

Satisfying-Senseless-Sonic Add-On (SSSAO)

workshop

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Urs Schmidt

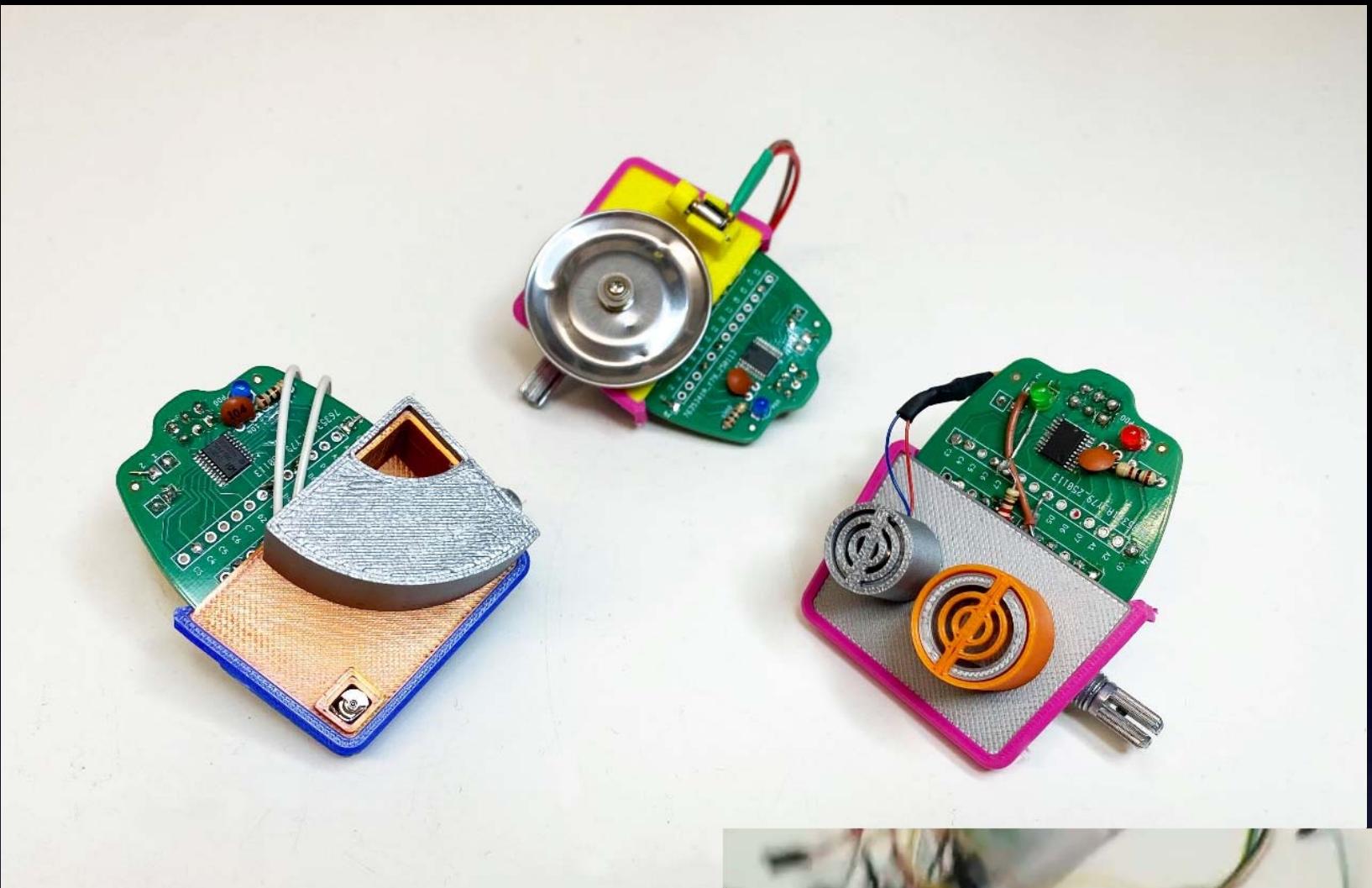
Electronics hacker, robotics, making, Berlin

email: ufogreeks@gmail.com

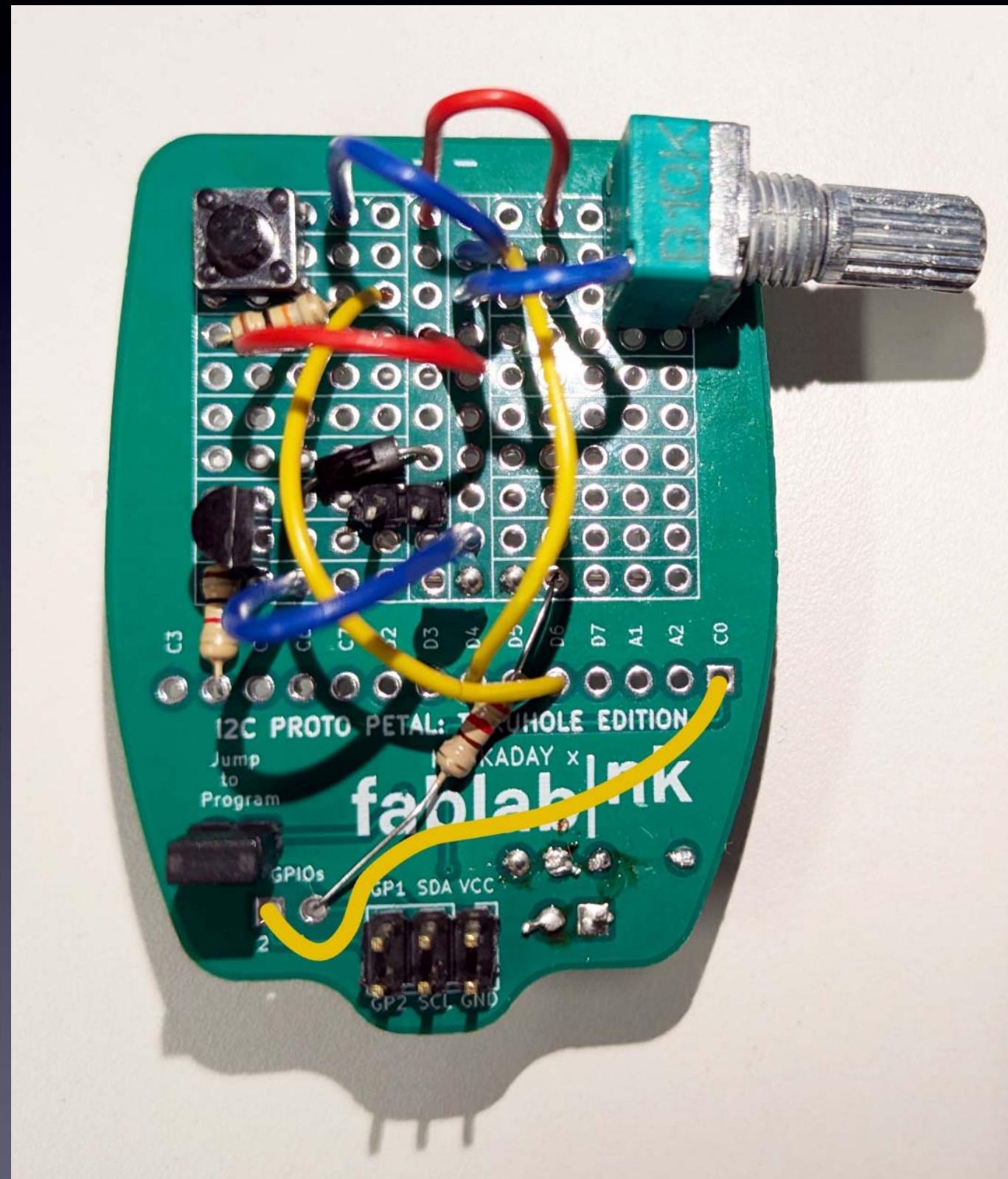


Syllabus

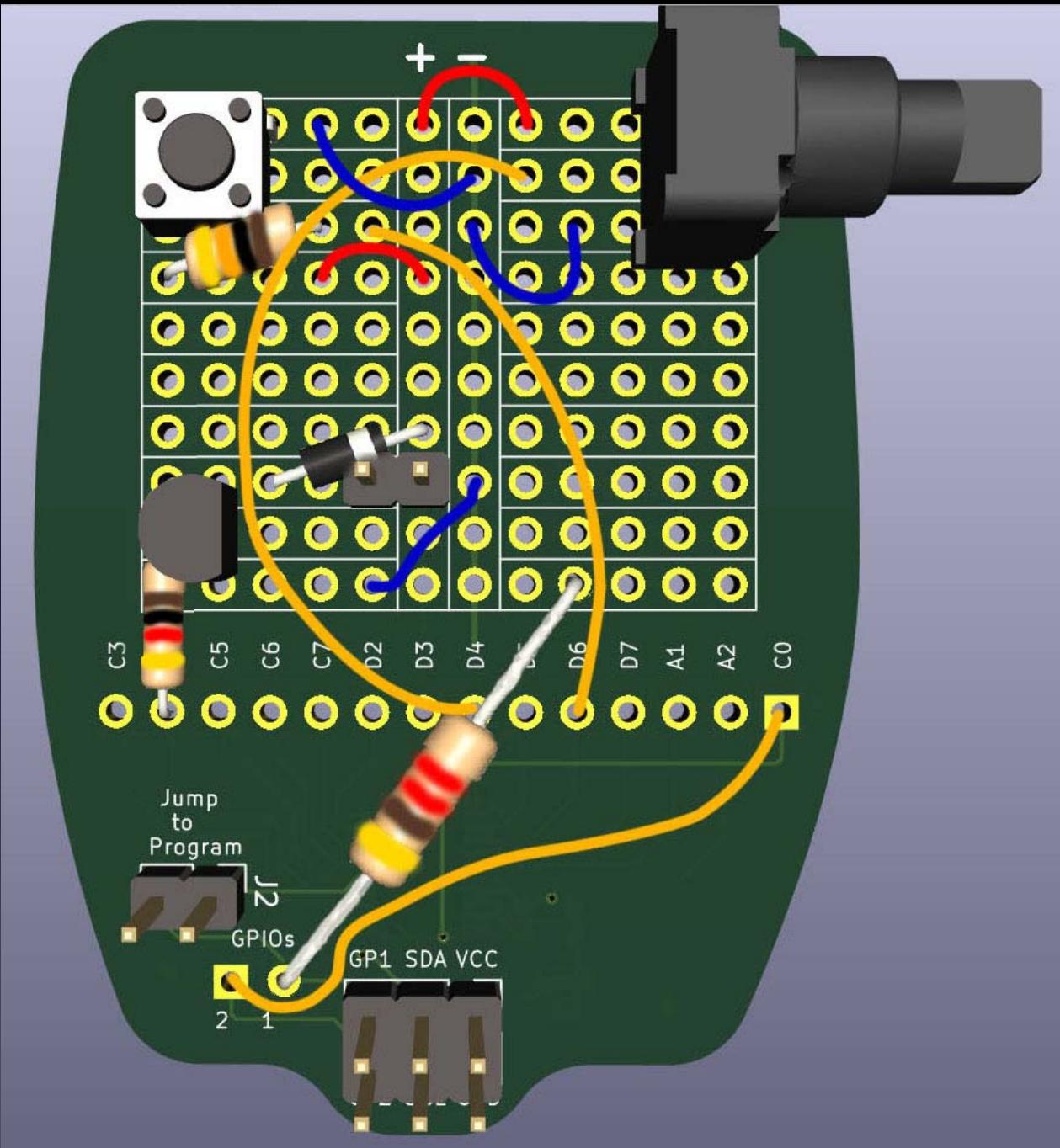
- About us
- Intro to SAOs / Hackaday Berlin 2025 Badge
- Intro to SSSAO (Satisfying Senseless Sonic Add-On)
 & Satisfying Senseless Sonic Orchestra
- Intro to SSSAO Sequencer
- Hackaday Berlin 2025 Badge Toolchain
- How to solder / make your SSSAO
- SSSAO orchestra



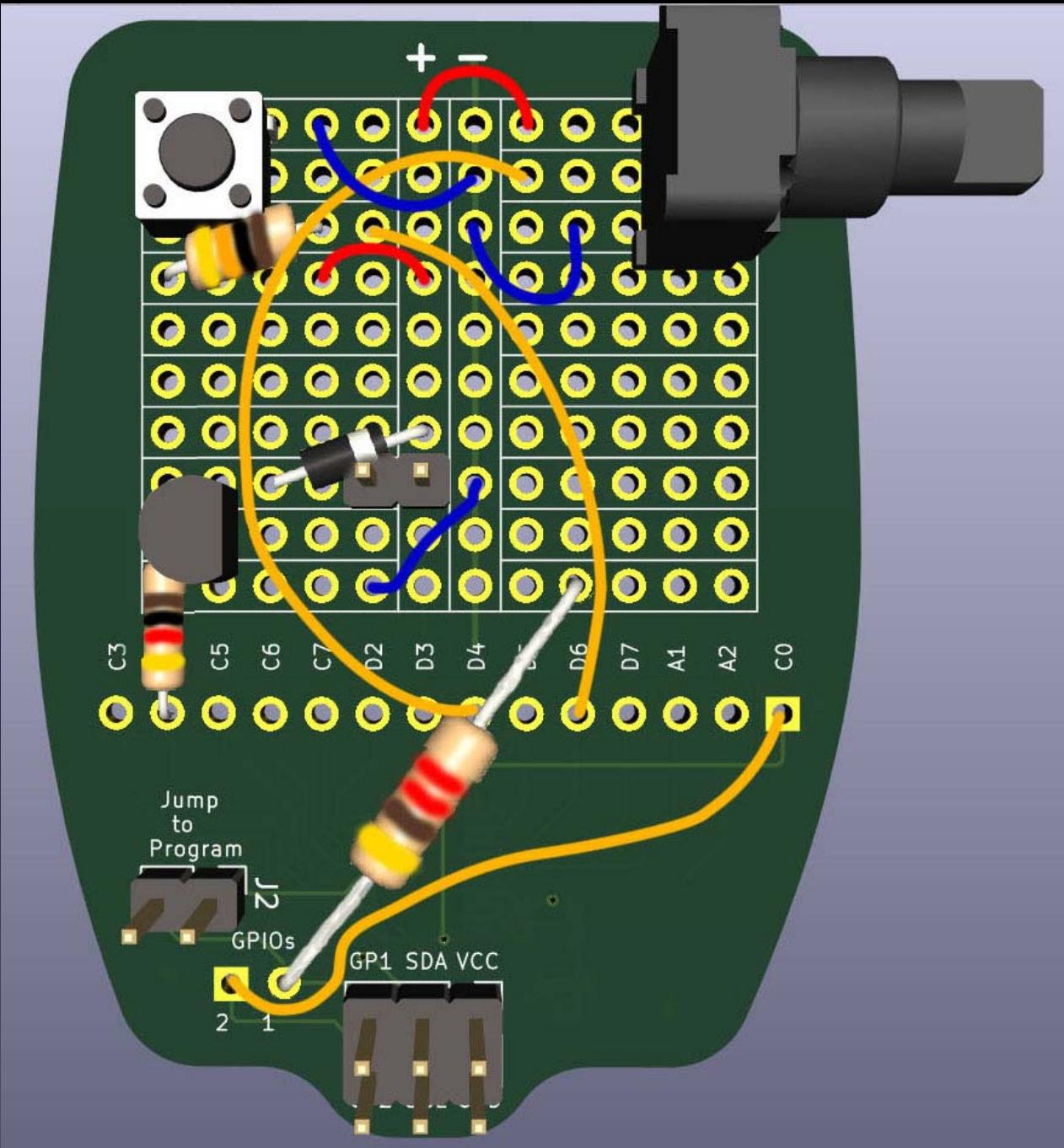
Satisfying Senseless Sonic Add-On



SSSAO

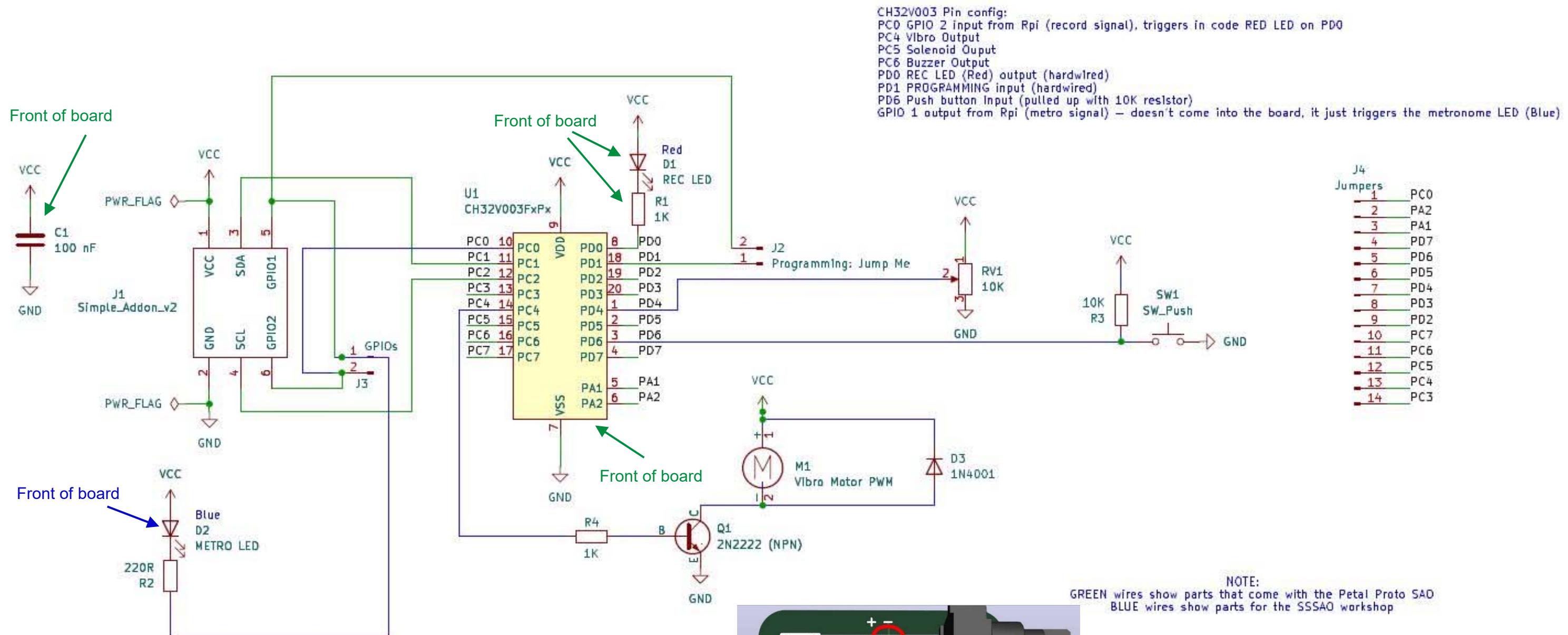


SSSAO

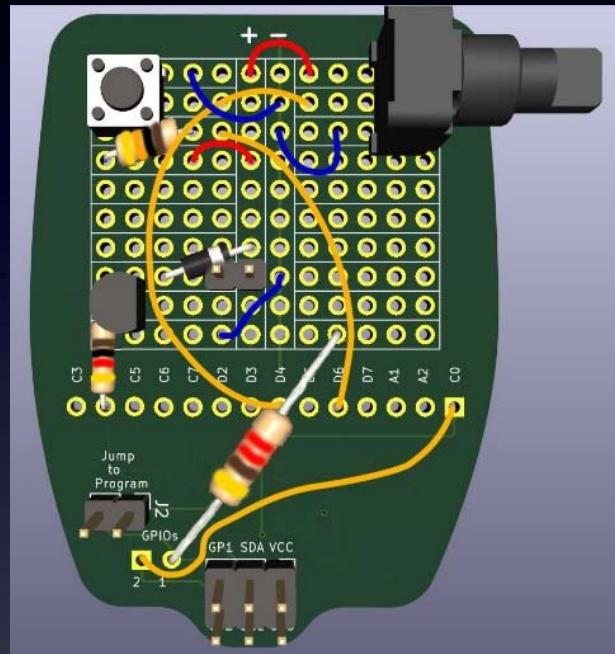


Great for
learning
to solder

SSSAO schematic



SSSAO



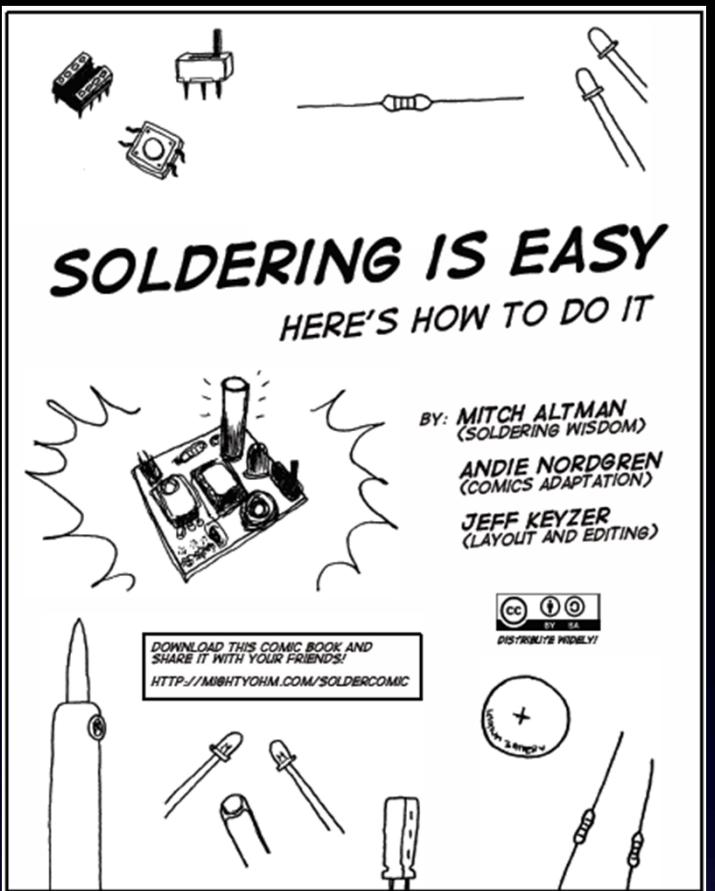
Live demo

(Don't bring these
home)

Tools



Learn To Solder

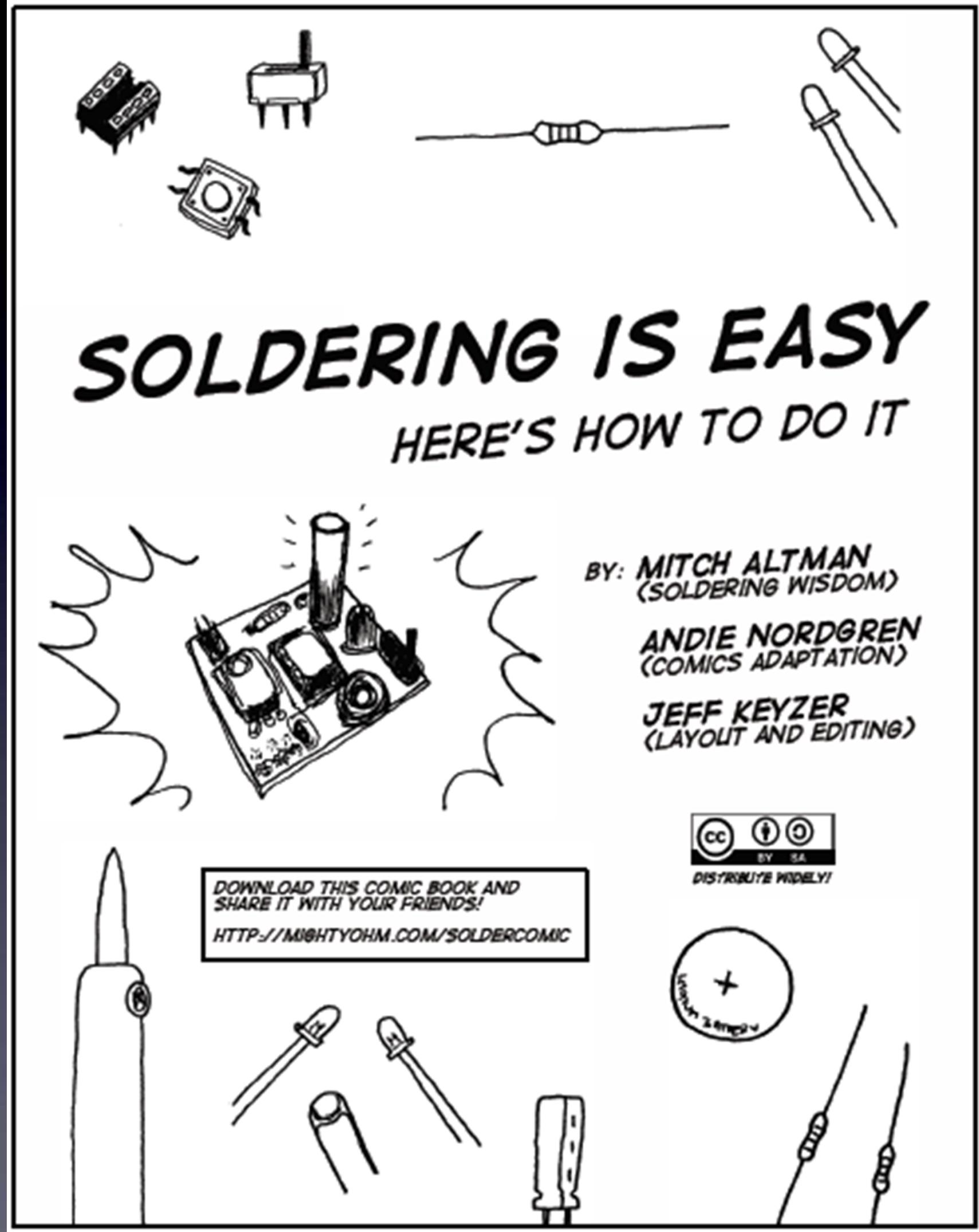


The following photos will show you how to solder.
But feel free to download the “Soldering Is Easy” comic book for free!

(In many different languages.)

