

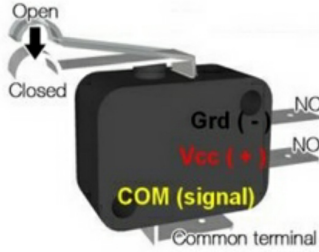
# Endstop trouble ?

## 1 Wiring endstop

The endstop are use for the machine can have reference point, machine origin "0"  
When you click in "homing icon" in control machine software. The machine need go in direction of endstop and hit them to setting the machine in origine position



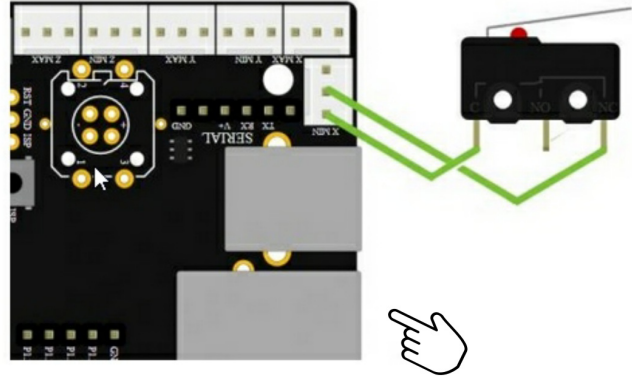
### Endstop or limit switch



NO : Normally Open  
NC : Normally Closed



For endstop it's common to use SPDT switch (Single Pole Double Throw) [information here](#)



In the official smoothieboard endstop documentation <http://smoothieware.org/guide-endstops> have this drawing and it's write "Wiring a basic NC endstop"

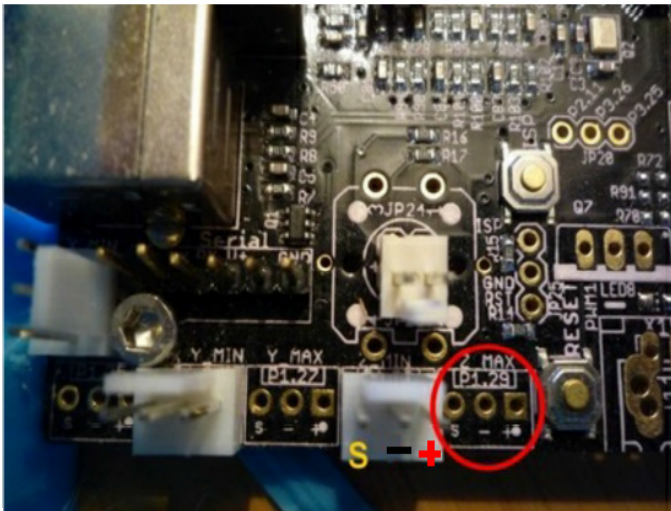
And when you see your smoothieboard , you can guest when endstop is hit the "0 Volt" go to the Signal pin

If you beginner to wiring endstop in input of microcontroller may be you ask at yourself two question.

– Why use only 2 wire and don't use 3 wires Ground (-) Signal and VCC (+) ?

Why the information "0" is send tu input of microcontroller and not "+" ?

The answers for there question are not specific for smoothieboard, the technology use is same when connect switch SPDT or pushbutton in input of electronicboard ( arduino, 3d printer board, etc ... )



## 2 Why use only 2 wire and don't use 3 wires Ground (-) Signal and VCC (+) ?

**Use 3 wire is Ok, it's works**

– when endstop push, the signal pin of électronique card receive 5Volt to send information "endstop push"

**It's works, just have 3 small disadvantage**

– when endstop don't hit, the signal pin of électronique receive 0 Volt to send information 'endstop don't hit

- need buy and prepare more 3 wires if you connect xmin ymin and 7min. 6wires more if you connect endstop min and end stop max. A little more money and time to prepare

- If the red wire (+) breakdown the machine continu to more over the endstop. If the machine is small without very big motor, not damage, but with heavy and strong CNC professional, a simple wire breakdown can be cost a lot of money with damage result.

- If you want connect a touch plate in Zmin, only have 2 location tu connect can't use the 3 wire.



### 3 If use 2 wire, have setting for this in config file

The setting is to overcome the floating voltage level

What this ?



### A way to learn about input information of microcontroller board



Explain in English

Explain in Chinese



A pin of input microcontroller board can't be unconnect.

If you do this the interference around create sometimes 4,8V; 0,15V 5V... and create fake information inside.

That's why in the first video sometimes the LED don't blink when push button and sometimes blink without push button. Have somethinks out of control.

