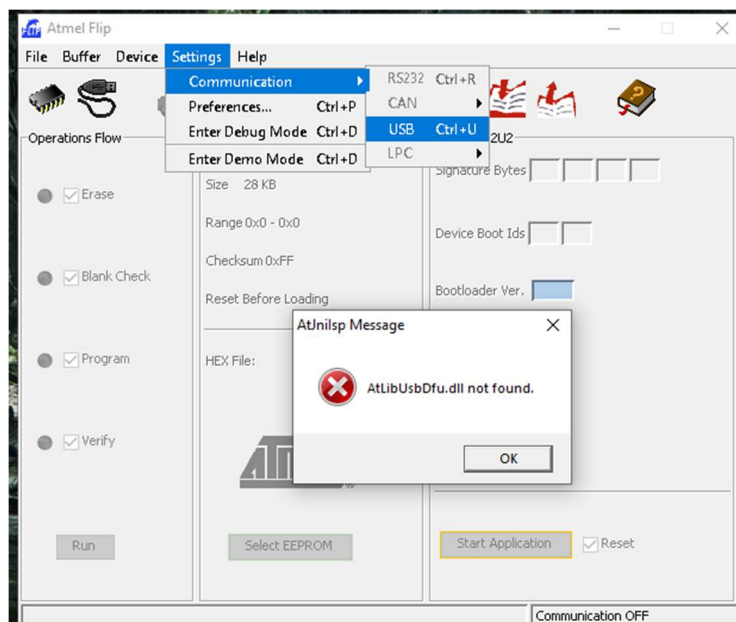
With the Magicians SOCD Cleaner plugged in, press the reset button, and it should appear under USB devices. Right click on the device and select "Update driver".
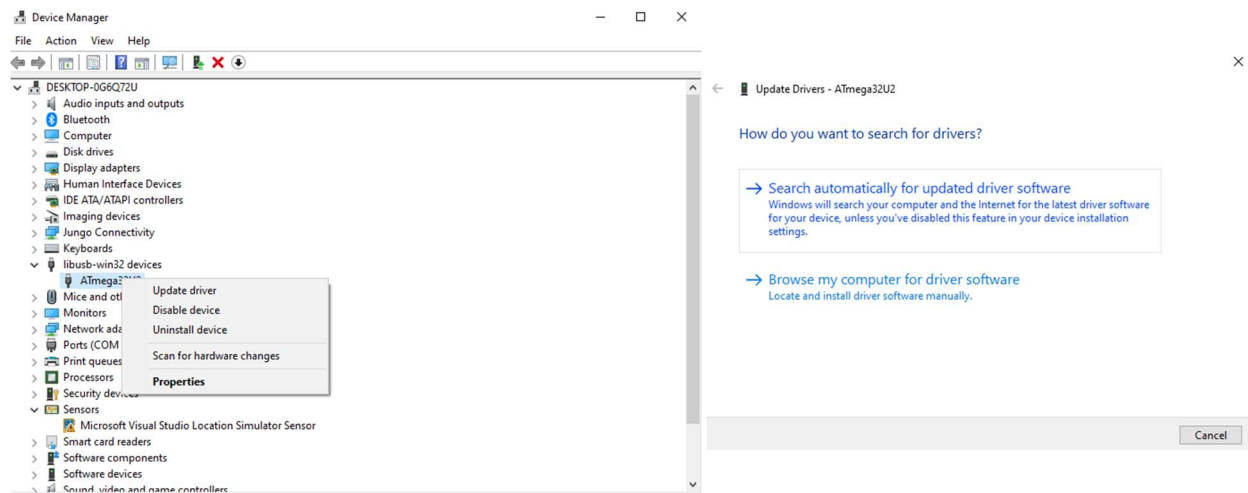
The folder location for the driver can be found below. After updating these drivers, you should be able to follow the firmware update procedure.

If it still doesn't work, go to C:\Program Files (x86)\Atmel\Flip 3.4.7\usb. Then find the driver it come installed with: atmel_usb_dfu.inf. Note this location. Now go to the device manager and manually select that driver.

If you are still having issues, please contact Bit Bang Gaming (bitbanggaming@gmail.com).

Questions?

If you have any questions, please connect us on any of our social media sites or send us an email (bitbanggaming@gmail.com).

Revisions

Revision	Date	Description	Initials
A	10/10/20	Rough draft for beta testers	JC
B	12/12/20	Rough draft #2	JC
C	1/2/2021	Updated firmware steps, added "configuring logic level" section	SD & JC
D	3/24/2021	Updated bypass section, added social media links	SD & JC
E	6/23/2021	Updated picture of PCB back, updated logic level section, added ground isolation and factory jumper section, updated firmware, added LED paragraph, updated t-tap AWG sizes, added a note on output signals section, updated 8bitdo non-compatibility note, added ODIN V2 info	SD & JC