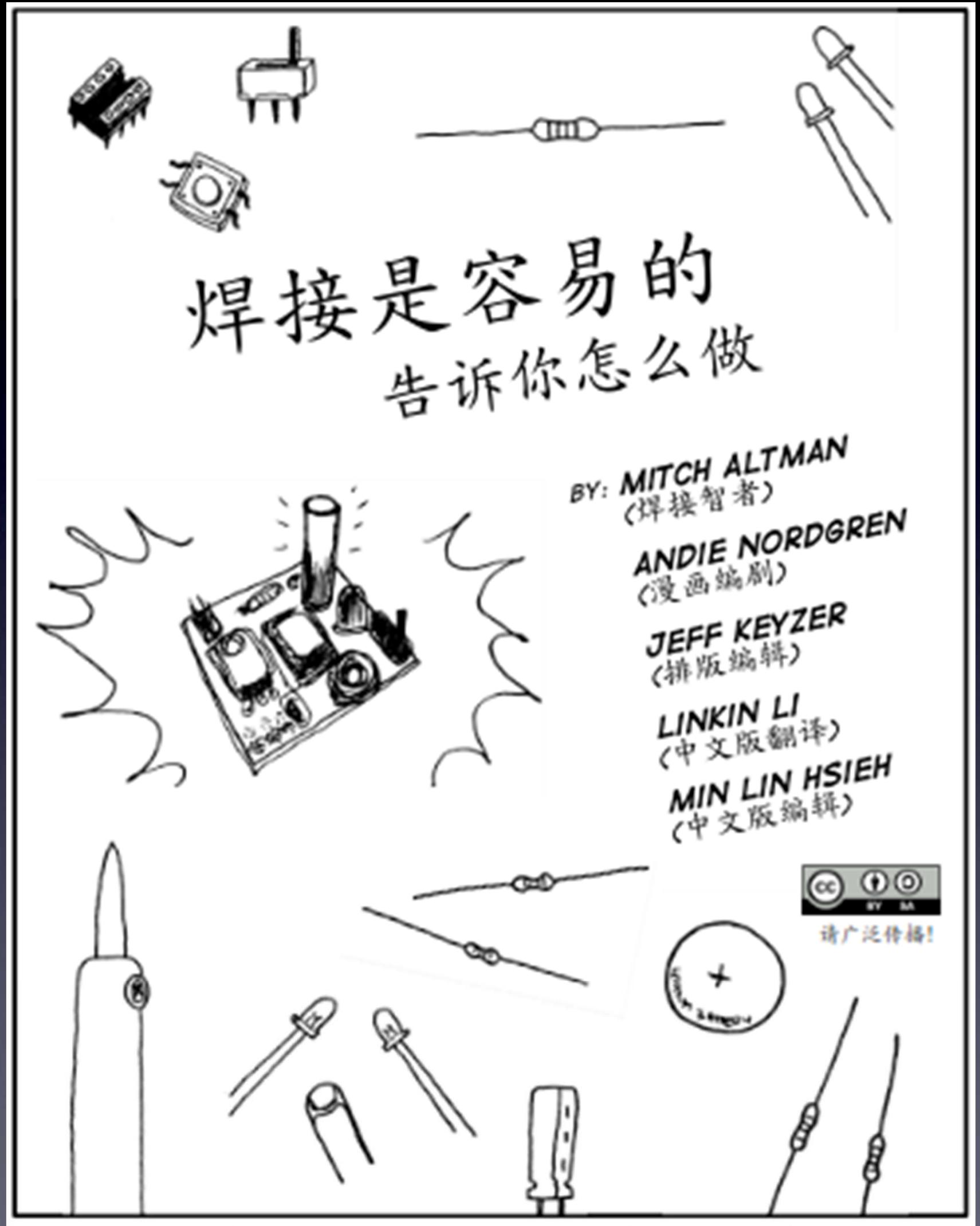
download for free at:
<http://mightyohm.com/soldercomic>

Learn To Solder



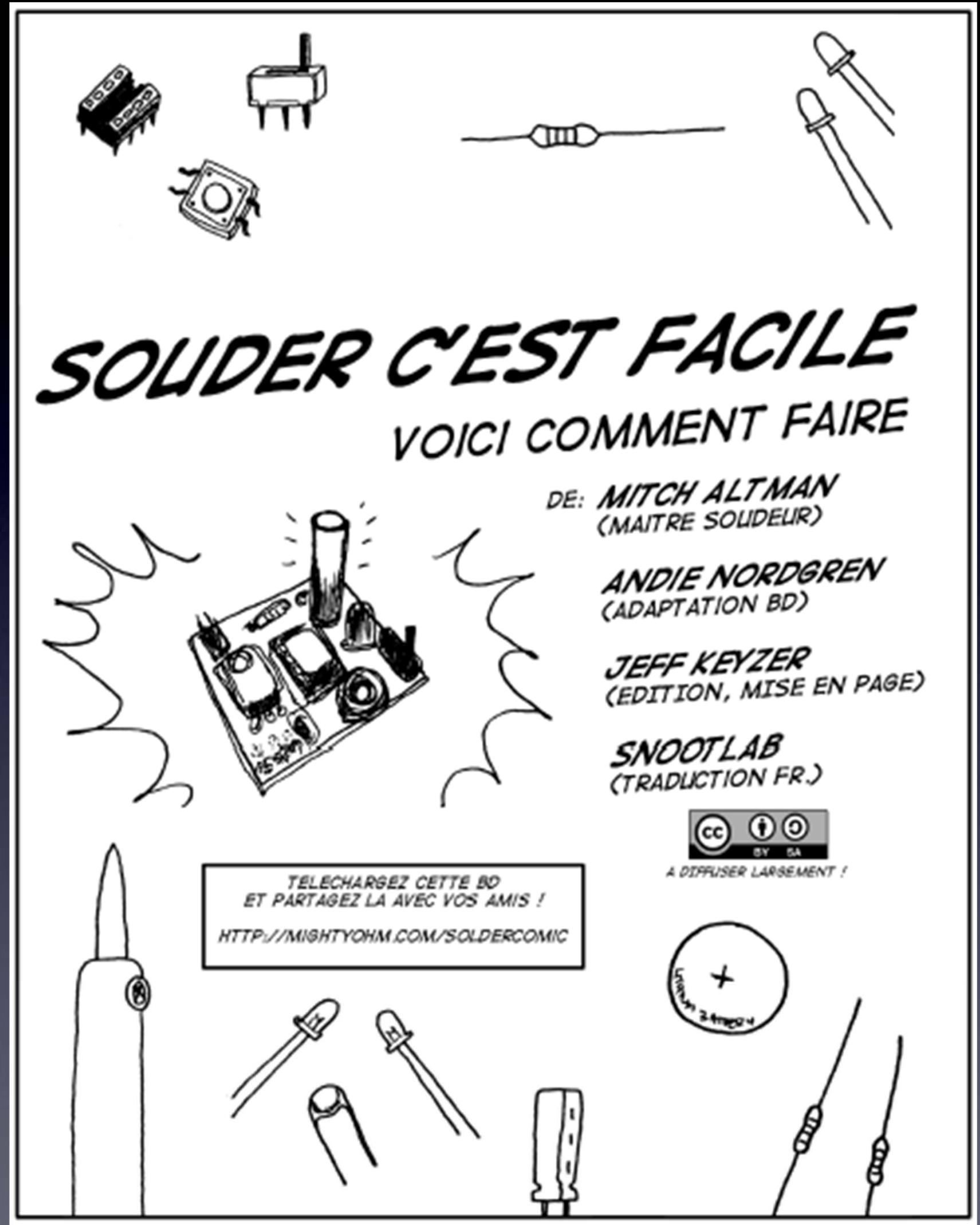
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Learn To Solder



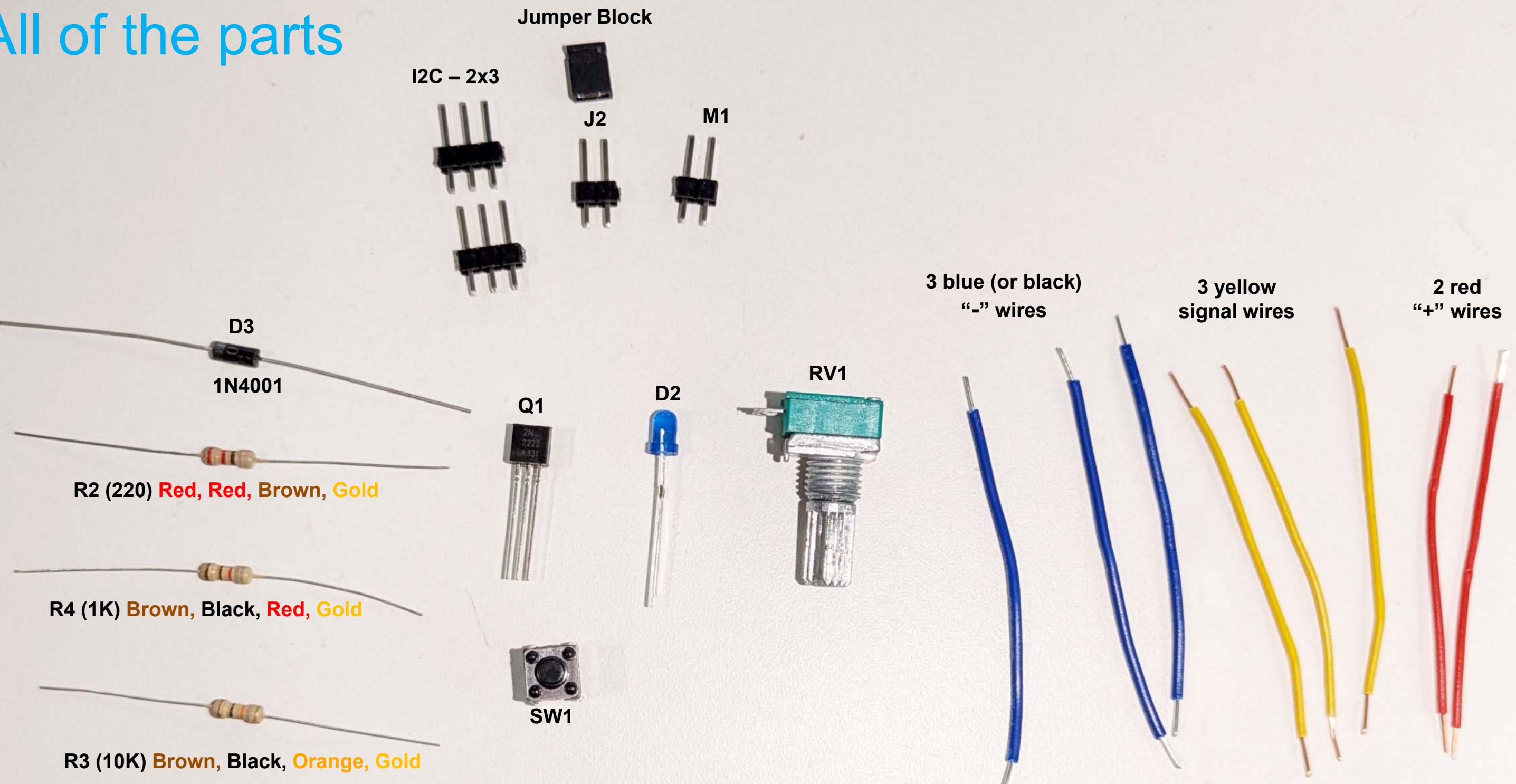
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(In many different languages.)

Learn To Solder

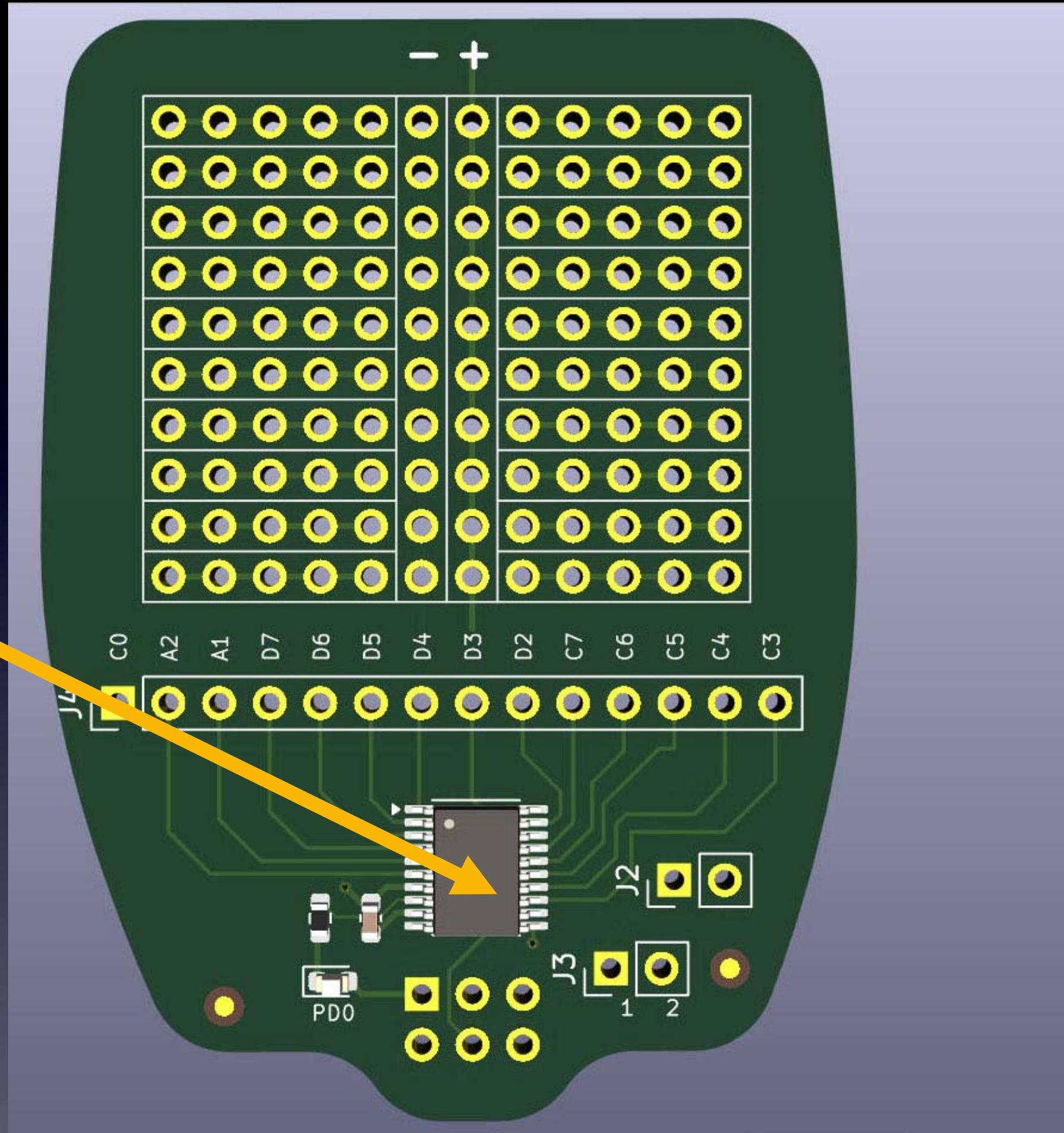


download for free at:
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(In many different languages.)

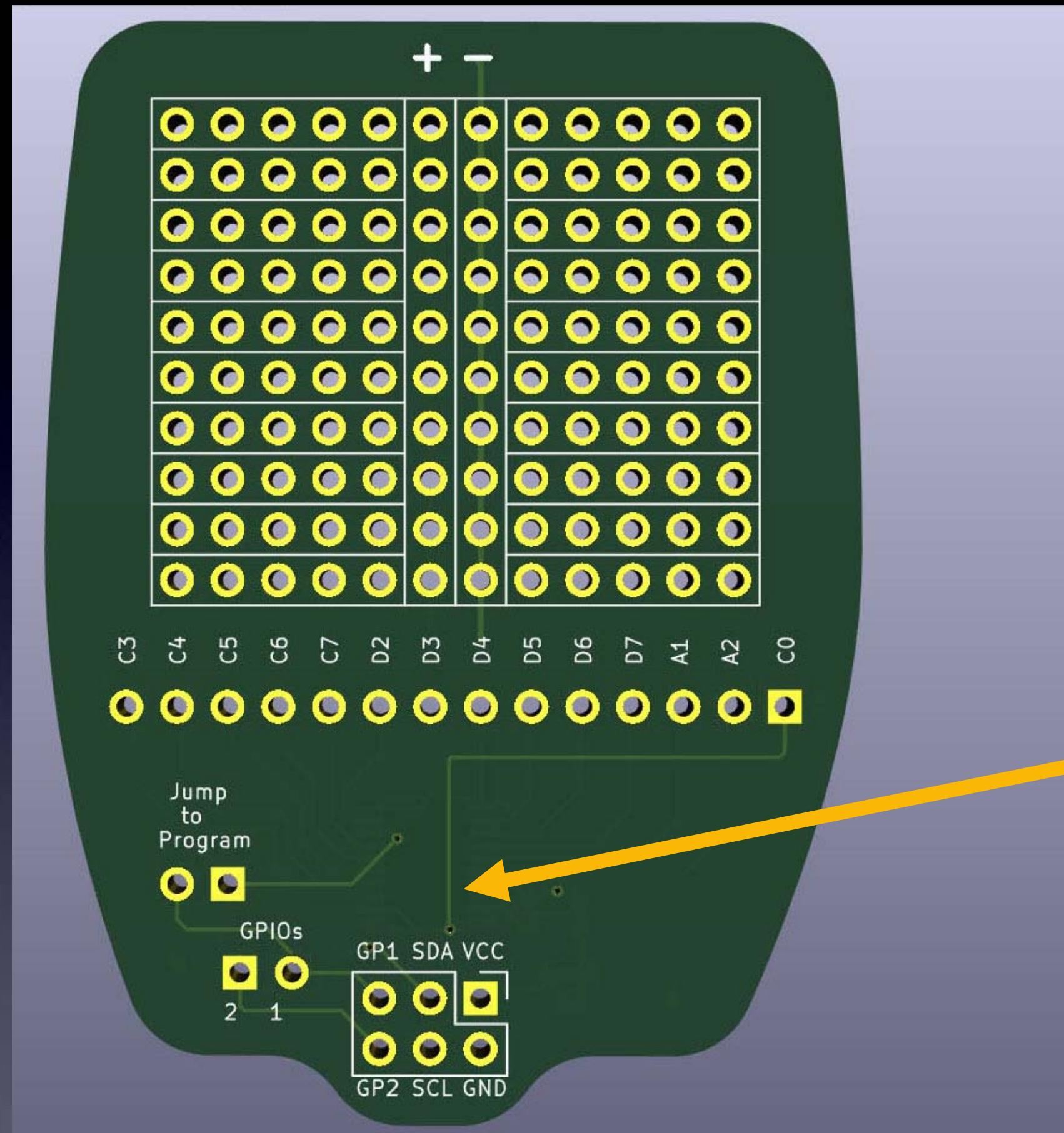
All of the parts



Front
of board
has the chip

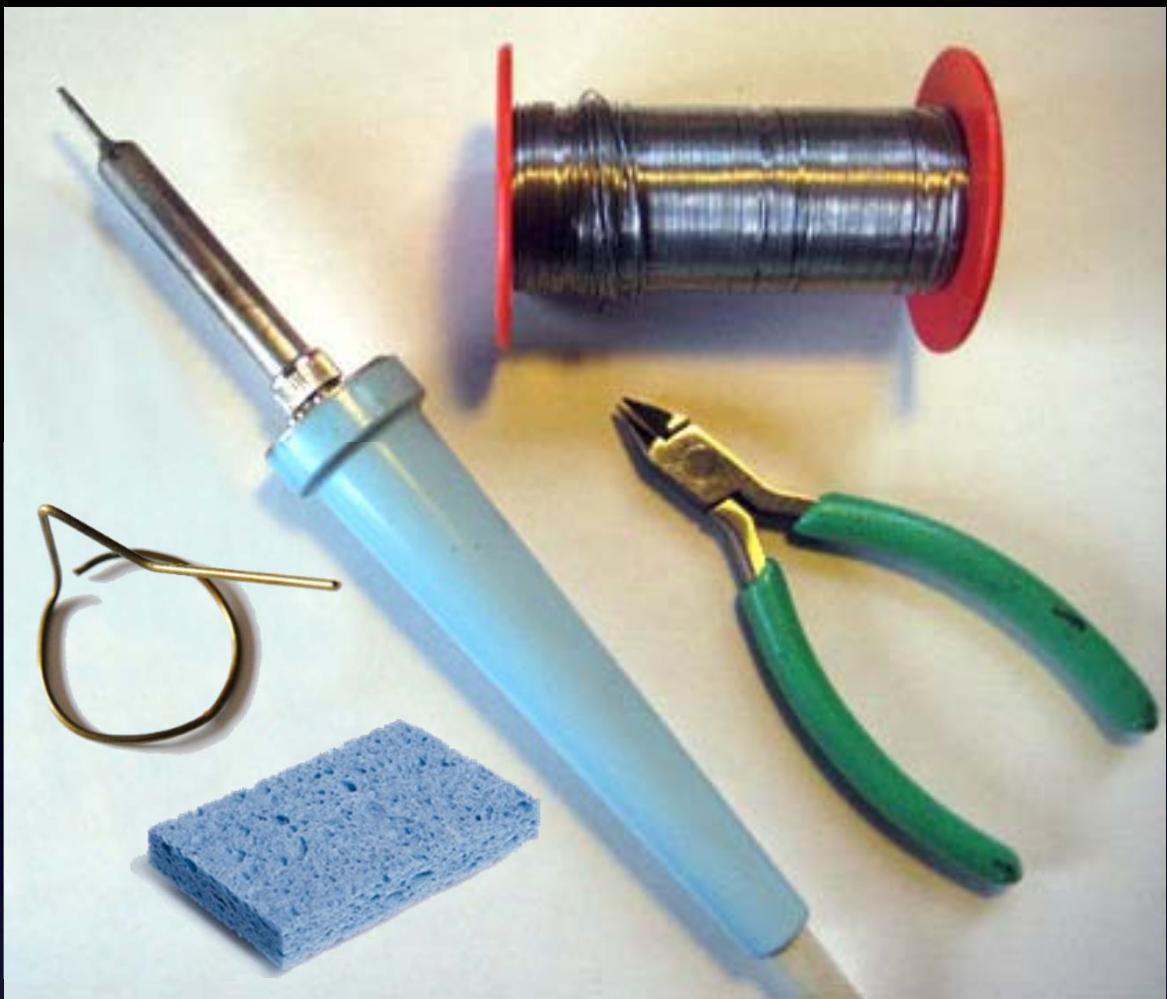


The Board (Front) – only the LED (D2) goes on this side



**Back
of board
has NO chip**

The Board (Back) -- All other parts are soldered on this side !