### 4 Why use normally closed endstop and "0" ground to send information ?

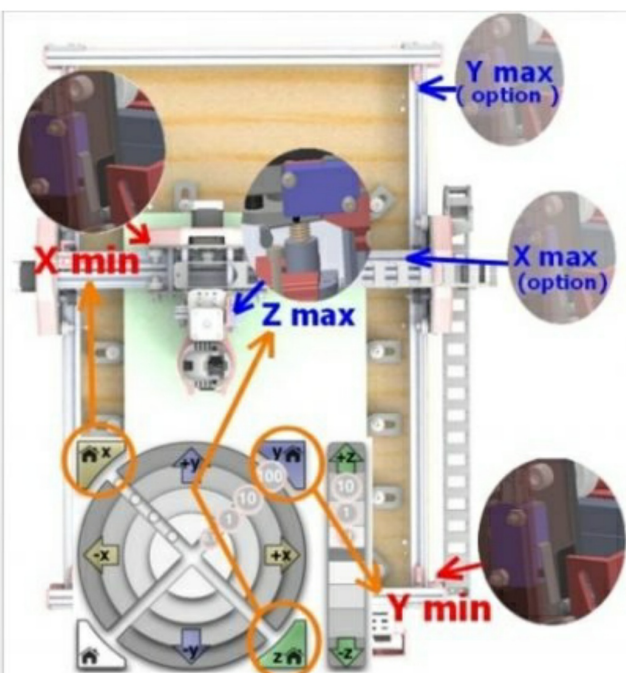
For each endstop, it's better to connect C to Signal and NC to Ground because this means the digital input pin ( endstop connector ) will be connected to Ground in it's normal state and cut from Ground when the button is pressed. This approach is less prone to noise than the reverse.

Another positive effect of this approach is, that if a wire breaks for some reason you get the same signal as if the endstop is pressed. That makes sure that even with a damaged wire you are not able to overrun the endstop.

## Important !!

Check that you do not connect **VCC ( red )** and **GND ( black )** to a mechanical (microswitch) endstop! Depending on your wiring that may fries your smoothieboard instantly or when the switch gets pressed.  
[If you're not careful enough you can damage your board.](#)

### 5 The endstop setting section in config file



```
# Endstops
endstops_enable      true
#corexy_homing      false
alpha_min_endstop   1.24^
alpha_max_endstop    1.25^
alpha_homing_direction home_to_min
alpha_min            0
alpha_max            200
beta_min_endstop     1.26^
beta_max_endstop     1.27^
beta_homing_direction home_to_min
beta_min             0
beta_max             200
gamma_min_endstop    1.28^
gamma_max_endstop    1.29^
gamma_homing_direction home_to_max
gamma_min            0
gamma_max            200
```



## All options of pin

	invert pin
o	set pin to open drain
^	set pin to pull up (Default on most pins)
v	set pin to pull down
-	to set no pullup
@	to set repeater mode

In smoothieboard like arduino board no need prepare pull up resistor for input pin, already have internal board resistor for this function.

Just activate the "pull up resistor" with option setting in config file

**So don't delete the " ^ " after the number the pin**

If you do this the function pull up resistor don't works

In cnc can have **endstop min** for setting the "o" machine and **endstop max** for when the machine move over capacity, stop automatically.

The Formosa don't have max endstop, it's just a option.

With this way the cabling is more simple, users just need check if the drawing is under the maxi size the machine can cut.

If the machine move over the limit don't worry just steppers motors loose step but don't have damage.

## 6 Check the correct wiring and setting of endstop

Use M119 command to check if the wiring of endstop is correct

when the **endstop is hit**, need **show 1**

When **endstop don't hit**, need **show 0**

If you don't use xmax ymax ... not need there parameters appear can comment

with # in the beginning of line like below to deactivate

```
alpha_min_endstop 1.24^
```

```
#alpha_max_endstop 1.25^
```

```
alpha_homing_direction home_to_min
```

Or use nc in the end of the line like

```
alpha_max_endstop nc
```

## 7

## Overcome problems with endstop

**If an endstop is read as pressed when it is not, and not pressed when it is, then your end-stop is inverted.**

You can fix that situation by inverting the digital input pin in your configuration file.

For example if your X min endstop pin is inverted, change :

```
alpha_min_endstop 1.28^
```

To :

```
alpha_min_endstop 1.28^!
```

**If a end-stop is read as always pressed, or never pressed, even when you press or release it, then you probably have a wiring problem, check everything.**

**If a endstop always reports 0, it probably means that it is not wired correctly.**

**If when homing the machine move just a little and after stop, that mean the "0" ground is disconnect**

**If the homing don't go in correct directio, check "homing\_direction" setting in config file**