Note:

Since we will use Lead-Free solder it is helpful to also have flux paste in a syringe And Isopropyl Alcohol

The tools you'll need:

- soldering Iron (35W or less)
- solder (*more details coming*)
- soldering iron stand
- cellulose kitchen sponge (*not plastic!*)
- *small* wire cutter



Our first part

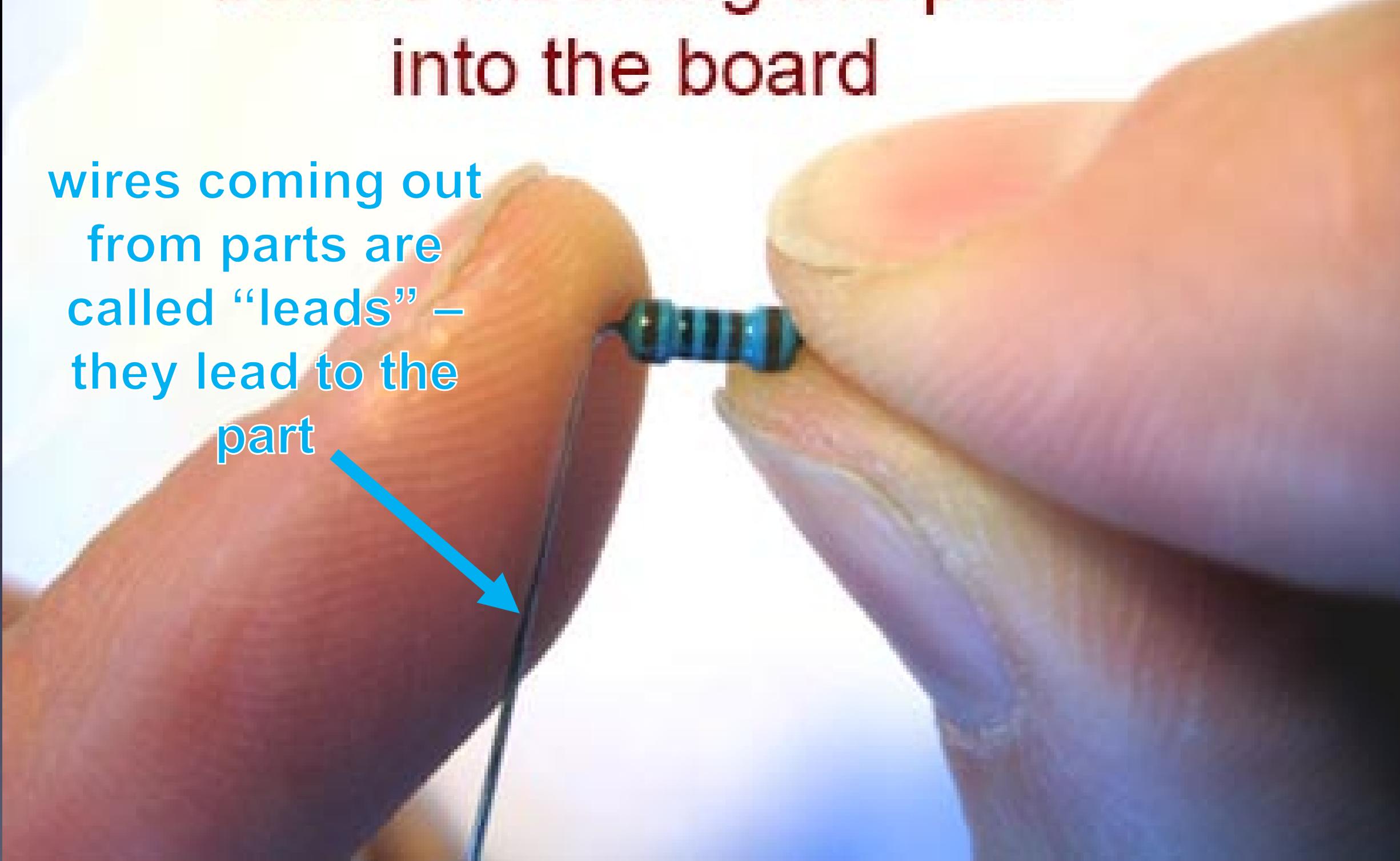


R2: Red, Red, Brown, Gold

Some parts, such as resistors, need their leads bent first

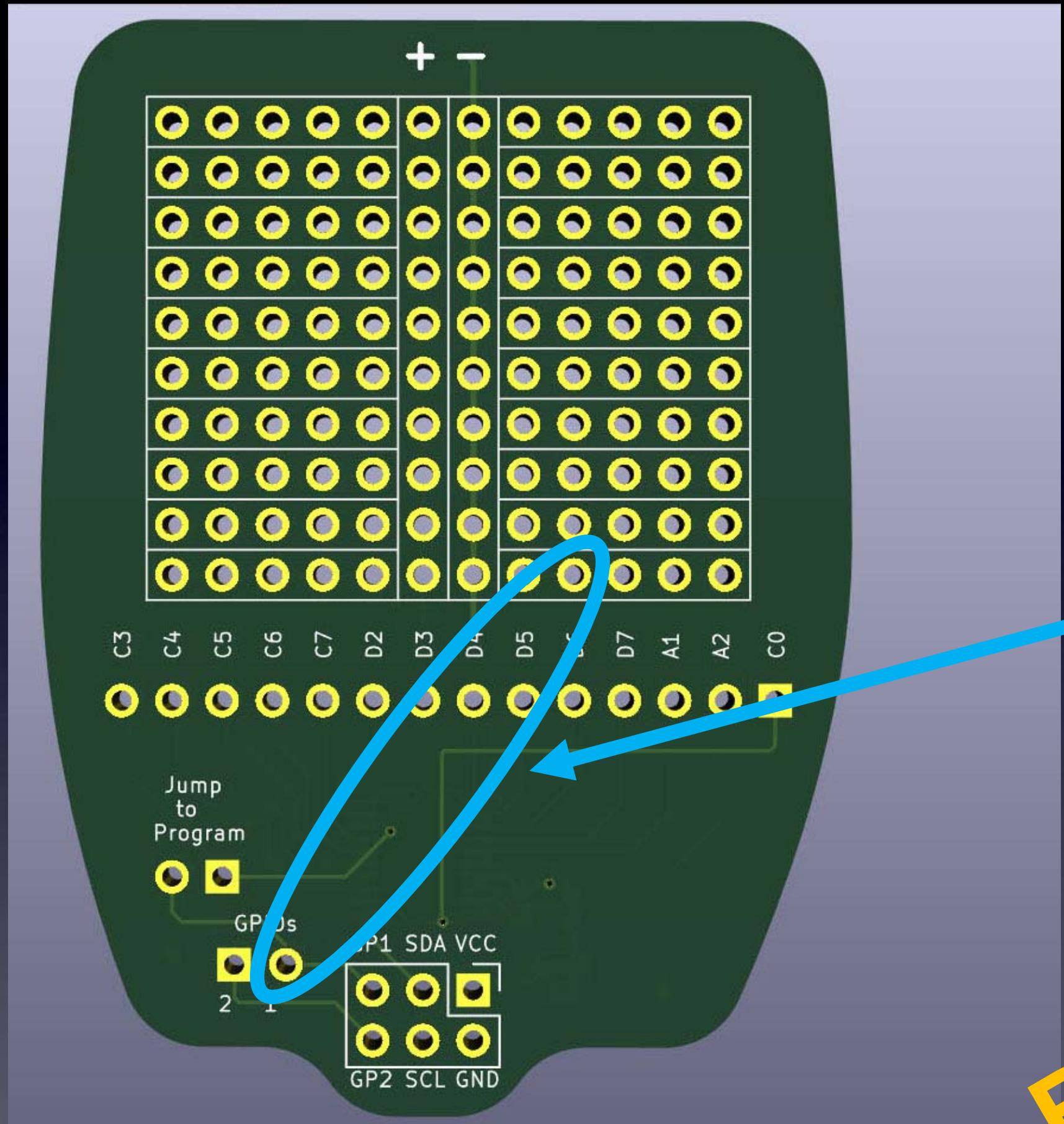
If necessary, Bend leads
before inserting the part
into the board

wires coming out
from parts are
called “leads” –
they lead to the
part





R2 – this is how it will look *before* inserting it into the board



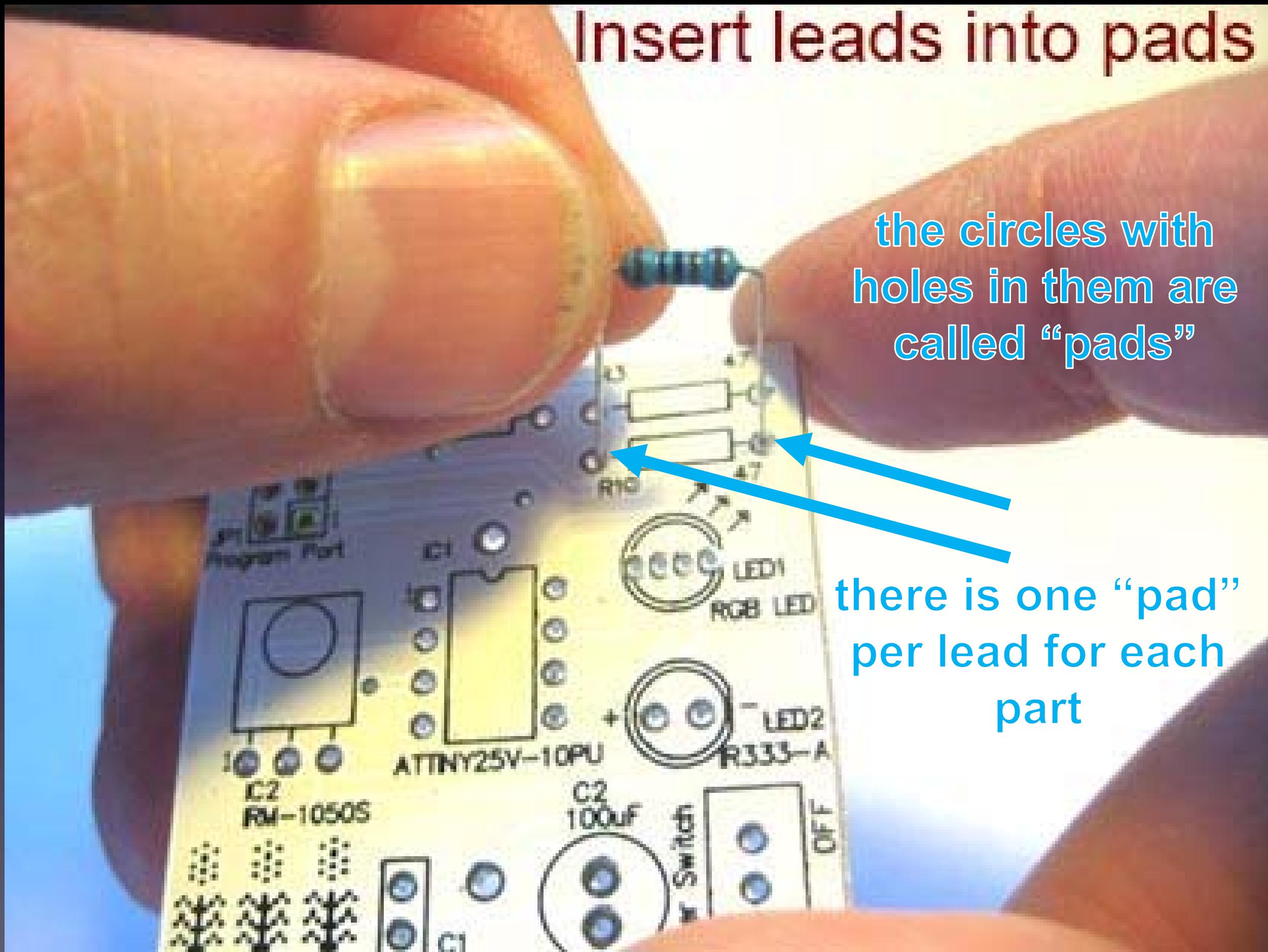
R2 – this is where it goes

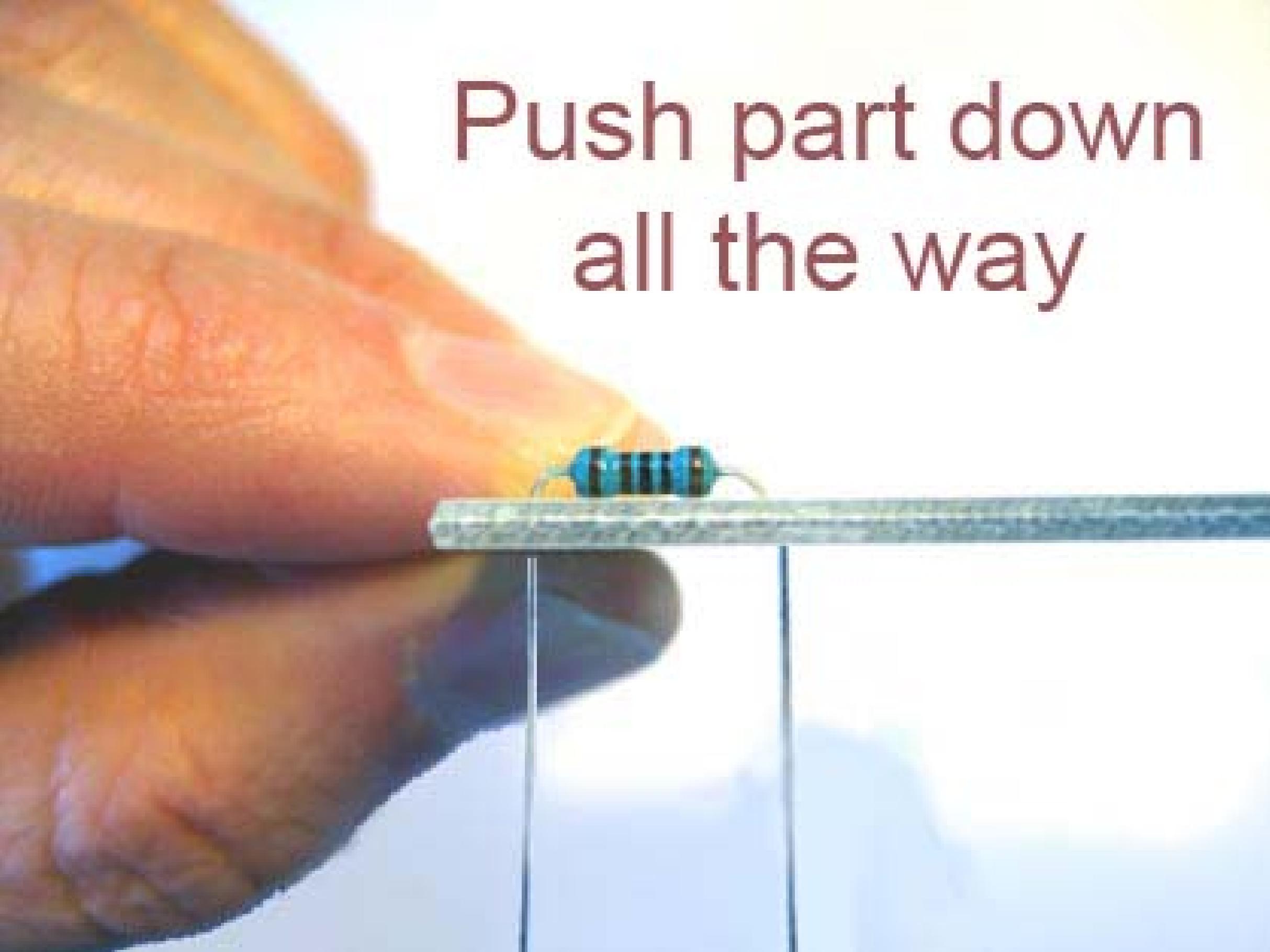
Back
of board!
(no chip)

Insert leads into pads

the circles with
holes in them are
called “pads”

there is one “pad”
per lead for each
part



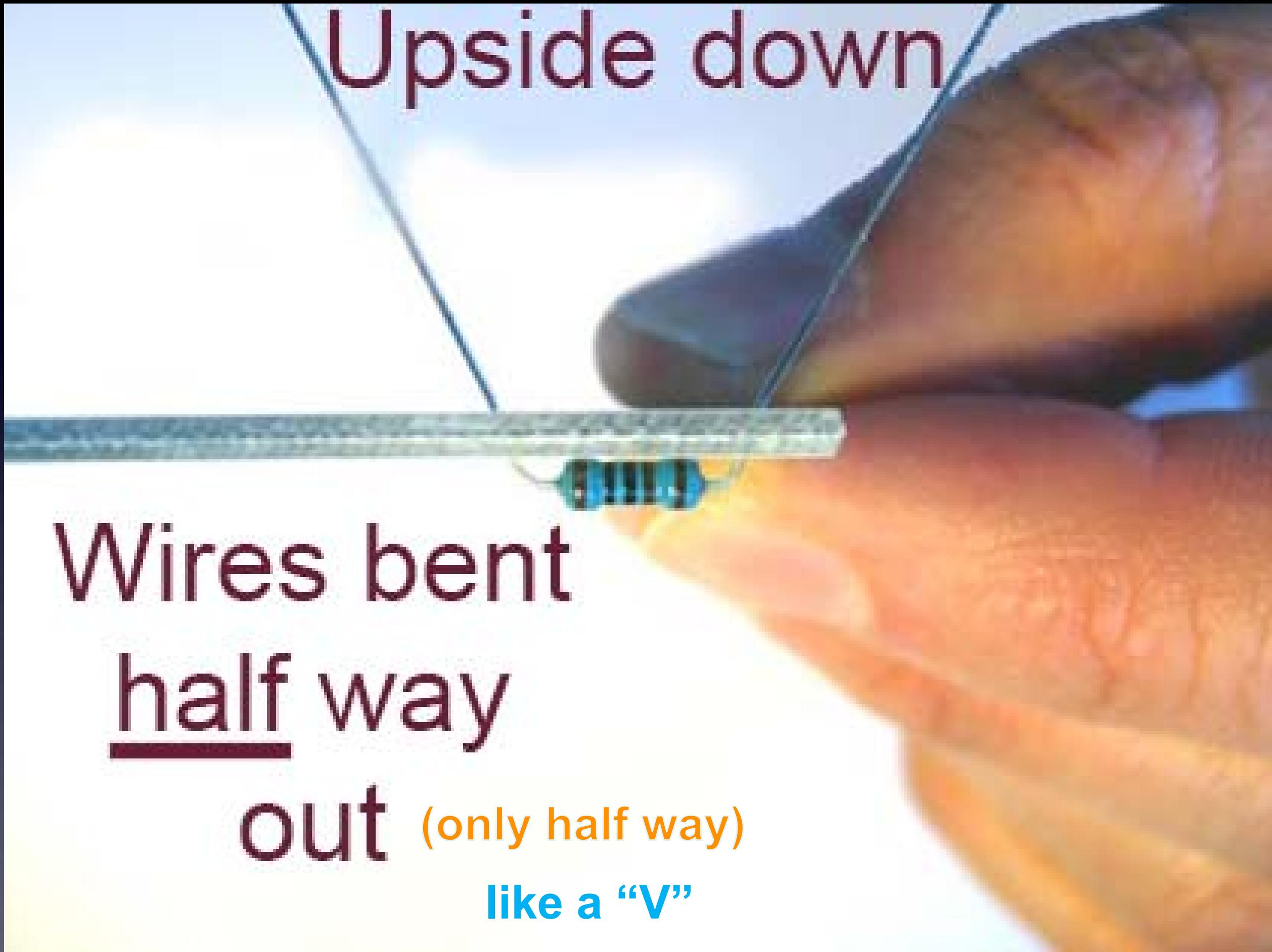


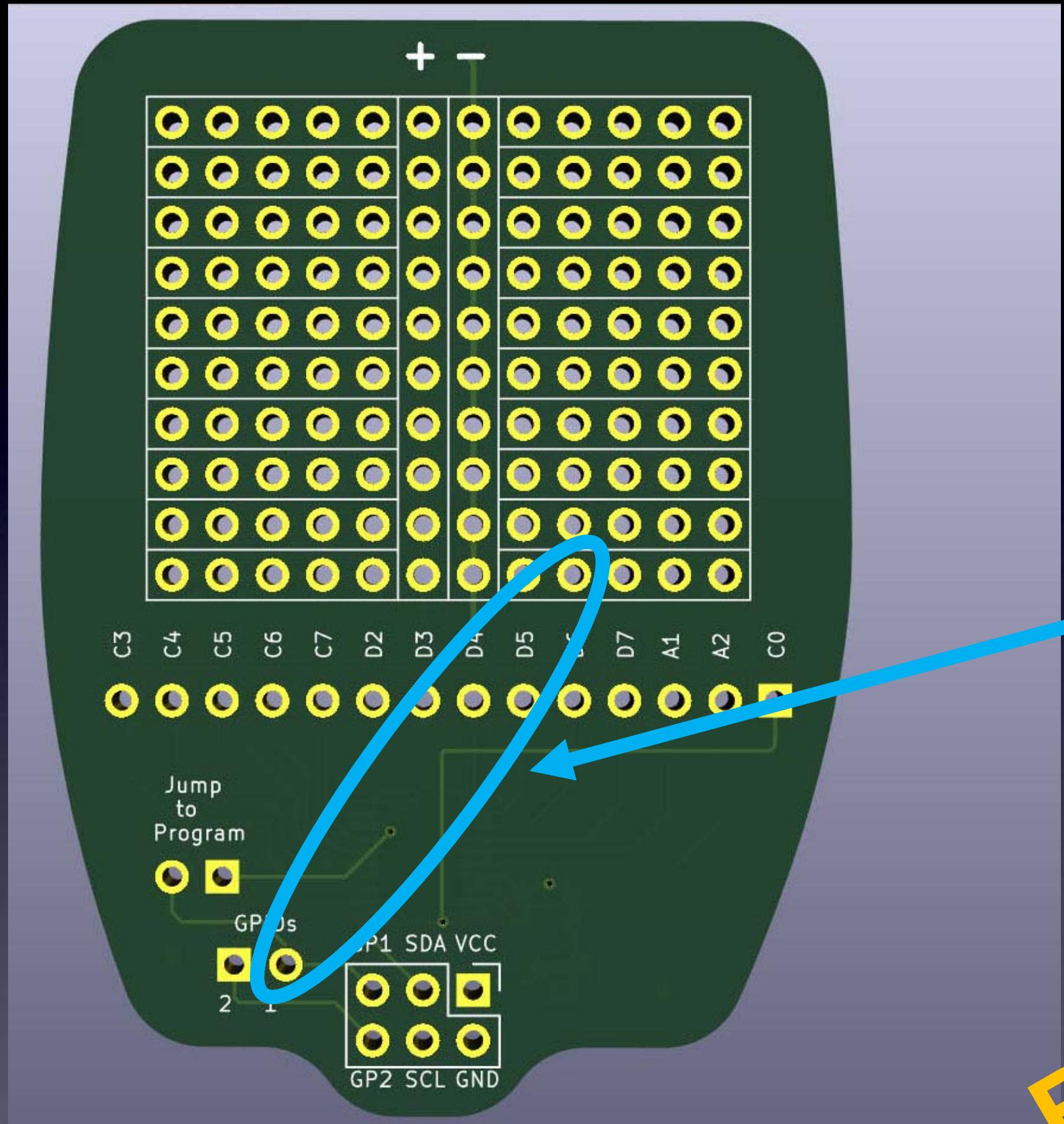
Push part down
all the way

Upside down

Wires bent
half way
out (only half way)
like a “V”

so that the part won't fall out while soldering it

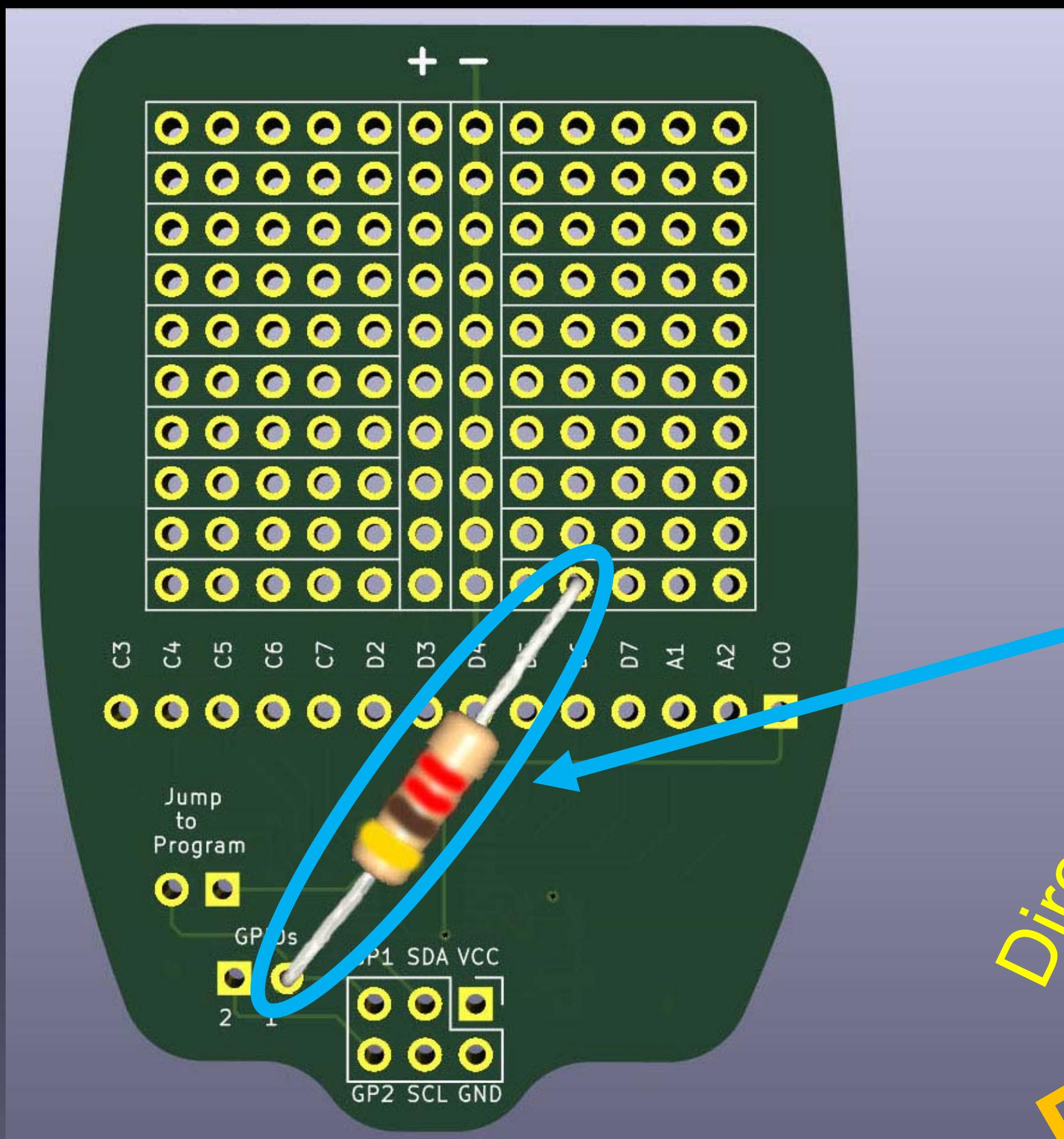




R2 – this is where it goes

Back
of board!
(no chip)

R2: Red, Red, Brown, Gold



R2 – this is where it goes

Direction does not matter
Back of board!
(no chip)



How to hold a soldering iron

(Like a pencil – held from underneath)

Important

The best kind of solder for DIY electronics:

(Sn – Tin / Pb – Lead)

63/37 rosin core,
0.031" (0.8mm) diameter (or smaller)

(60/40 is also good)

Note:

Most
Lead-Free solder
has poisonous fumes!

This is what we will use: A good kind of solder for DIY electronics:

*This is the only good
Lead-Free solder I have found!
(after years of searching)*



Kester
K100LD Rosin
(not “No Clean”)
0.031" diameter (0.8mm)

This is what we will use: A good kind of solder for DIY electronics:

*This is the only good Lead-Free solder I have found!
(after years of searching)*



Kester K100LD Rosin Solder

0.031" diameter (0.8mm)

Note:



Since we will use **Lead-Free** solder
it is *helpful*
to also have
flux paste in a syringe
And Isopropyl Alcohol

3 Safety Tips...

Safety Tip #1:

Hot !!

(When you touch the tip,
you *will* let go quickly every time!)

Safety Tip #2:

Soldering chemicals
are toxic

But they easily wash off your hands
with soap and water

Safety Tip #3:

(coming soon)

2 secrets
to good soldering...

Secret #1:

Clean the tip!

(before every solder connection)

Bang (lightly) 3 times,

Swipe, Rotate, Swipe (on the sponge):

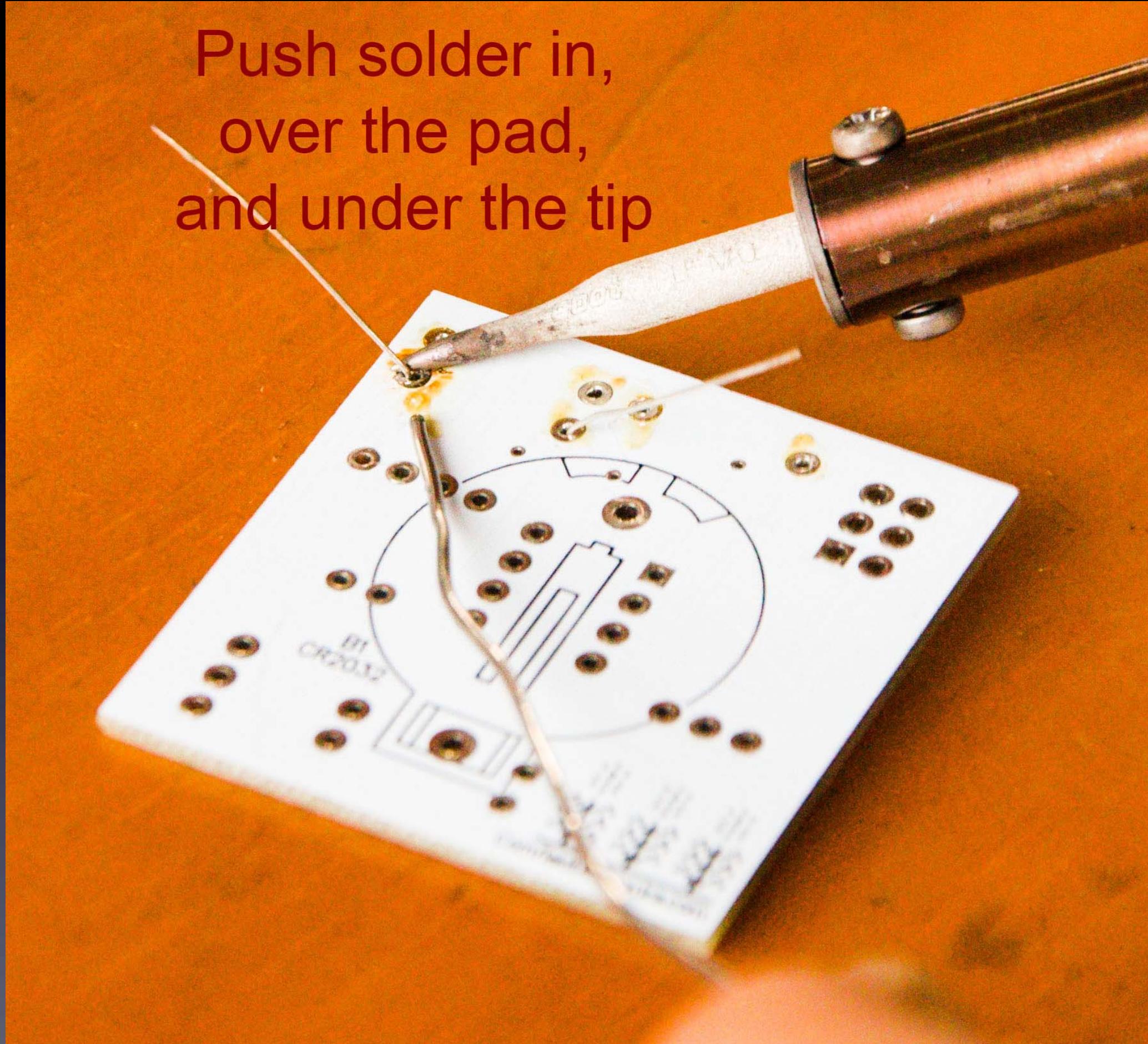
Keep the tip shiny silver!

knock solder off the tip

Lay clean tip across half of the pad,
touching the pad and lead
for 1 second

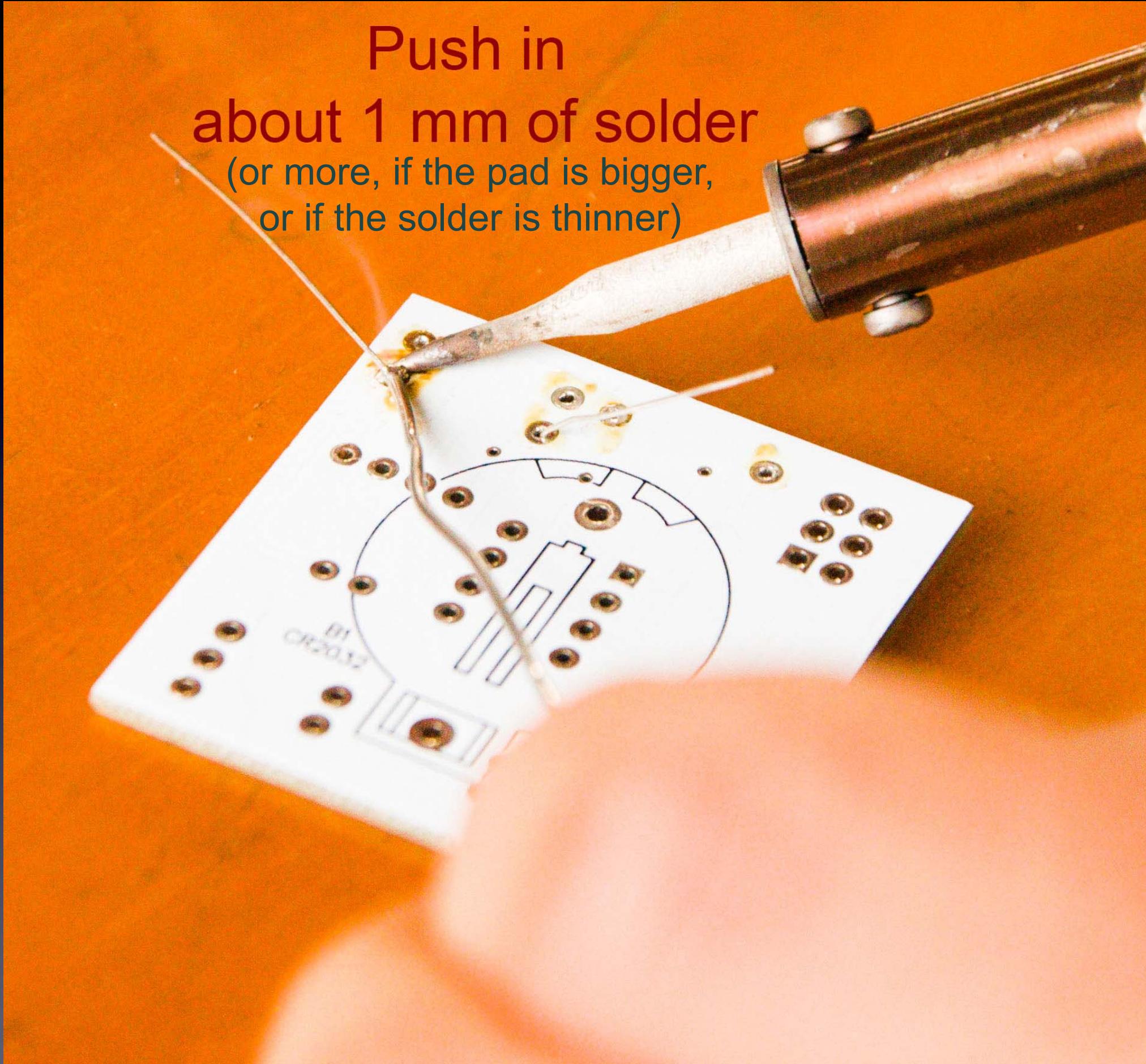


Do this quickly (slowly doesn't work well) – solder in & out in about 1 second

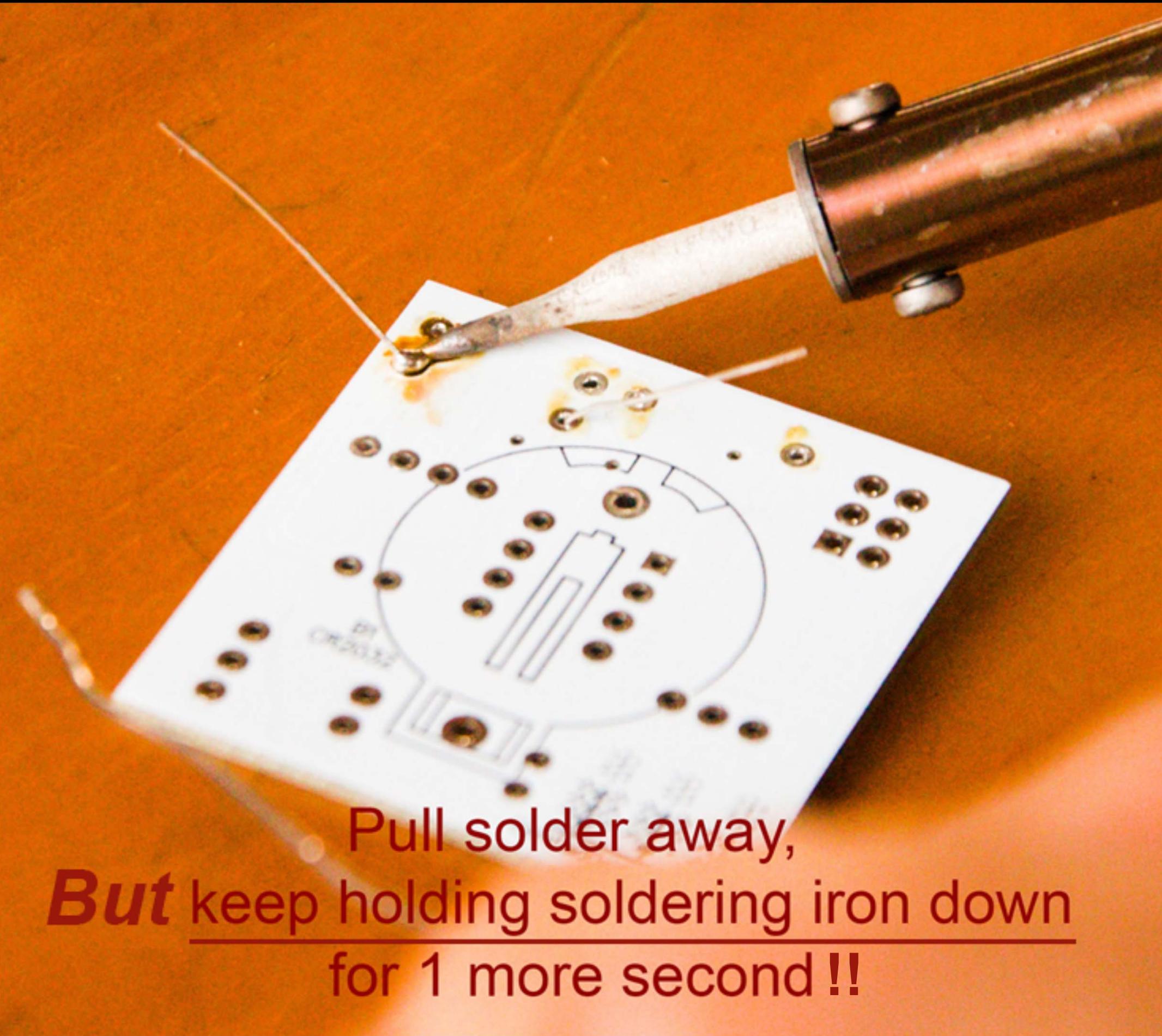


Make sure solder melts on the underside of the soldering iron tip
(not the side or top of the soldering iron tip)!

Do this quickly (slowly doesn't work well) – solder in & out in about 1 second



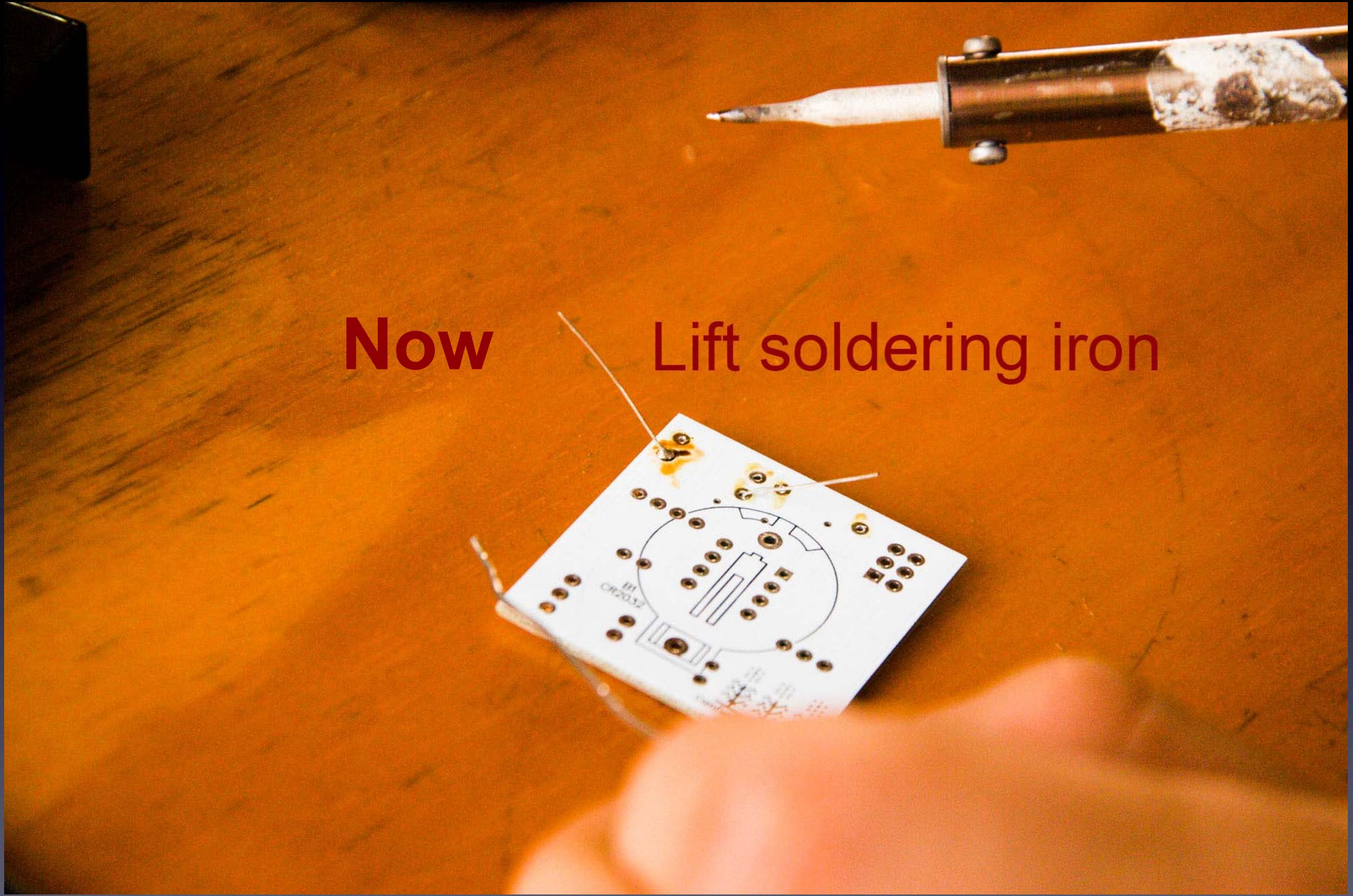
Make sure solder melts on the underside of the soldering iron tip
(not the side or top of the soldering iron tip)!



Pull solder away,
But keep holding soldering iron down
for 1 more second !!

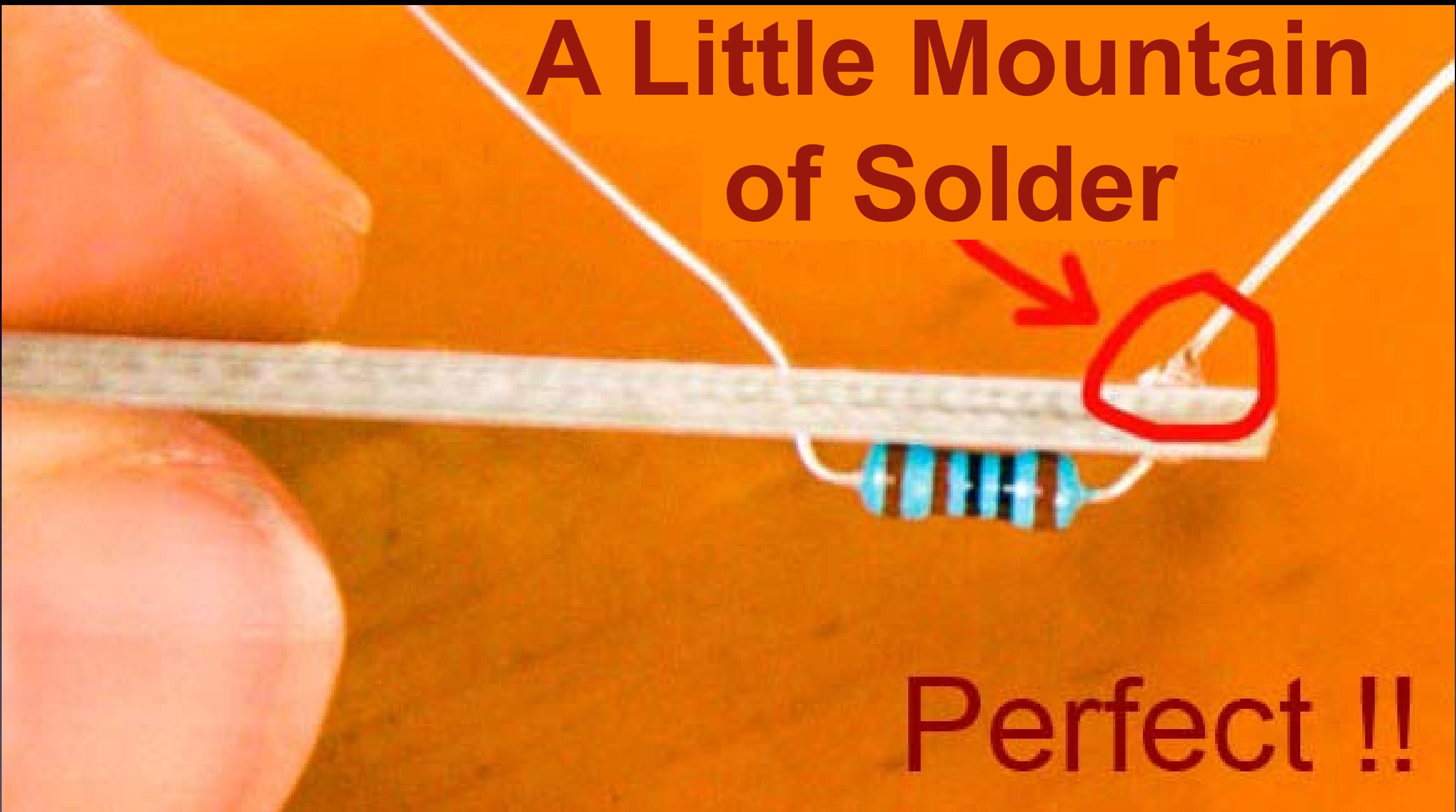
Secret #2:

Keep hot tip down
1 second
for solder to flow !!



Now

Lift soldering iron



**A Little Mountain
of Solder**

Perfect !!

If you can see any of the pad, or the hole, you need more solder – so, just do all the steps again to make it perfect.

The Rhythm !
is just as important as the preceding steps!

The Rhythm !
and speed (about 1 second per step)



The Rhythm !
and speed (about 1 second per step)
Clean the tip



The Rhythm !
and speed (about 1 second per step)



Tip Down

The Rhythm !
and speed (about 1 second per step)



Solder In

The Rhythm !
and speed (about 1 second per step)



Solder Out

The Rhythm !
and speed (about 1 second per step)



WAIT !

The Rhythm !
and speed (about 1 second per step)



Lift Tip

The Rhythm !
and speed (about 1 second per step)



The Rhythm !
and speed (about 1 second per step)
Clean the tip



The Rhythm !
and speed (about 1 second per step)



Tip Down

The Rhythm !
and speed (about 1 second per step)



Solder In

The Rhythm !
and speed (about 1 second per step)



Solder Out

The Rhythm !
and speed (about 1 second per step)



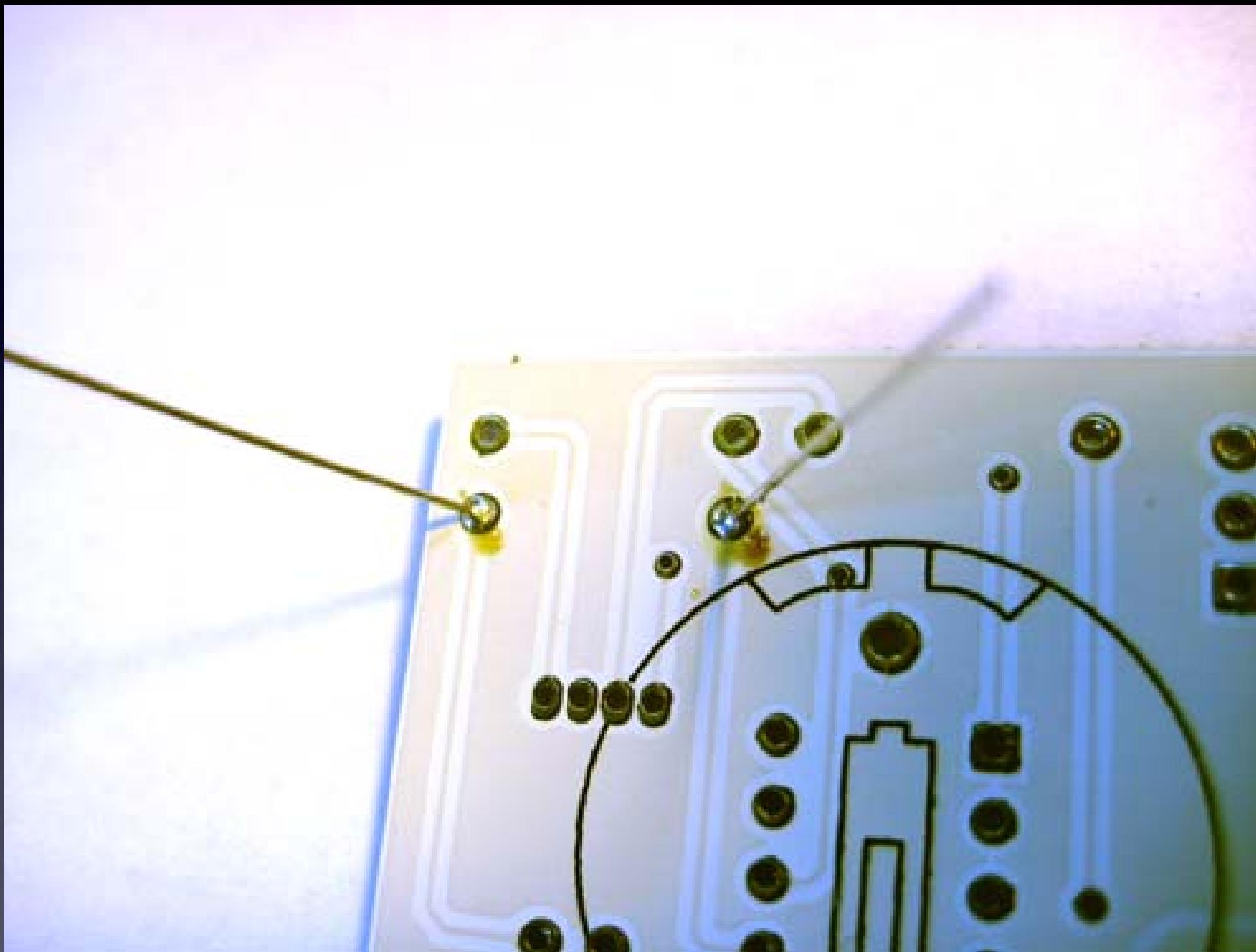
WAIT !

The Rhythm !
and speed (about 1 second per step)



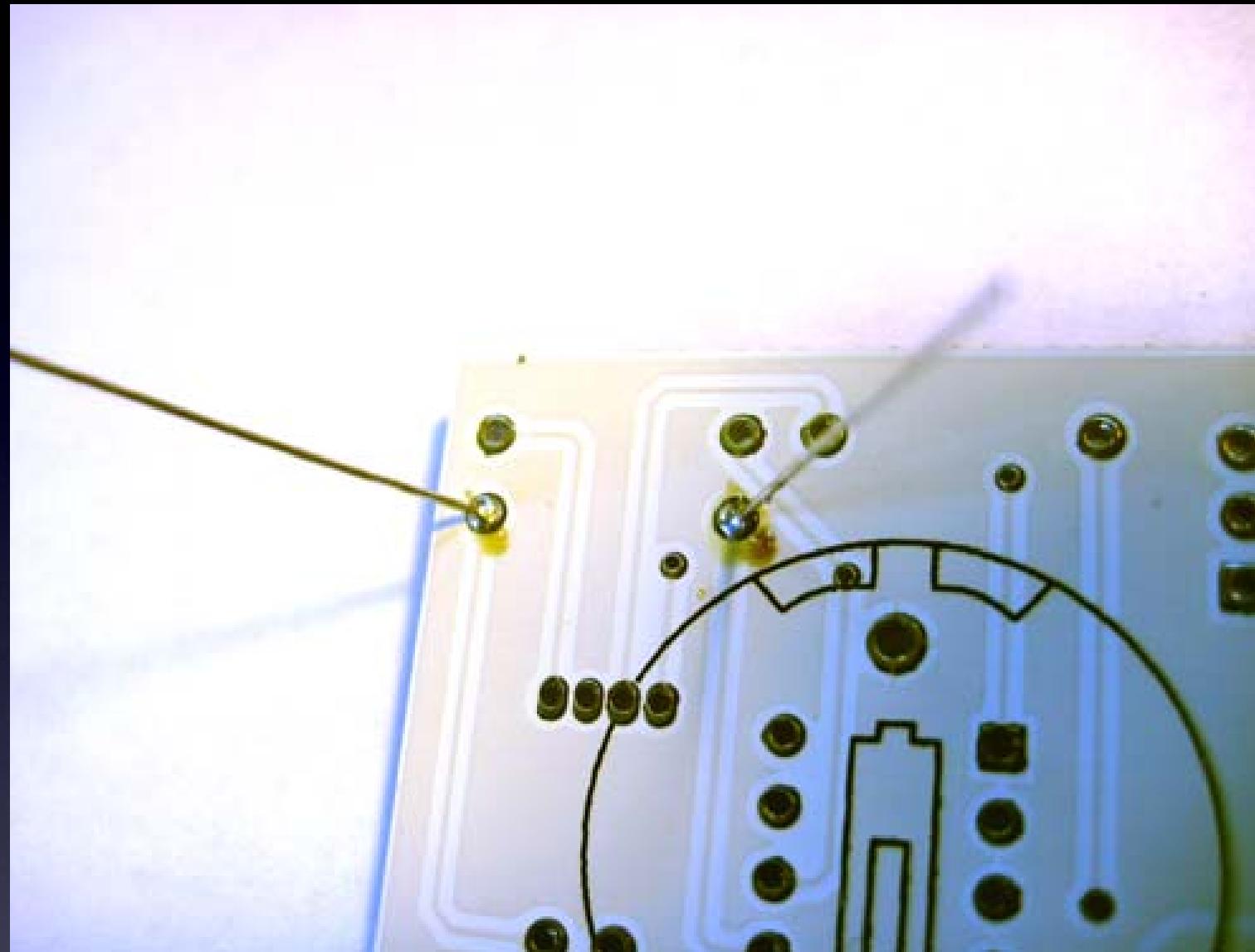
Lift Tip

Solder all of the leads of the part to the board



For this part, there are two leads
Here you can see two good solder connections

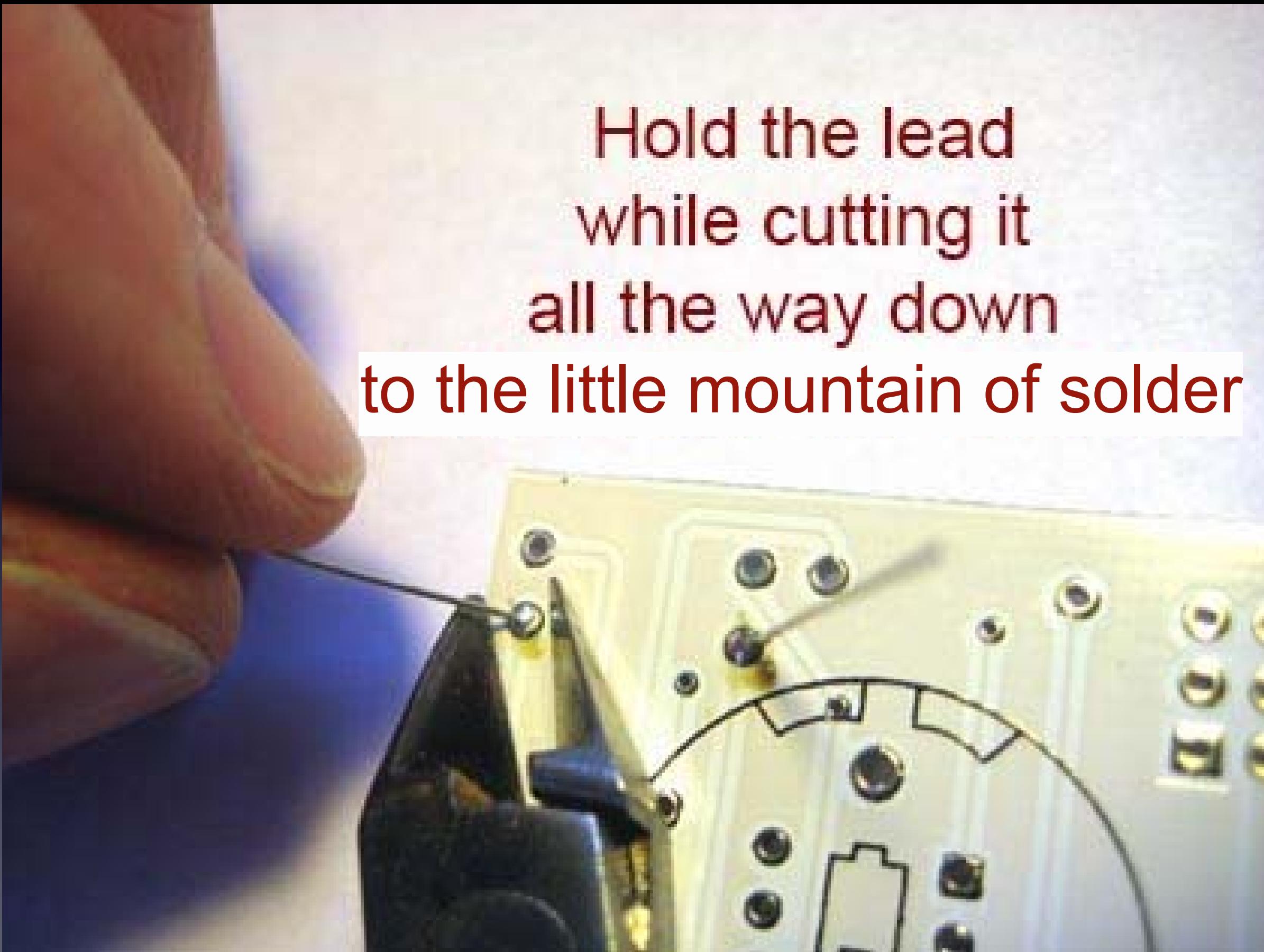
Two good solder connections



- Little mountains (not flat)
- Pads totally covered in solder
- Can't see the hole
- No connections to other pads

Now cut the leads short

Hold the lead
while cutting it
all the way down
to the little mountain of solder



Cutting with the tip of the wire cutter gives you more control

Safety Tip #3:

Hold or cover the lead !

(or it will fly into your eye!)

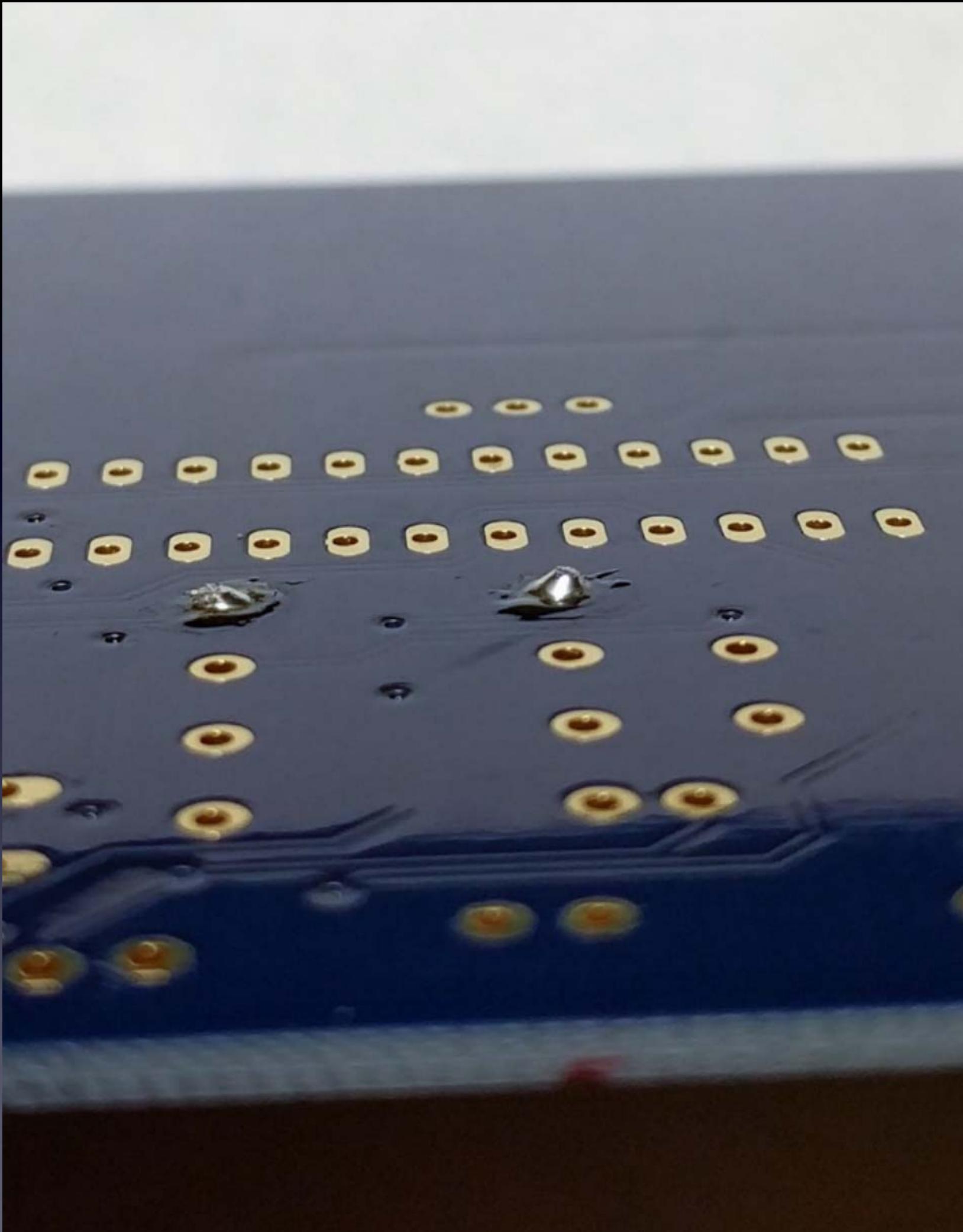
(They like doing that – so please hold or cover the lead when you cut.)



All done !

No wires sticking out

Good Solder Connections

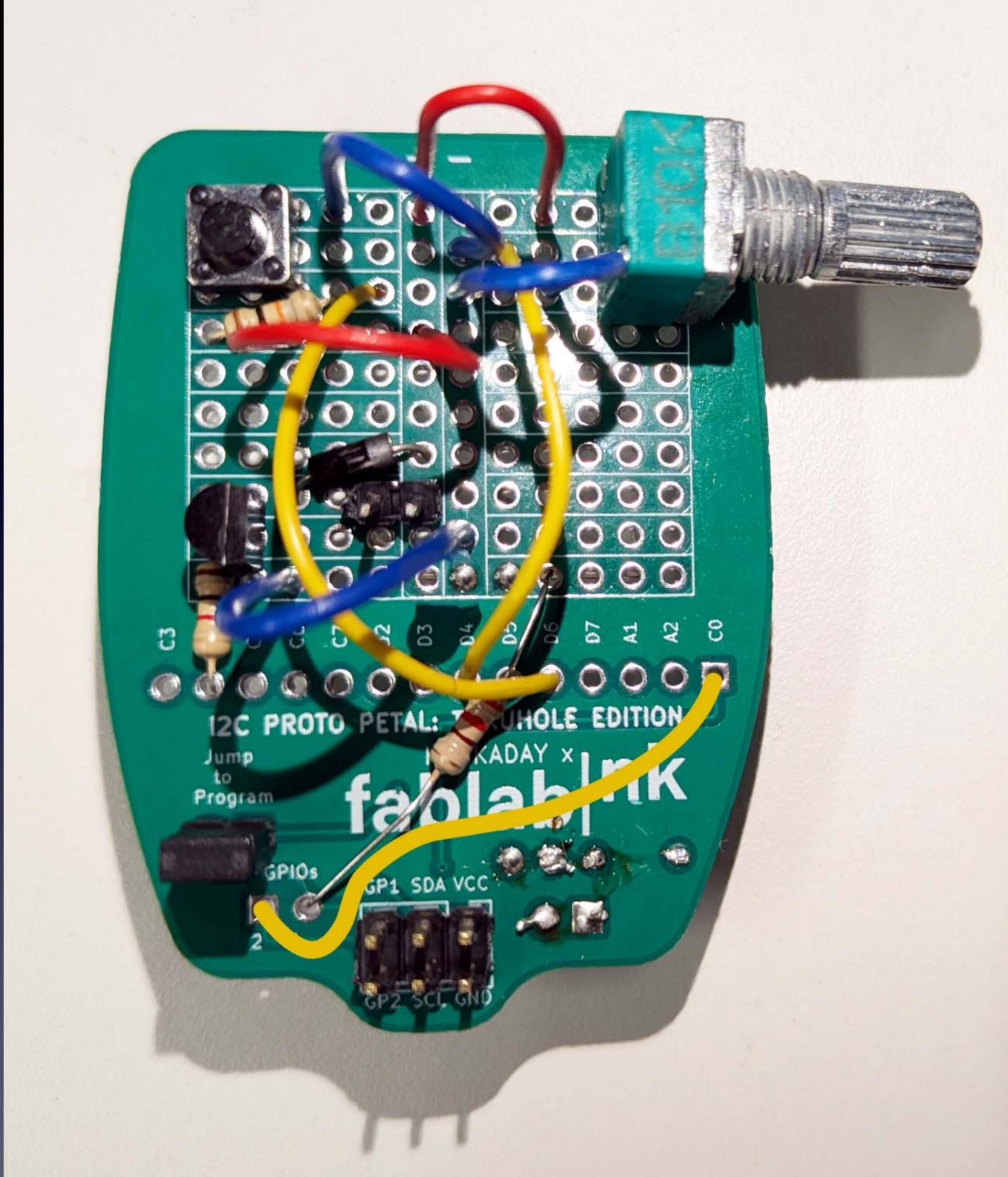


Notice that:

- Each connection is a small mountain (not flat)
- You cannot see any pad (they're totally covered with solder)
- You cannot see the holes (they're totally covered with solder)
- No connections to other pads

One part at a time

Till all the parts are soldered

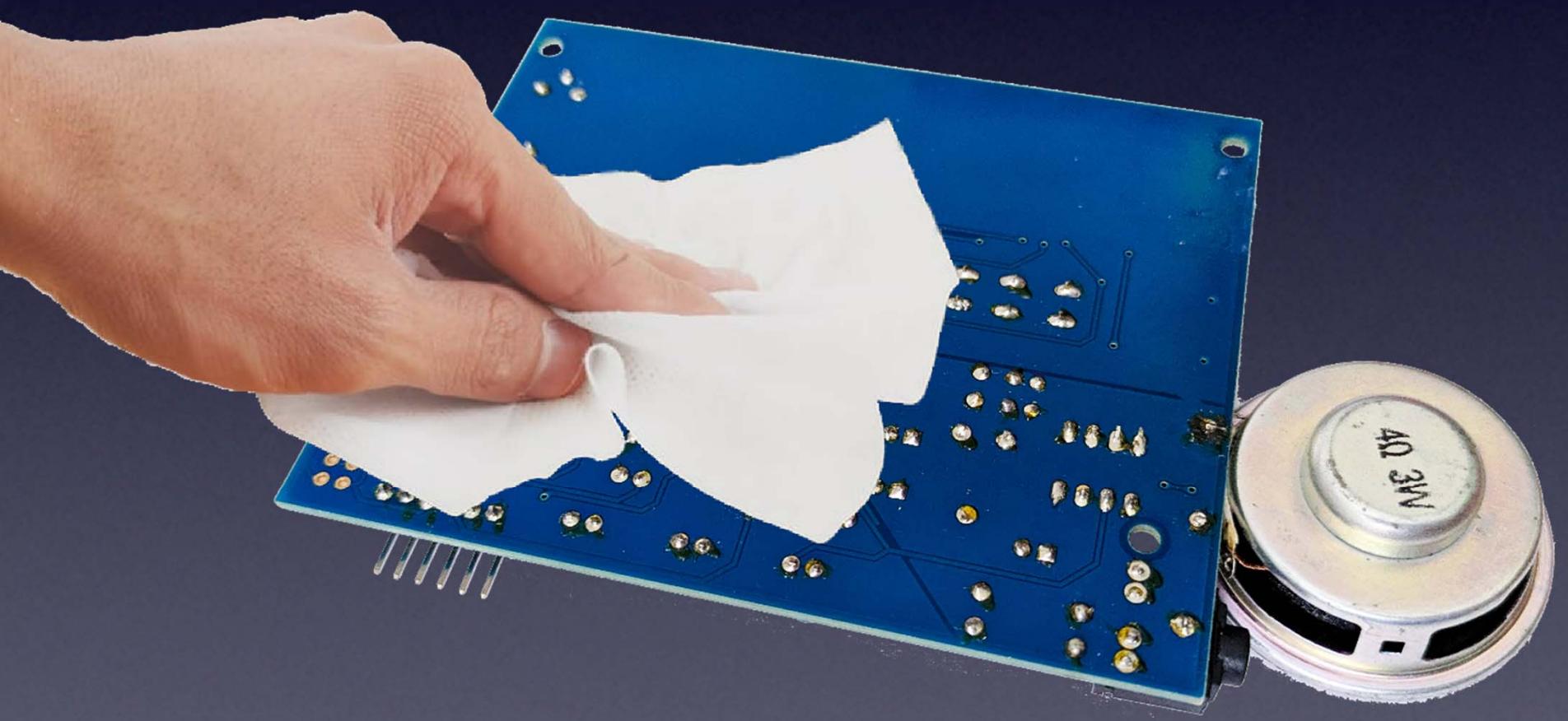


And it will look like this when you're done soldering.

If you used any ***flux paste*** for re-working problems



The bottom of the PCB will be sticky from the flux

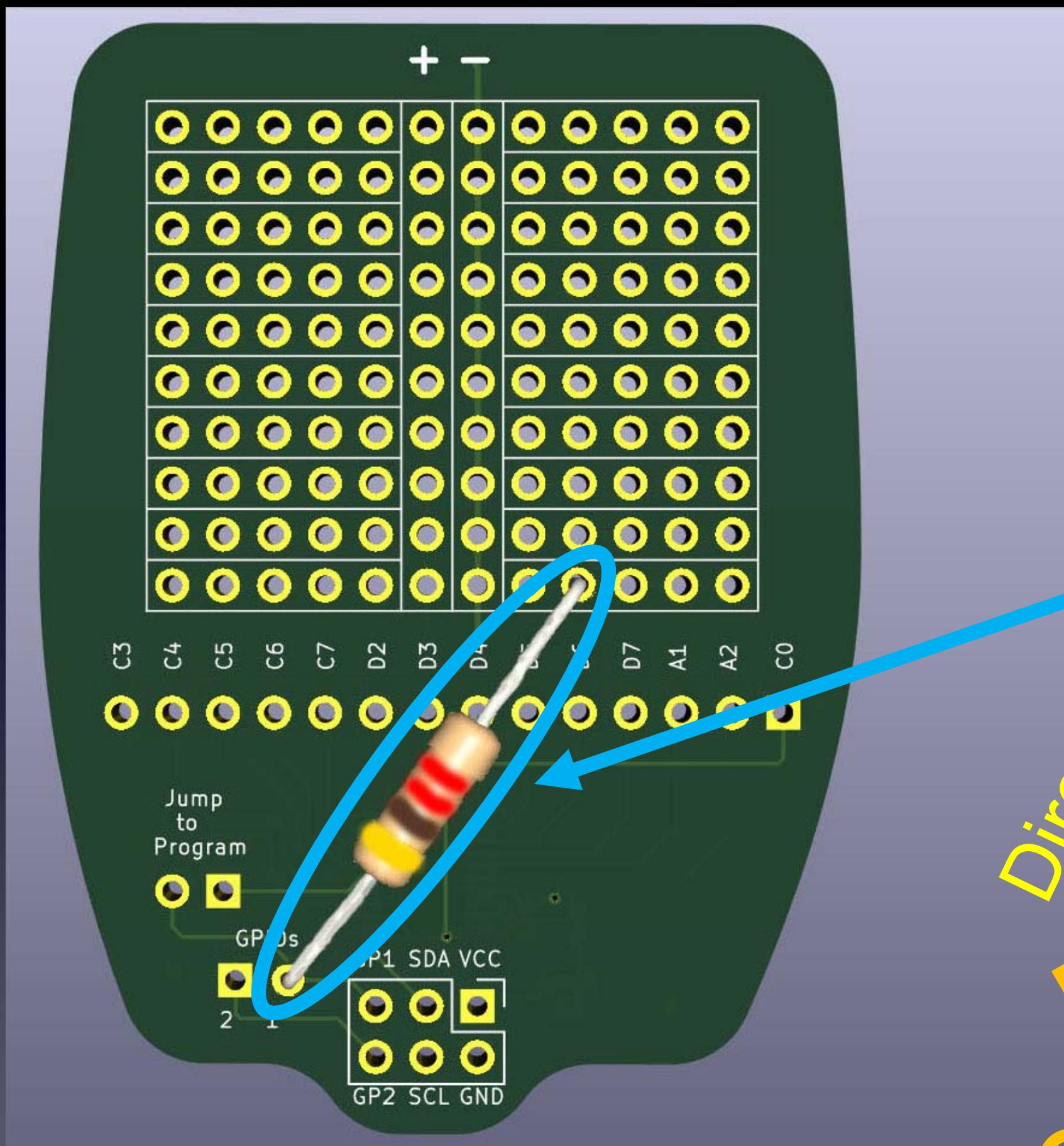


You can clean it with a cloth
wet with Isopropyl Alcohol

Then,
Power it up,
And it works!
(Or you start debugging.)

Let's start!

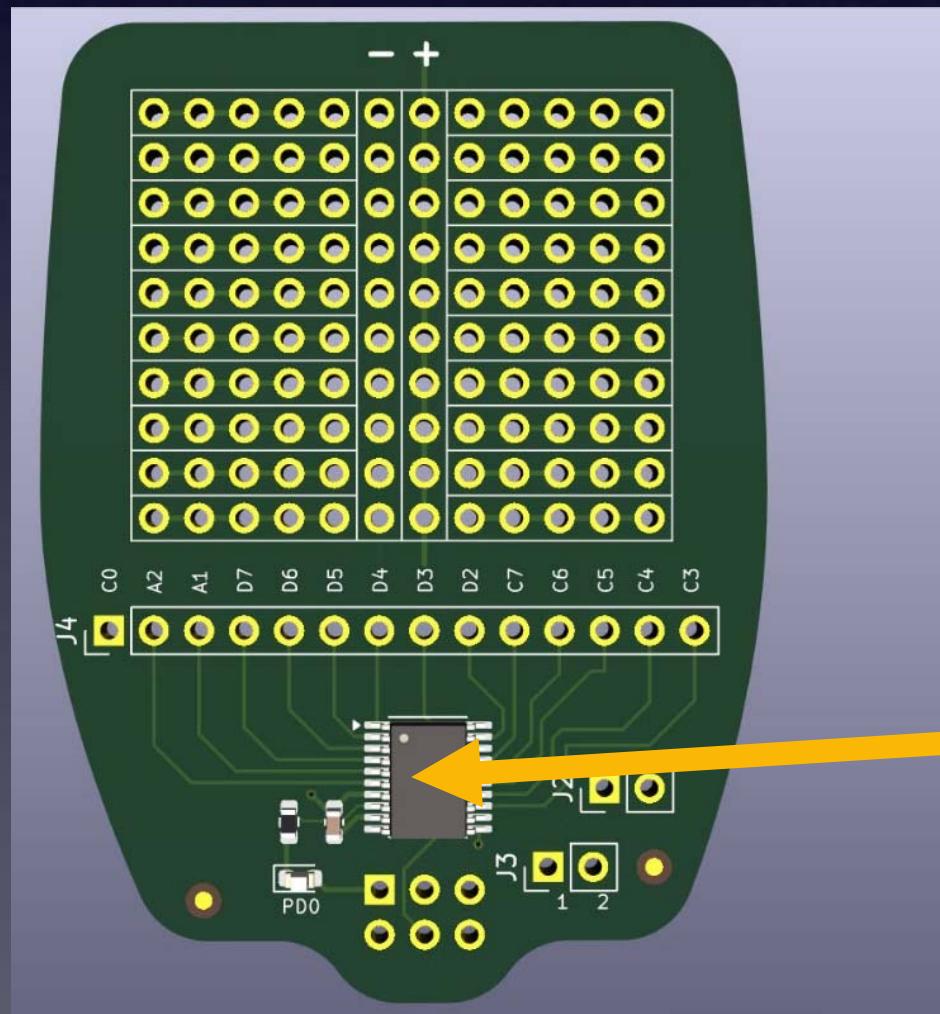
R2: Red, Red, Brown, Gold



Direction does not matter
Back of board!
(no chip)

If you haven't done so already, solder R2

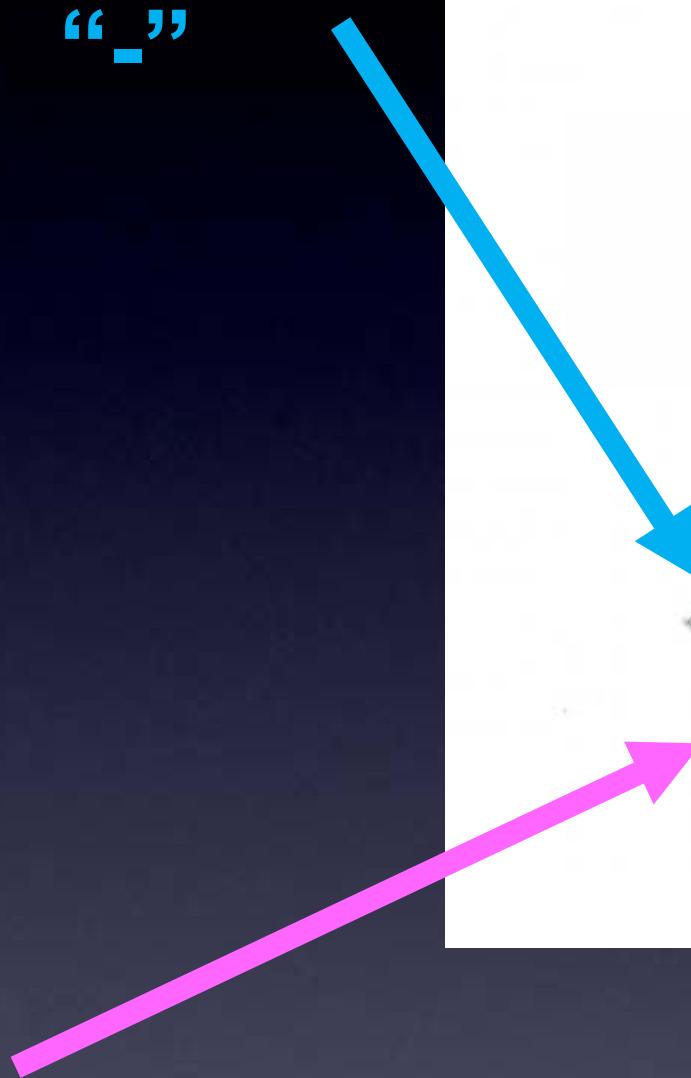
NOTE: The next part (LED D2)
is inserted into
the *Front* of the board !



(the side
with
the chip)

Short Lead

“_”



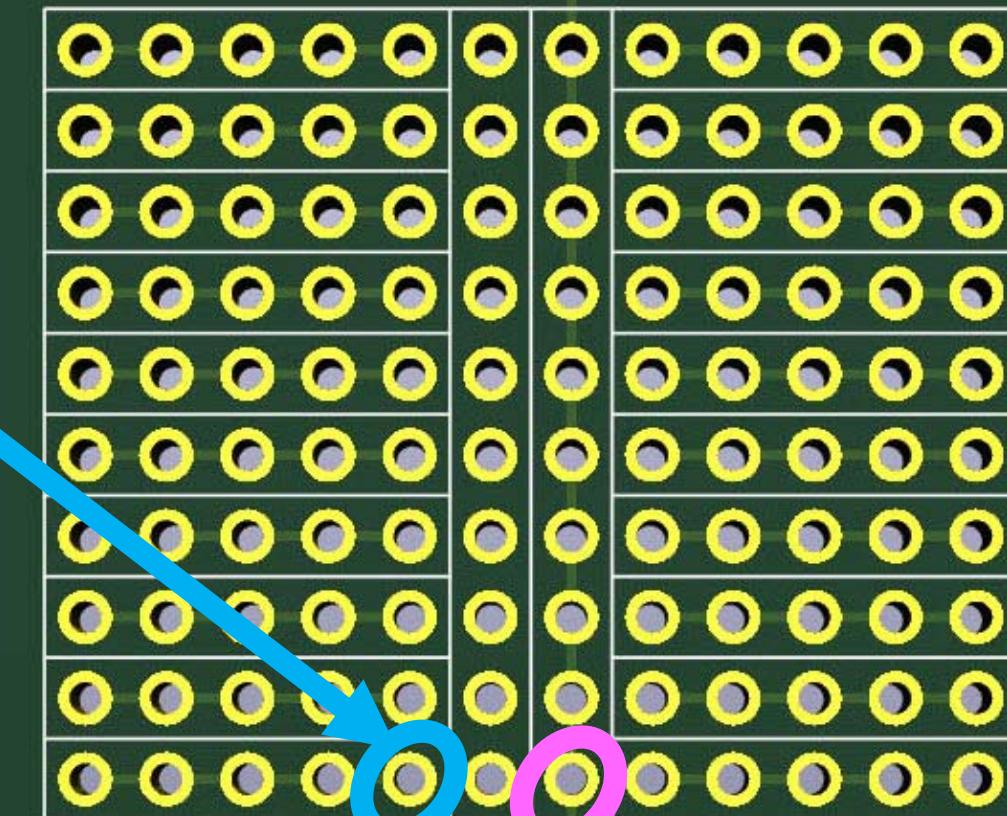
Long Lead

“+”

D2

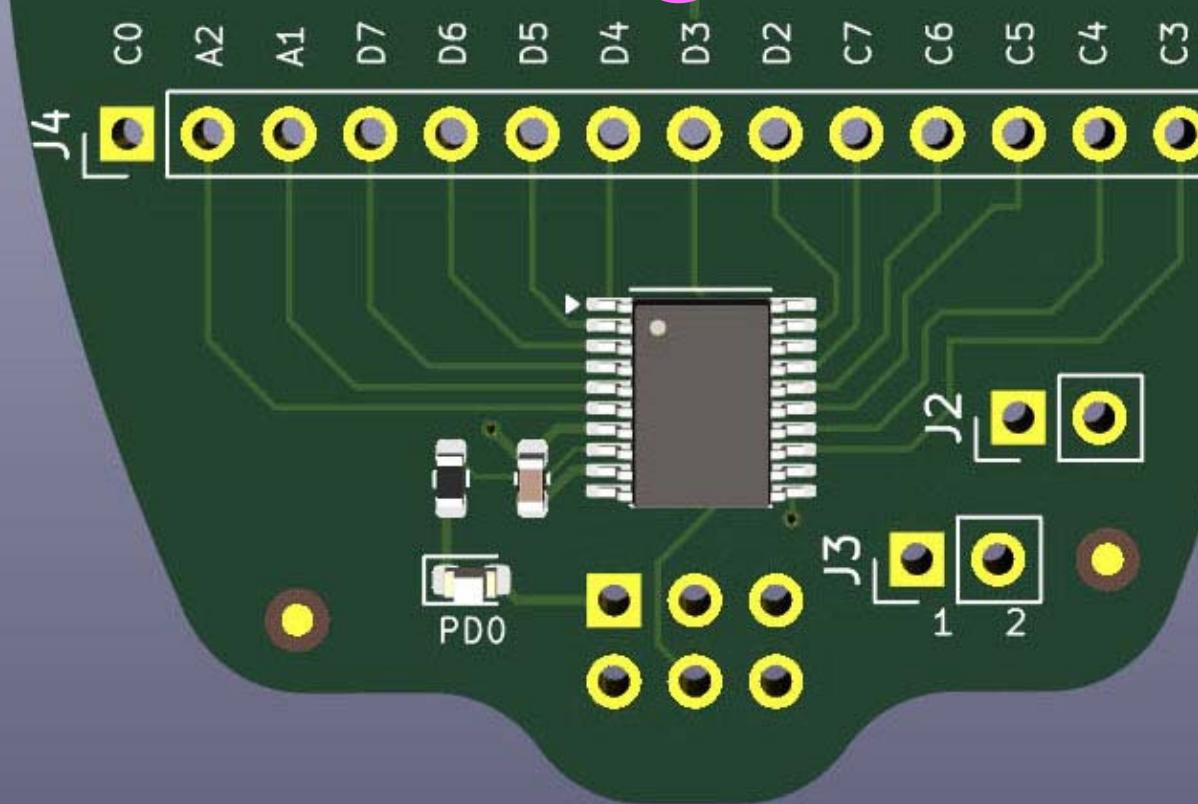
Short Lead

" - "



Long Lead

" + "



D2 - this is where it goes

**Front
of board!
(chip side)**

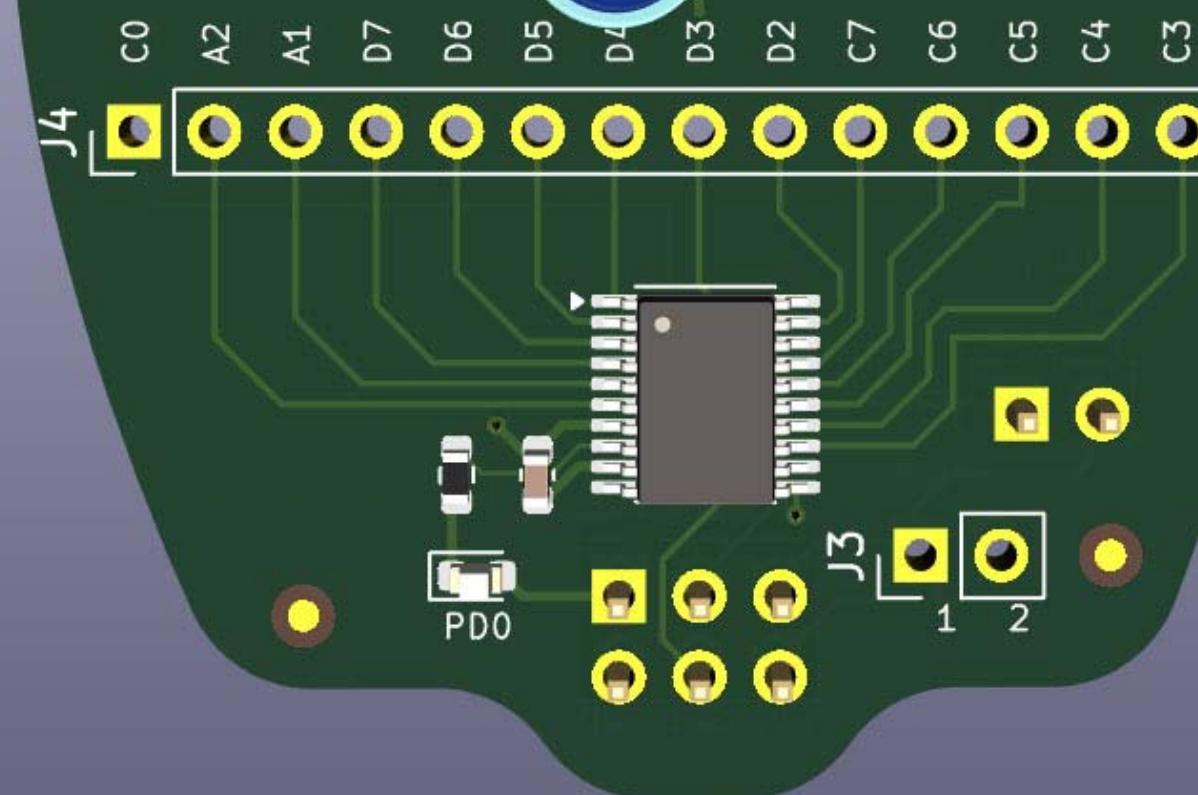
Short Lead

" - "



Long Lead

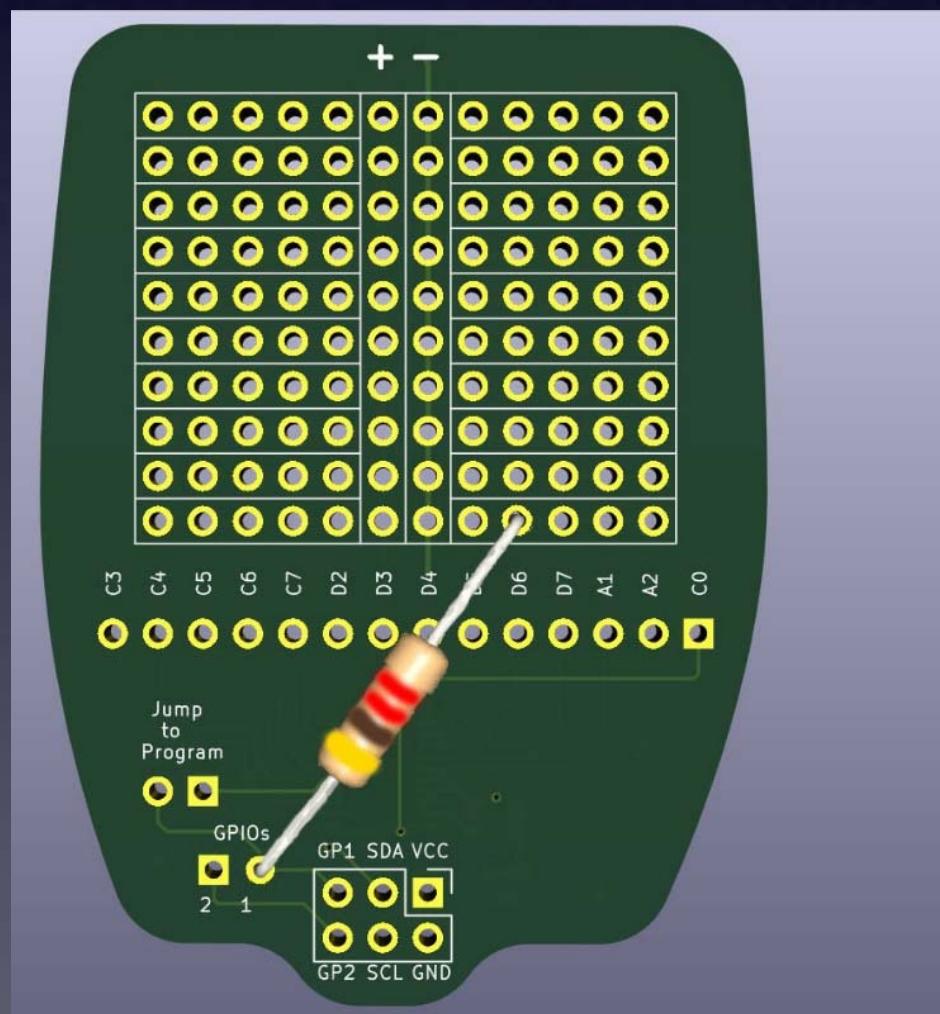
" + "



D2 – this is where it goes

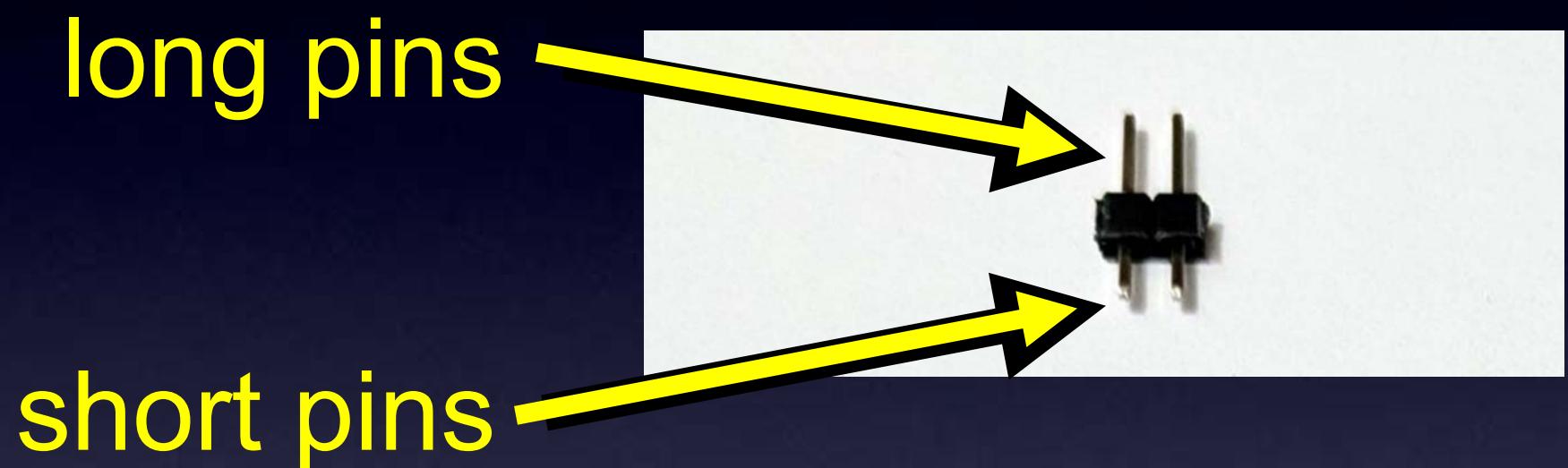
**Front
of board!
(chip side)**

**NOTE: All of the remaining parts
are inserted into
the back of the board !**



(the side
with
no chip)

Header Pins



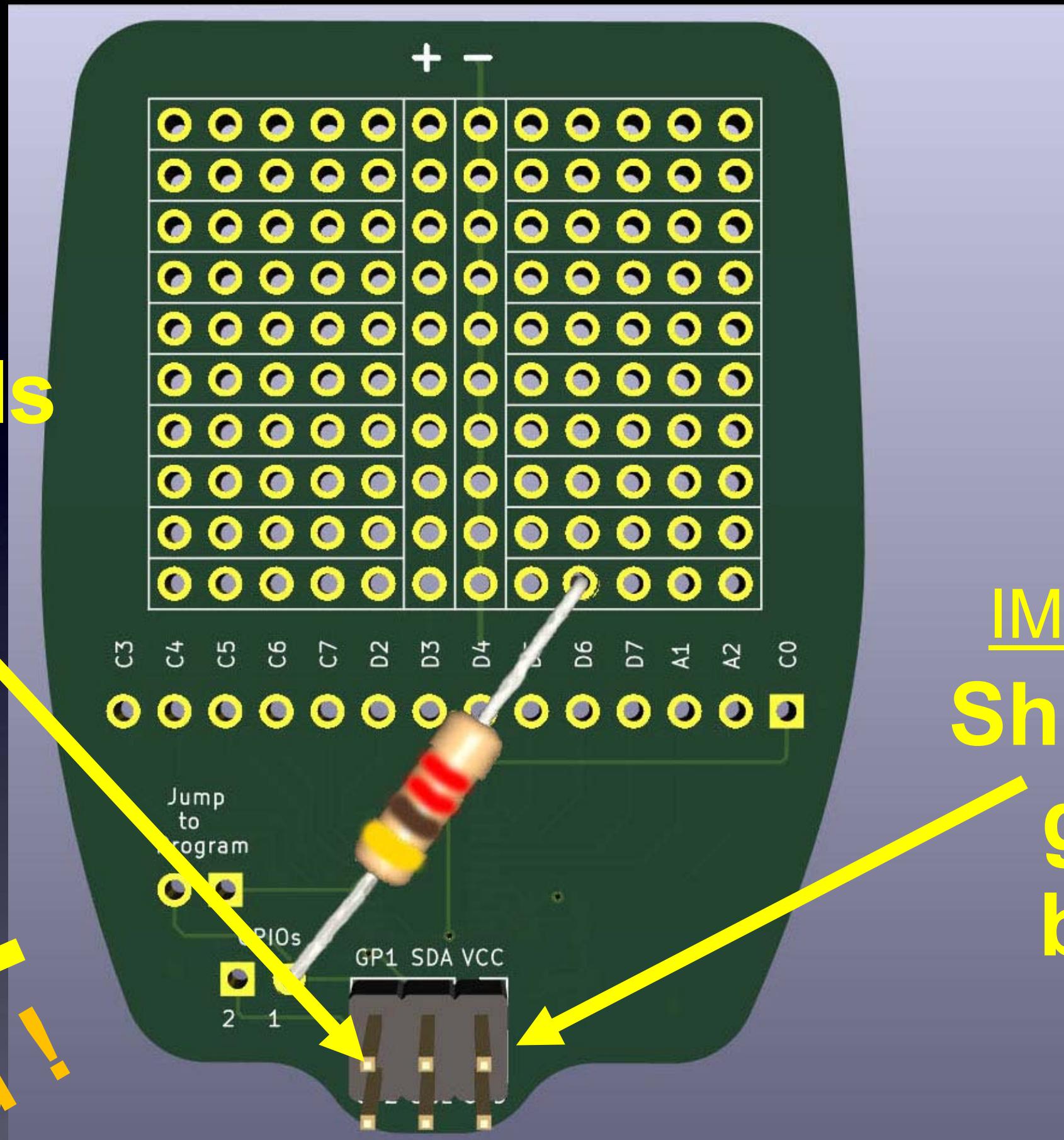
IMPORTANT:
**Short leads
go into
board !**

I2C connector

&
J2
&
M1

**Long leads
sticking
out**

**Back
of board !
(no chip)**

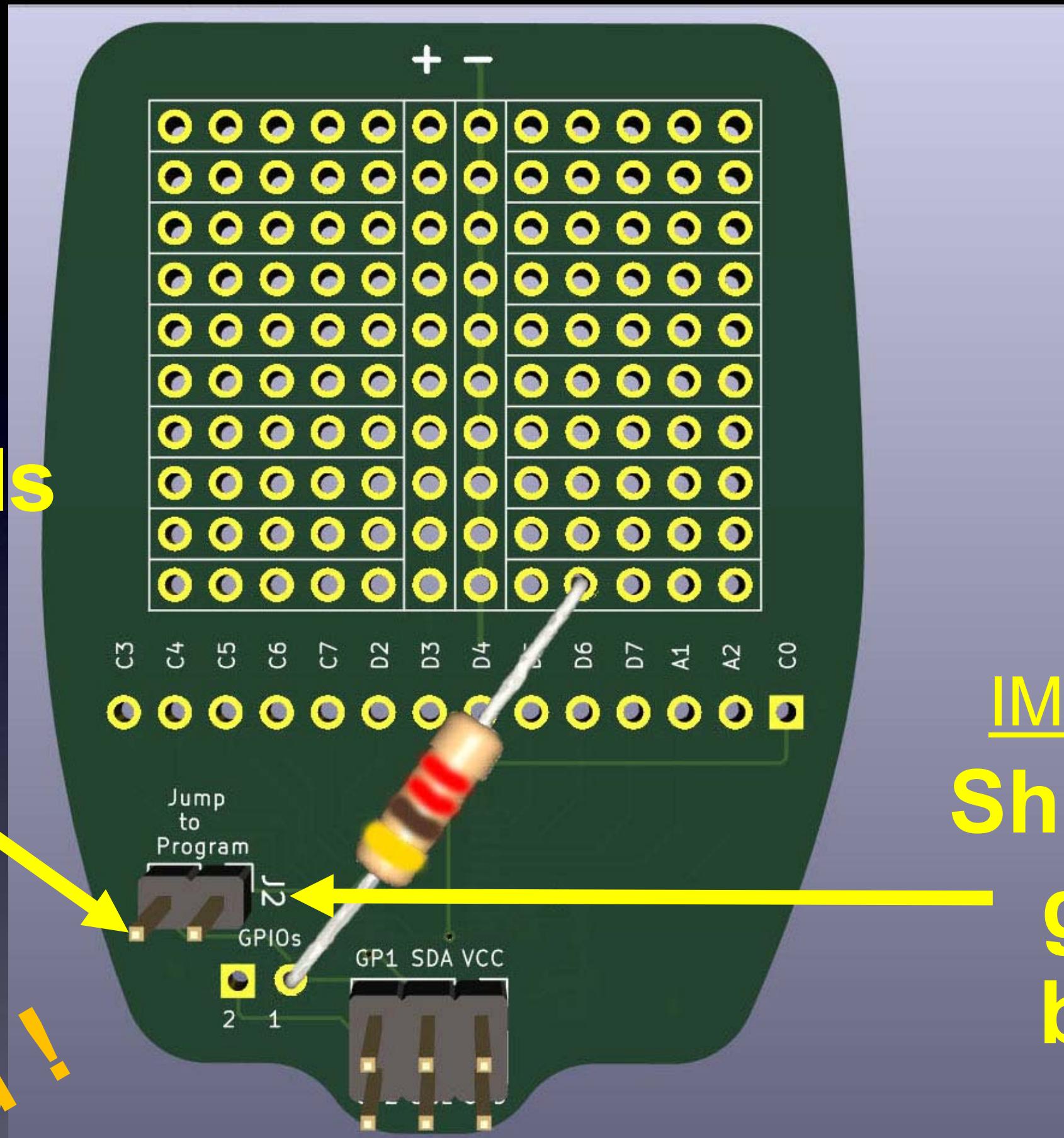


IMPORTANT:
**Short leads
go into
board !**

I2C connector

**Long leads
sticking
out**

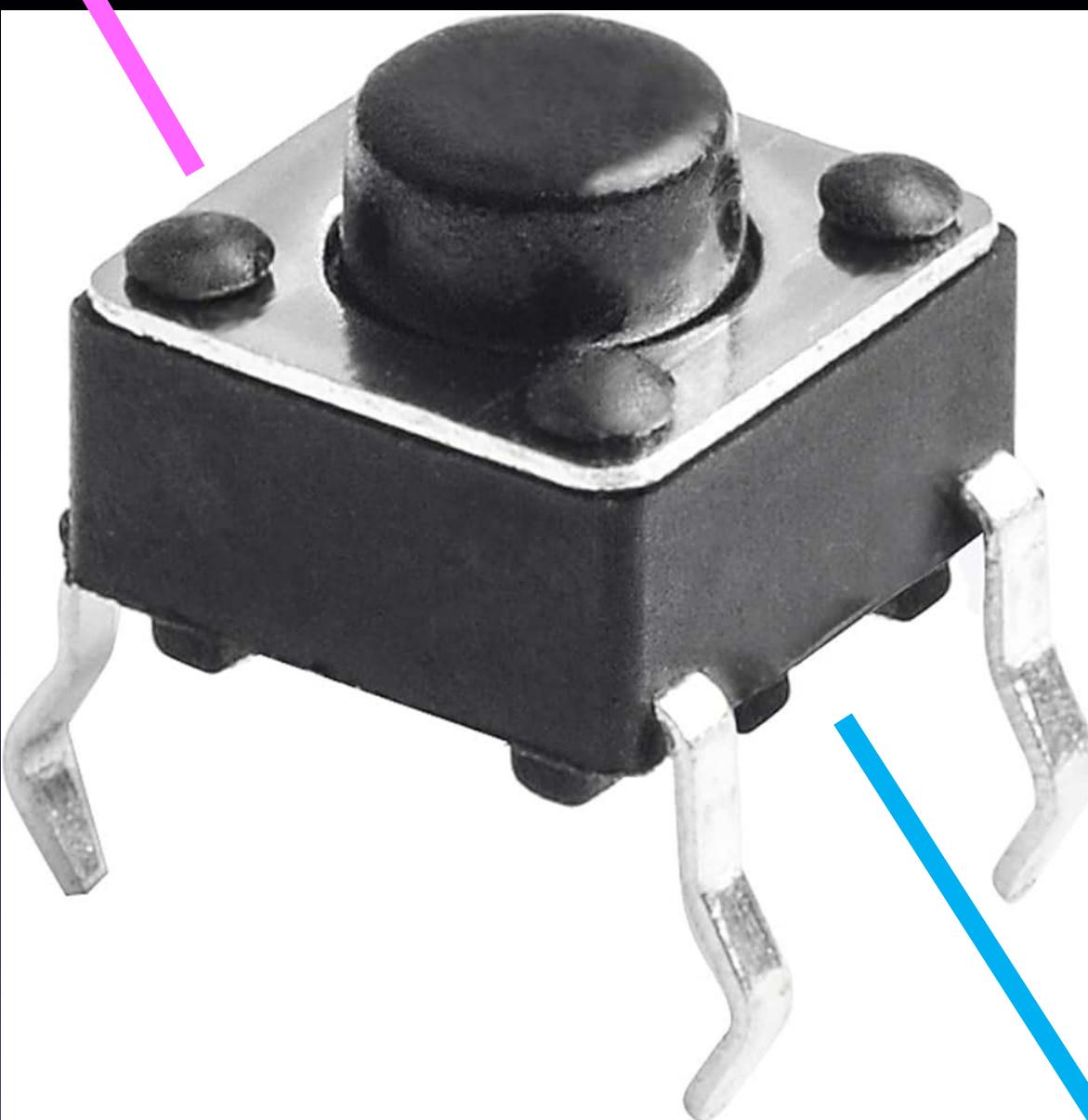
**Back
of board !
(no chip)**



J2

IMPORTANT:
**Short leads
go into
board !**

Left side leads



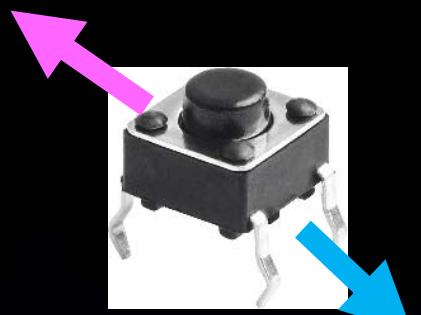
NOTE:

This part
is not
symmetrical

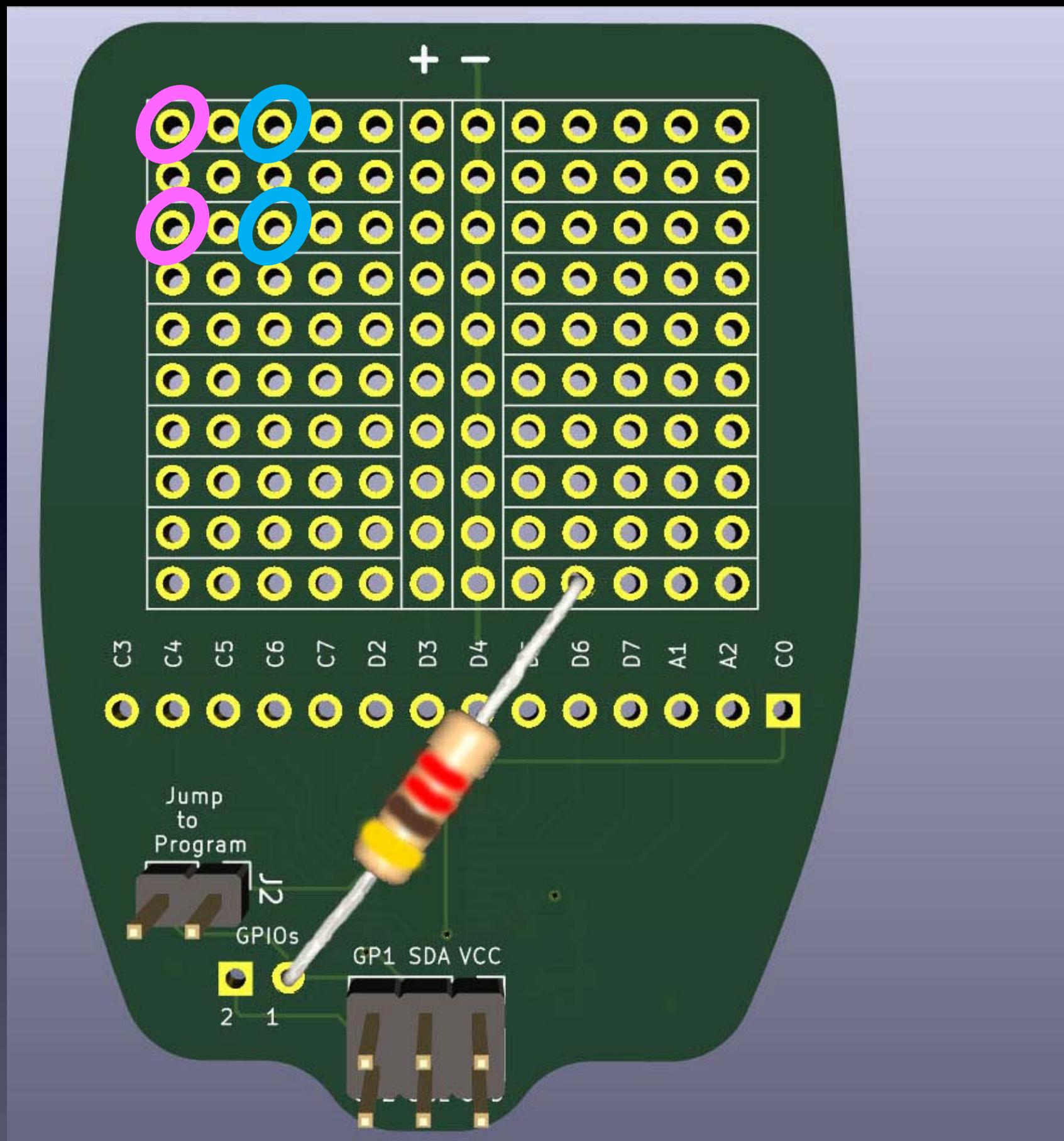
Right side leads

SW1

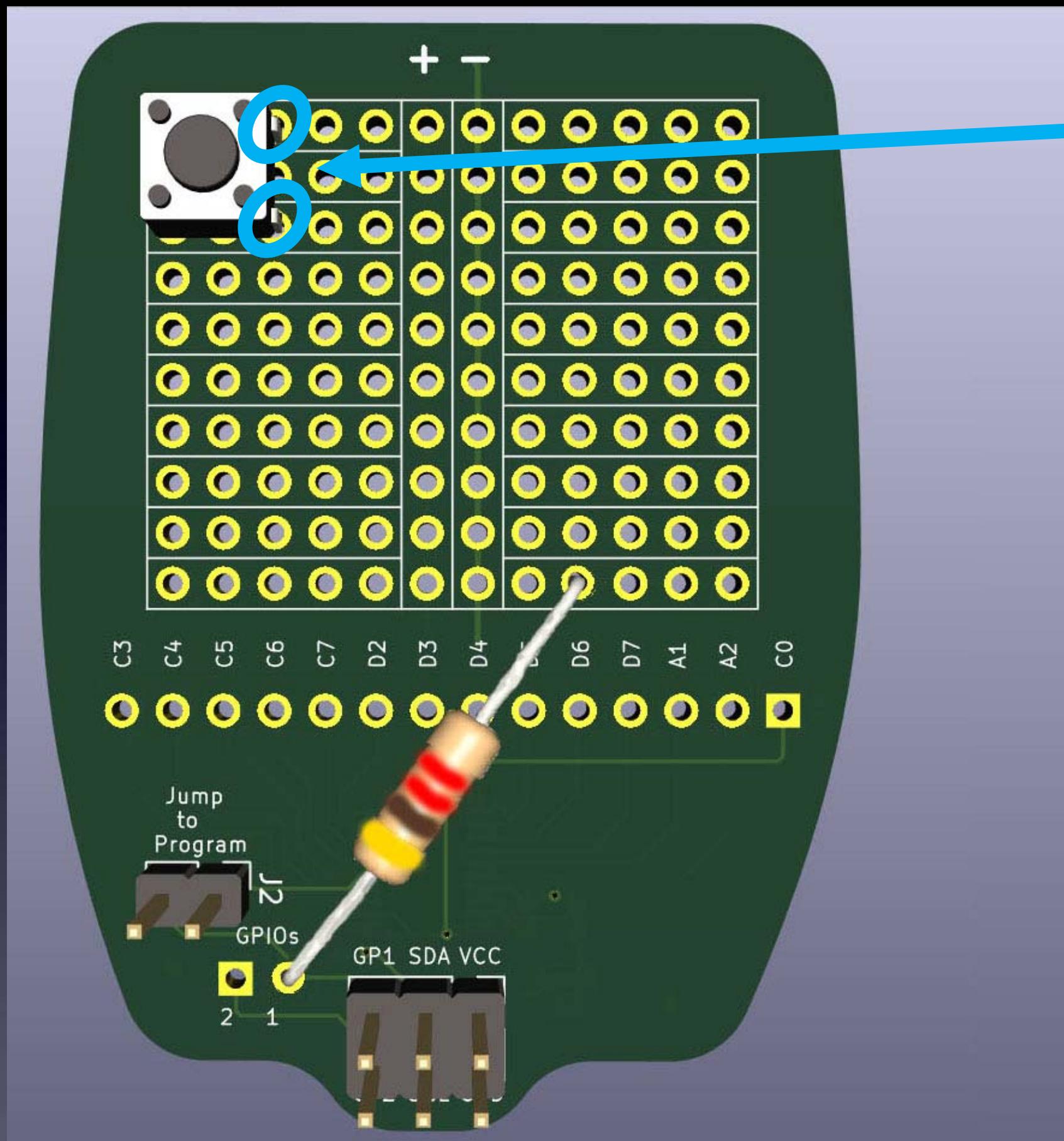
Left side leads



Right side leads



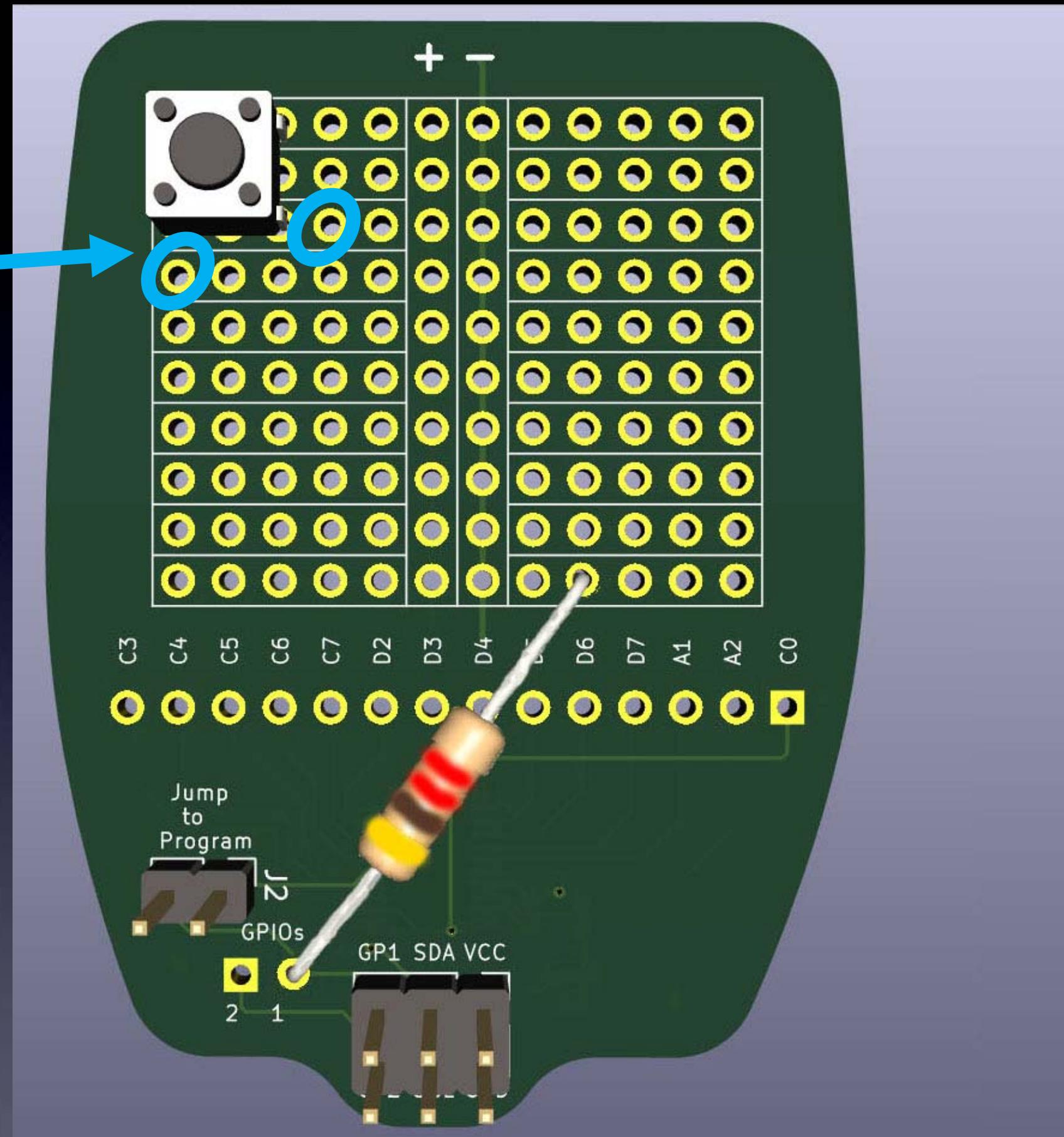
SW1



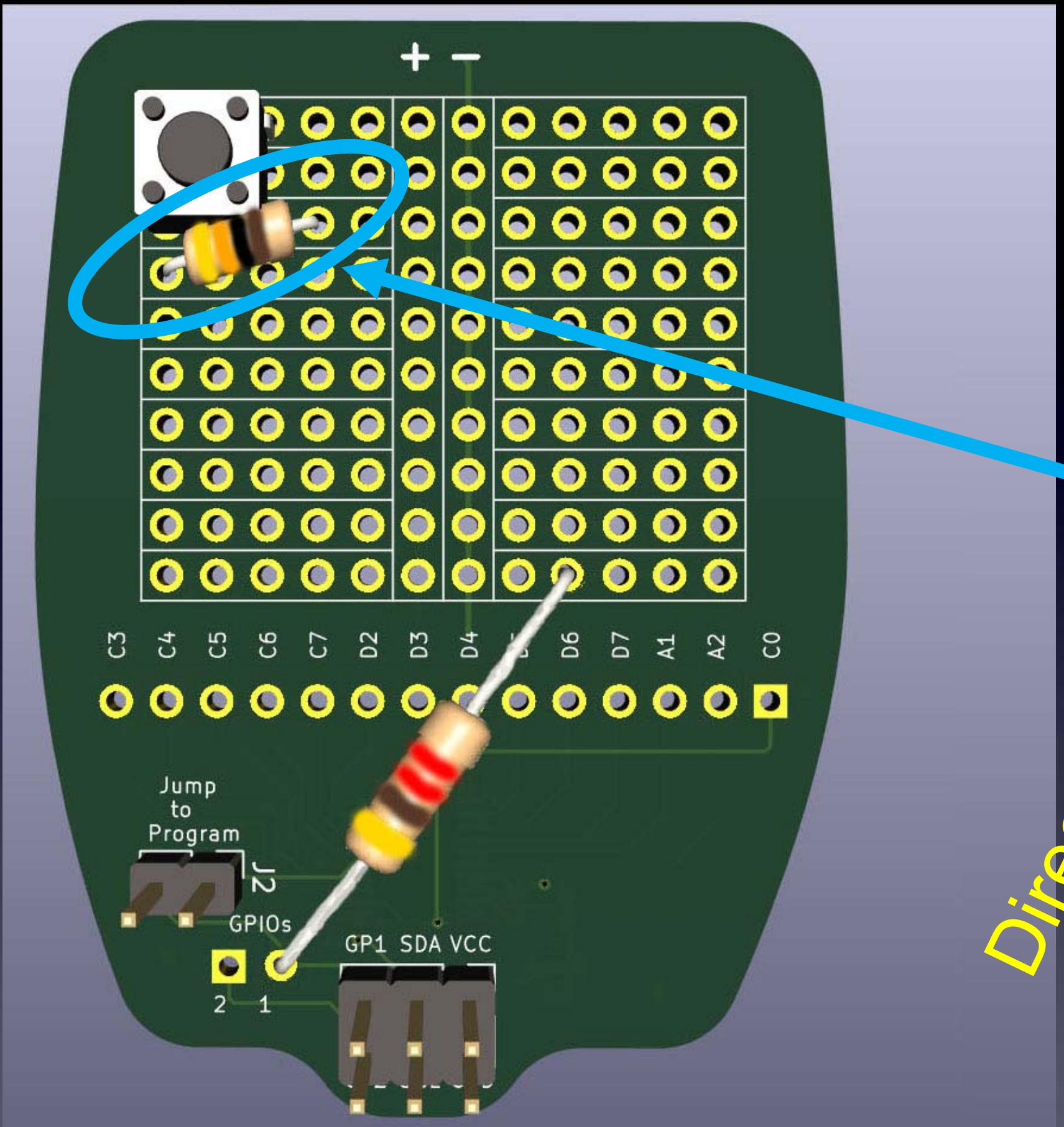
SW1

You can
see the
Right side
leads here

R3:
Pads
to use



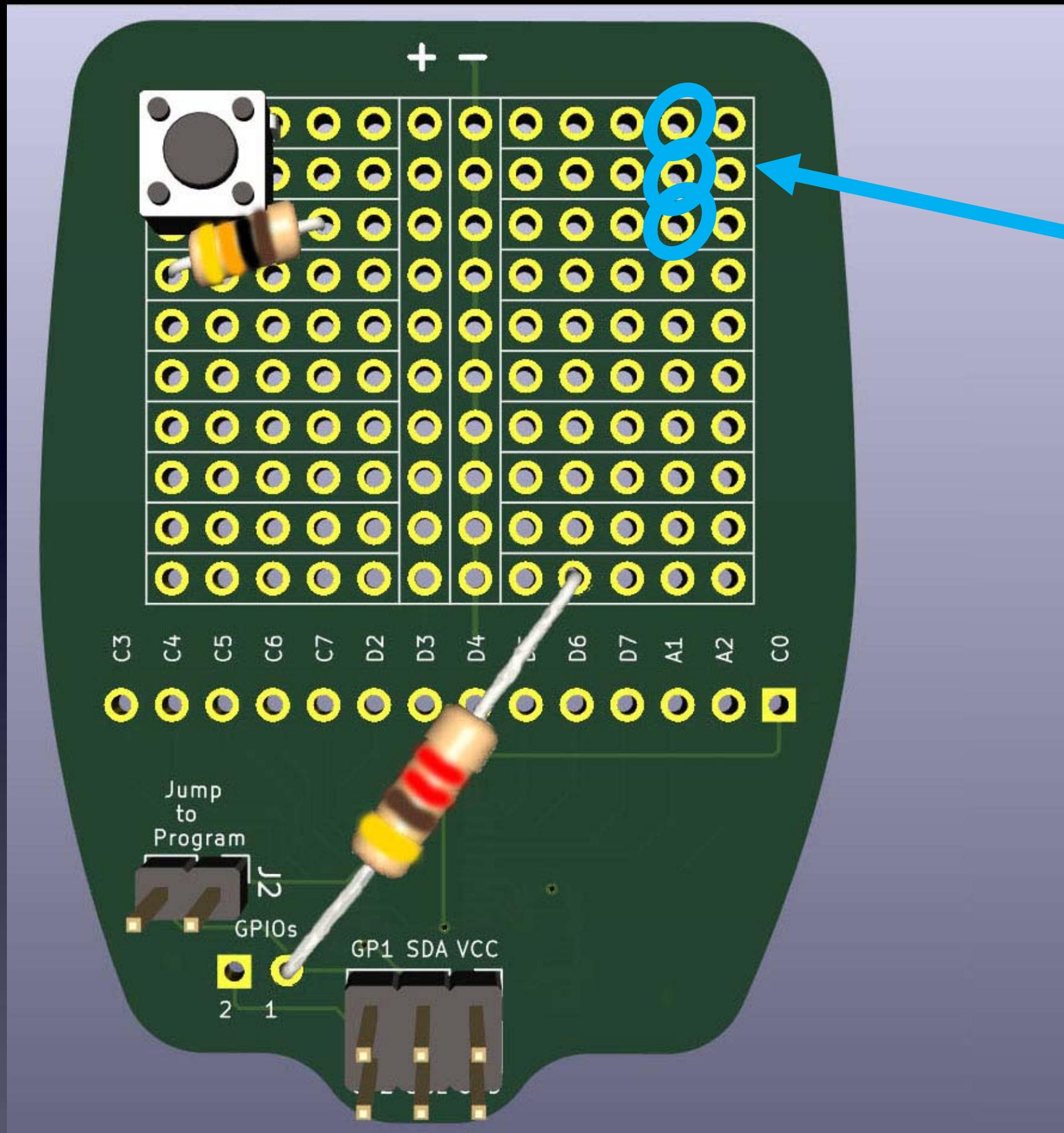
R3



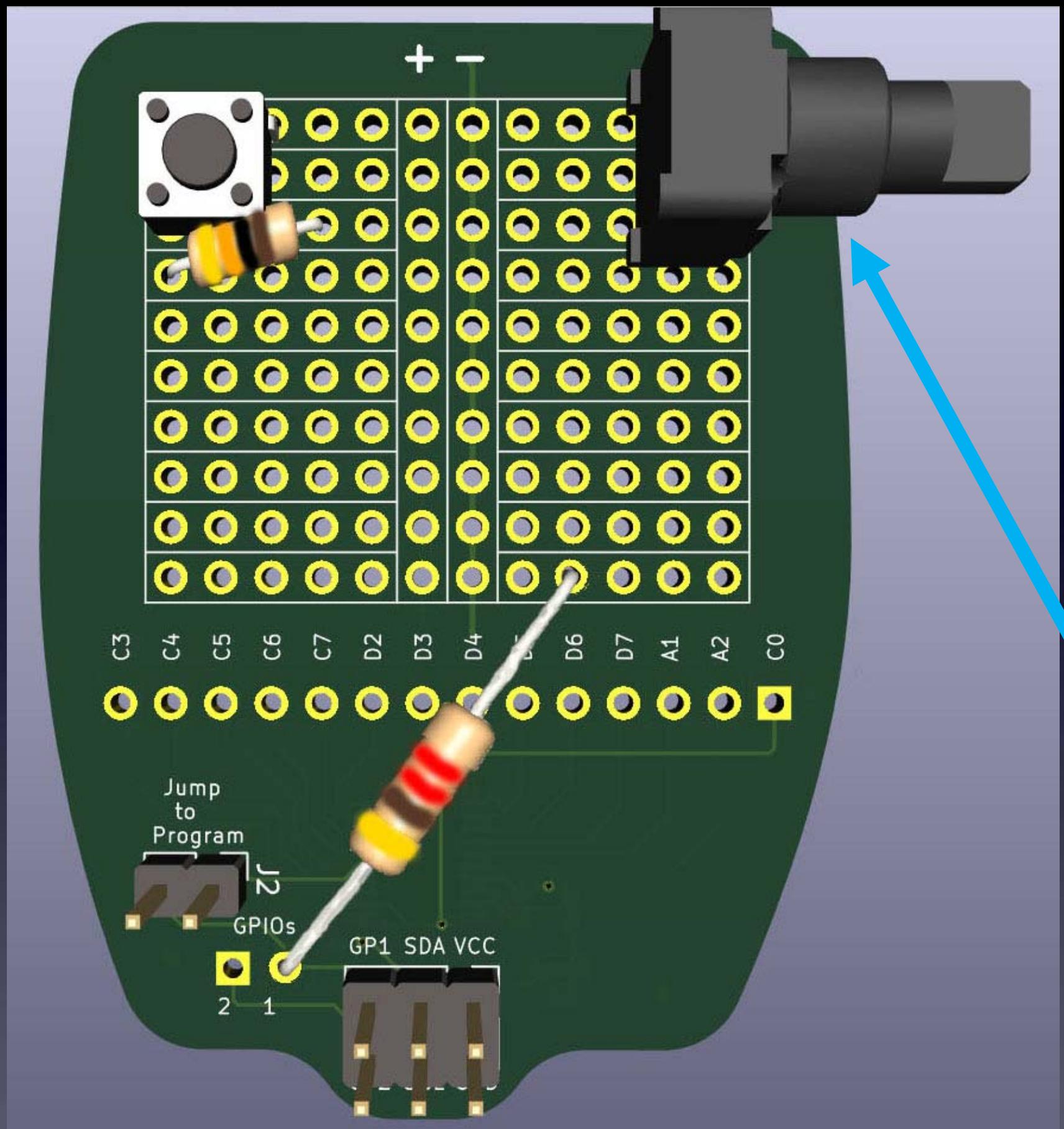
Direction does not matter

R3: Brown, Black, Orange, Gold

RV1:
Pads
to use

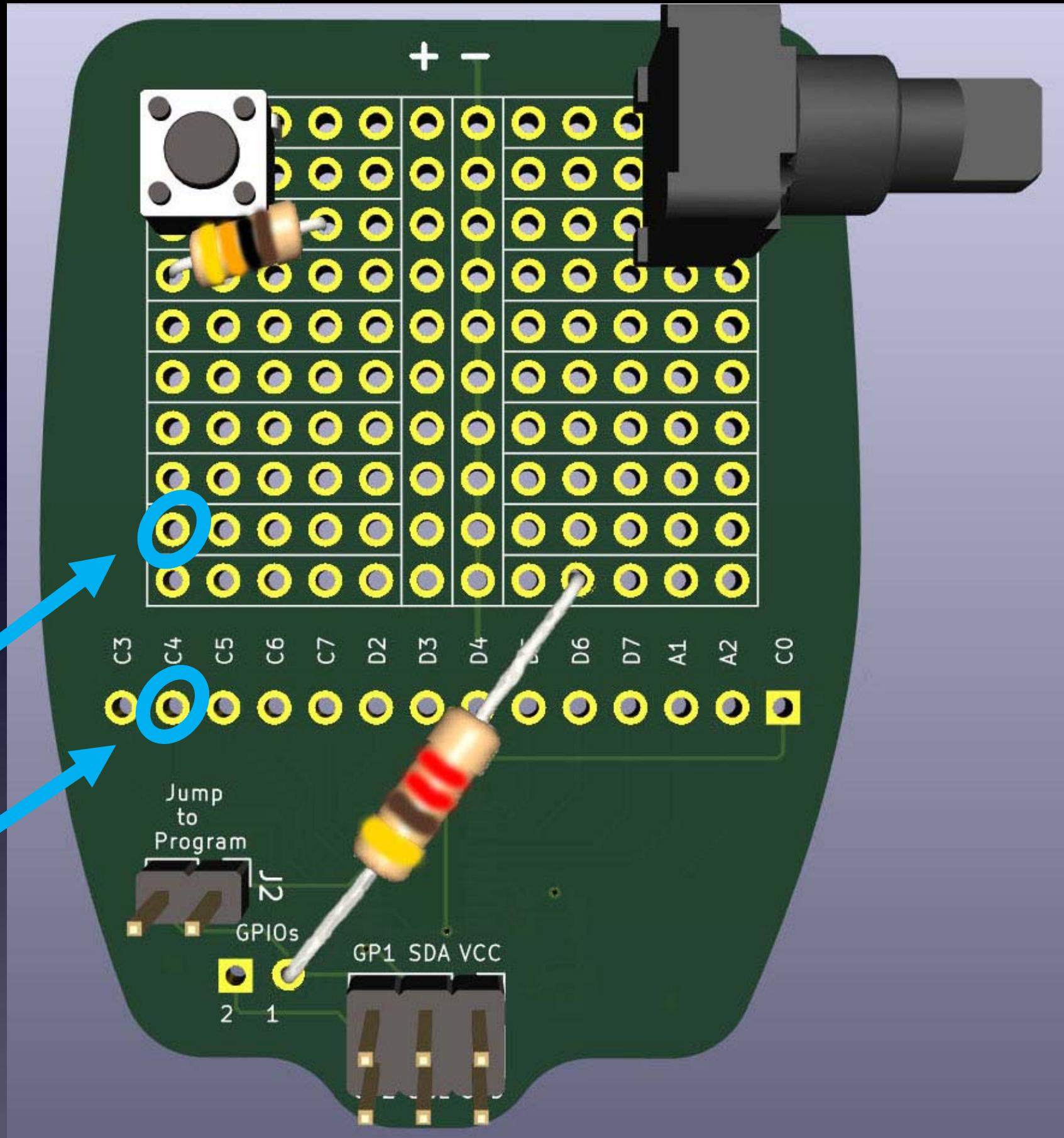


RV1



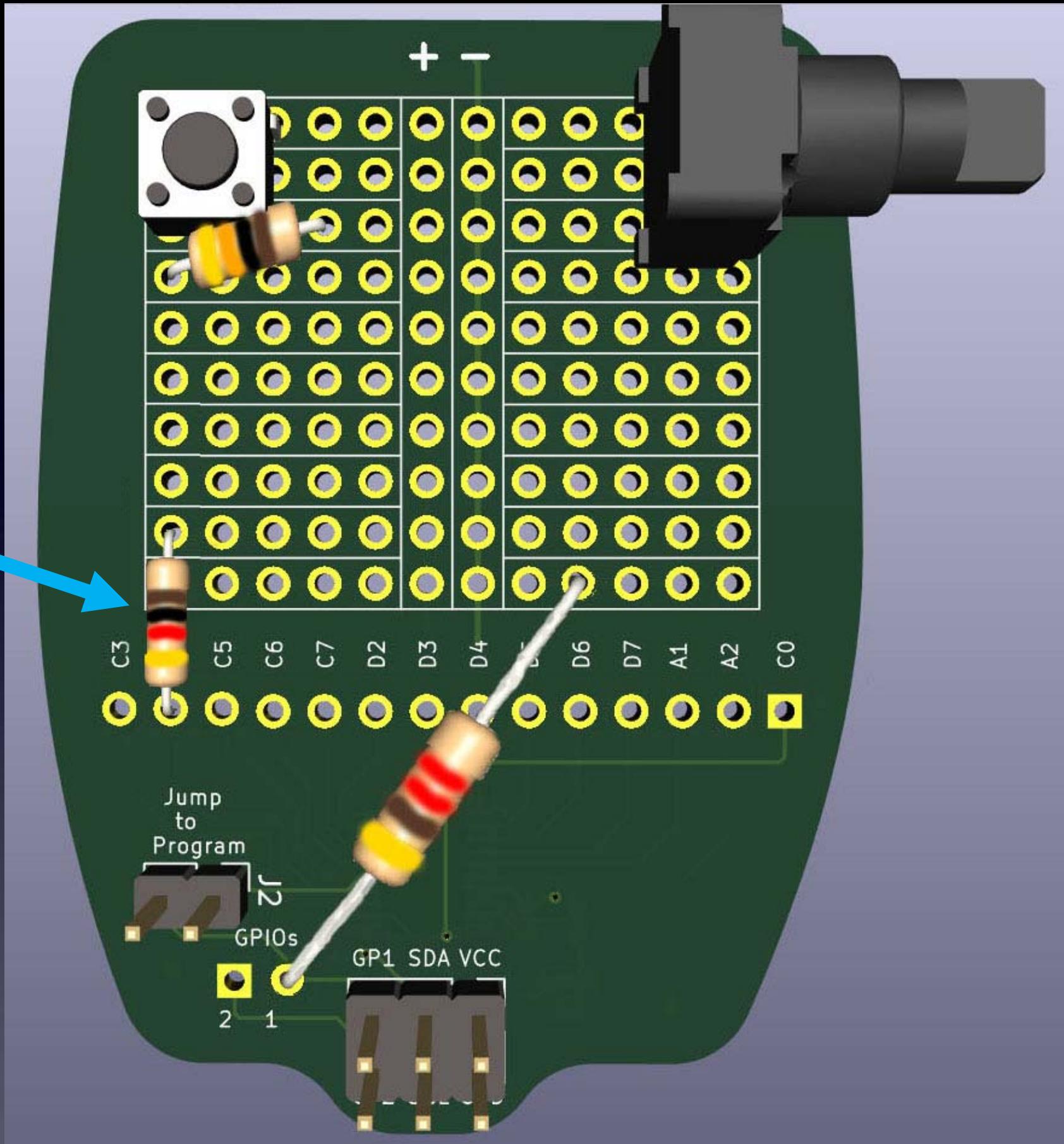
RV1

R4:
Pads
to use



R4

Direction does not matter



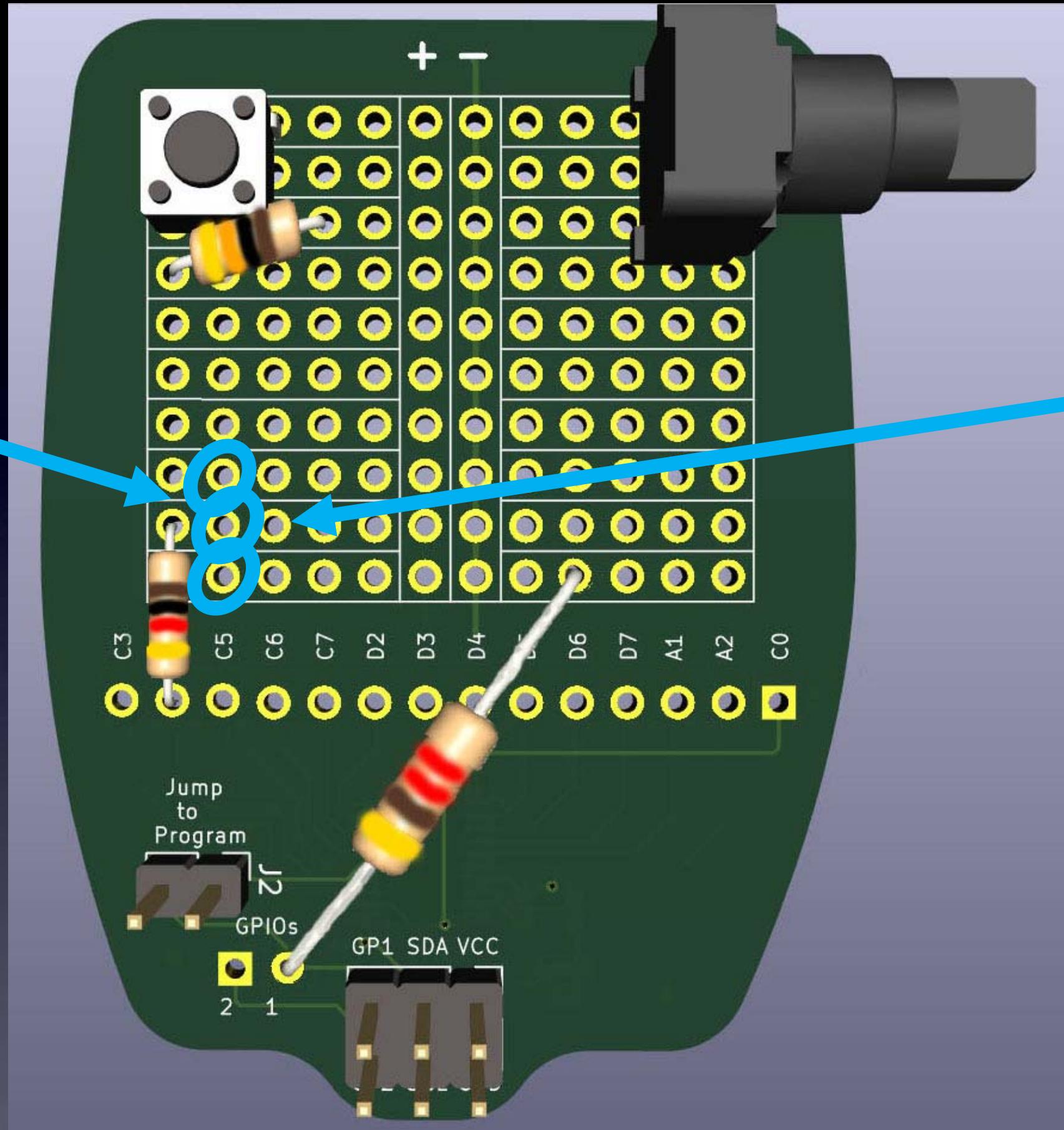
R4: Brown, Black, Red, Gold

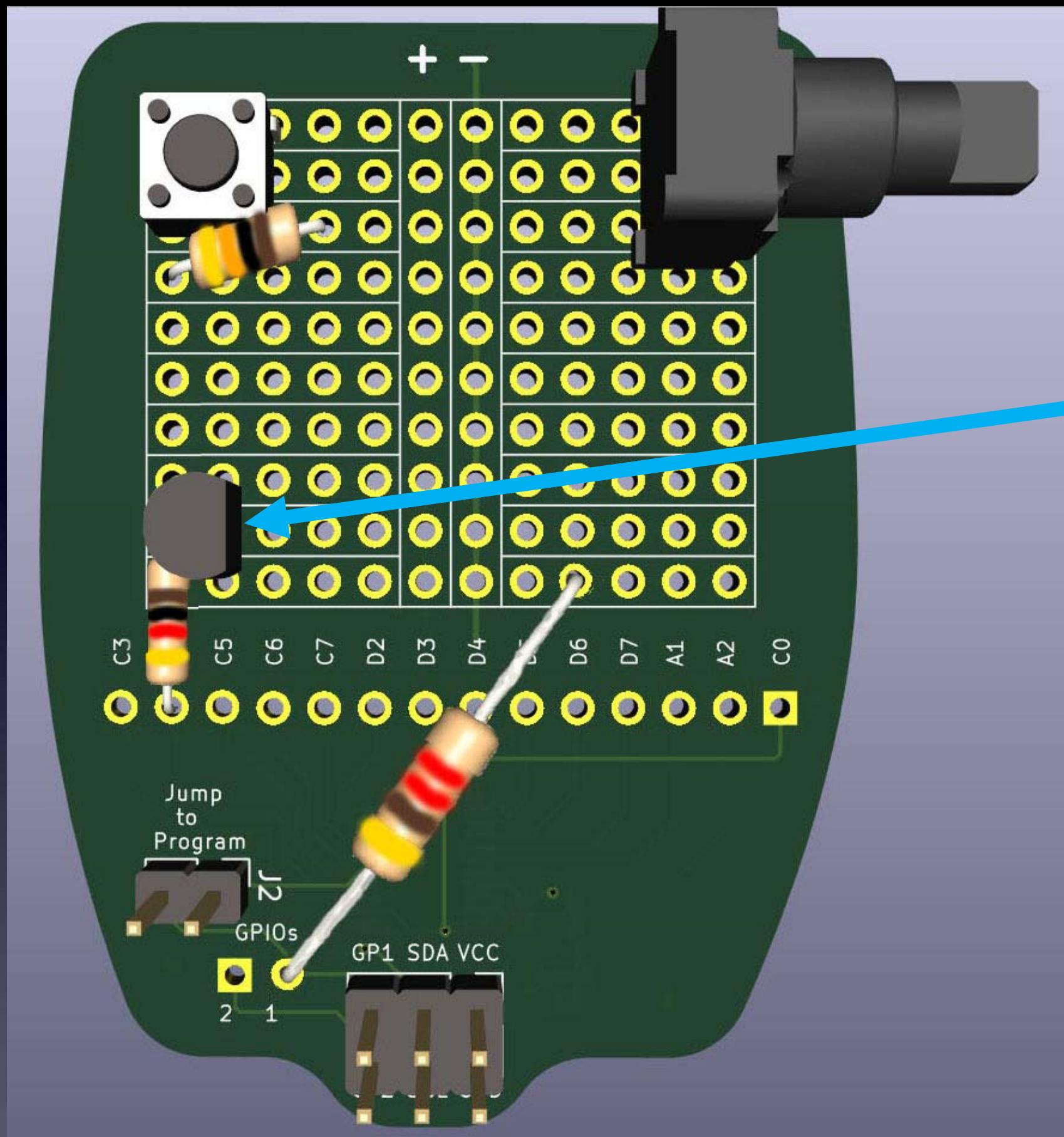
Flat side



Q1

Q1:
Pads
to use

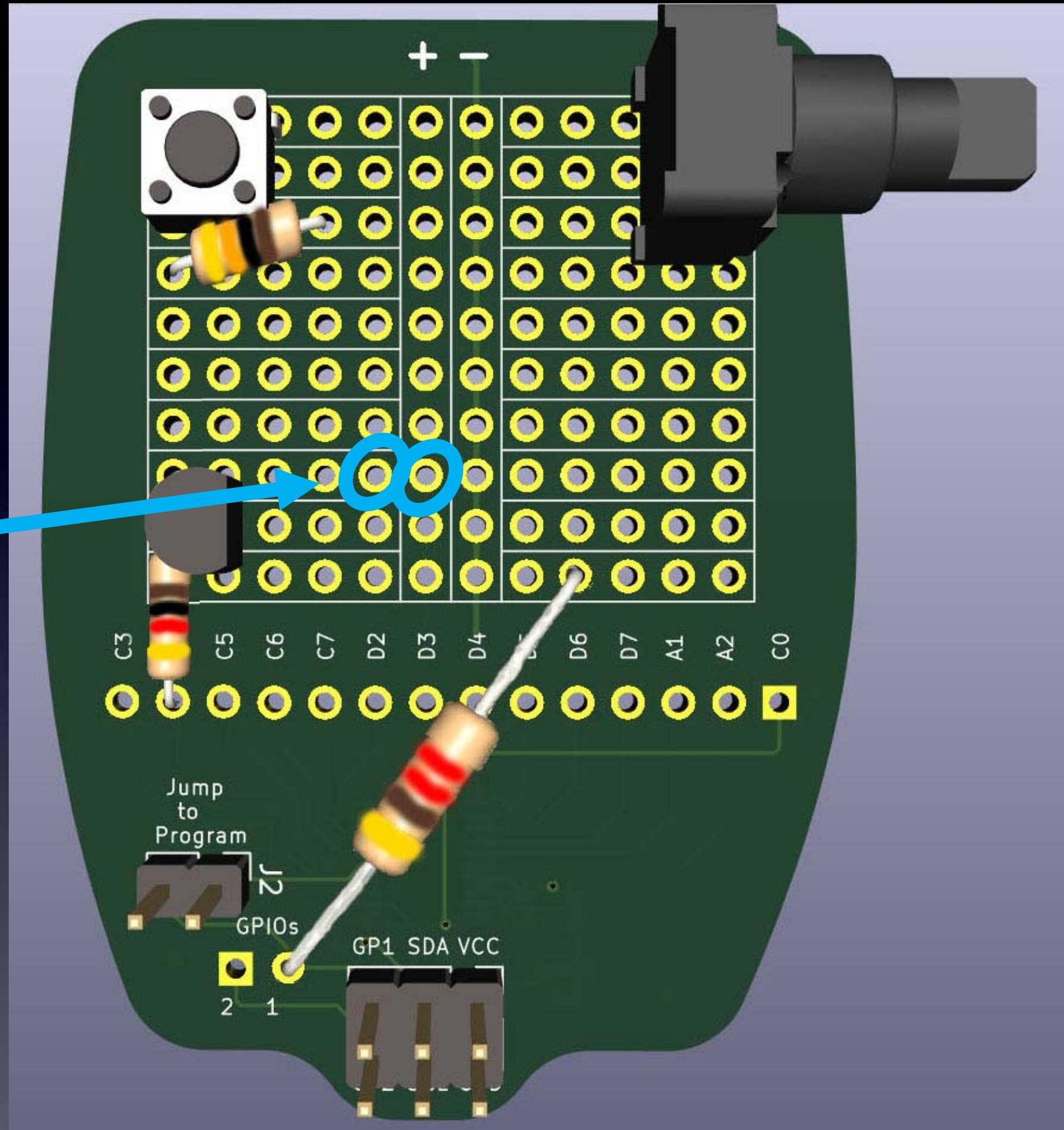




Q1

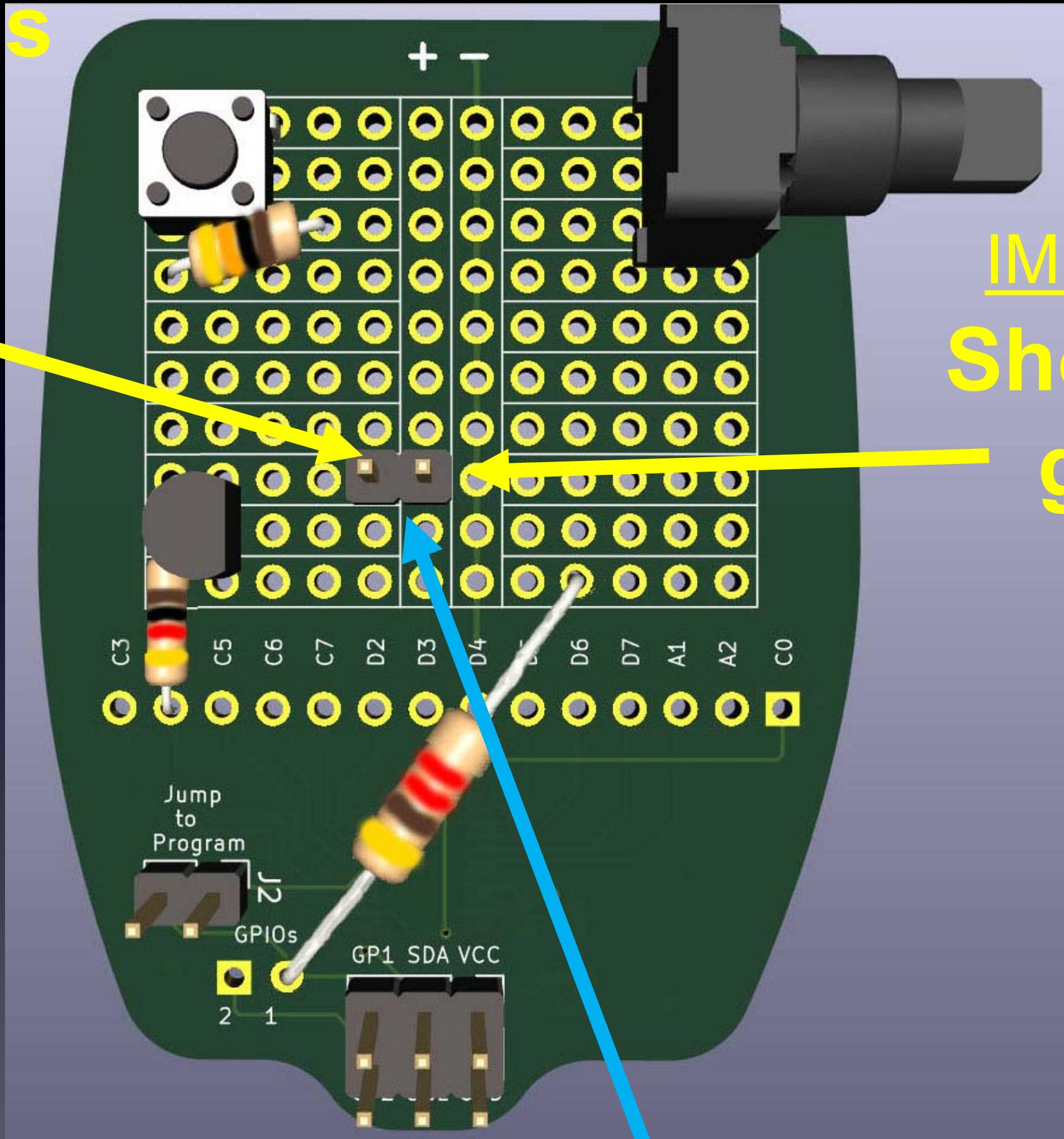
Flat side !

M1:
Pads
to use



M1

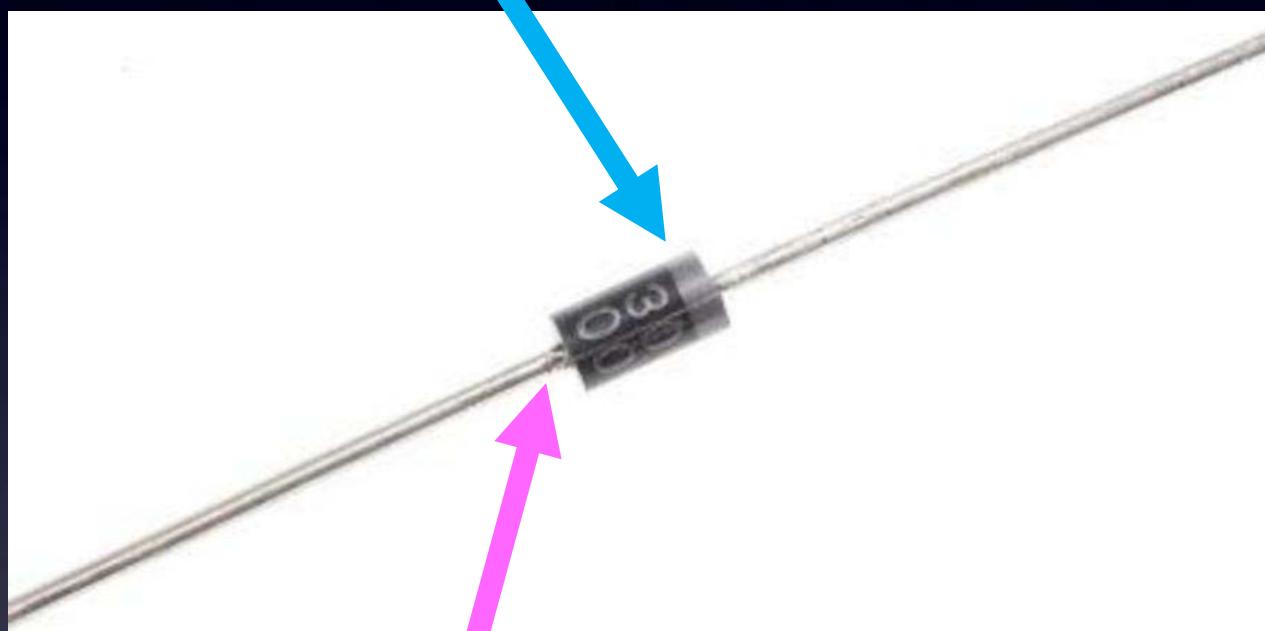
**Long leads
sticking
out**



IMPORTANT:
**Short leads
go into
board**

M1

“-” side



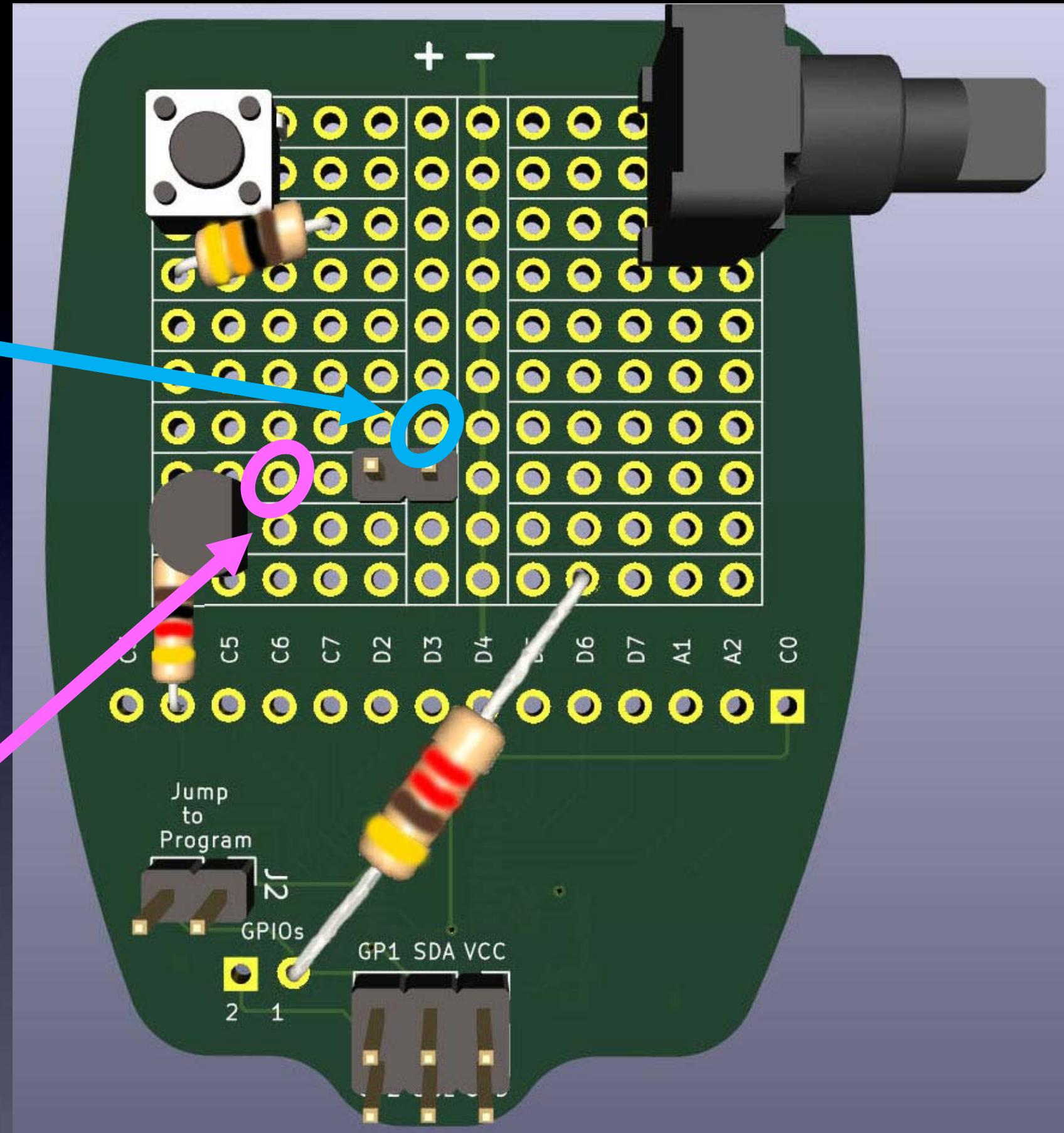
“+” side

D3

"-" side

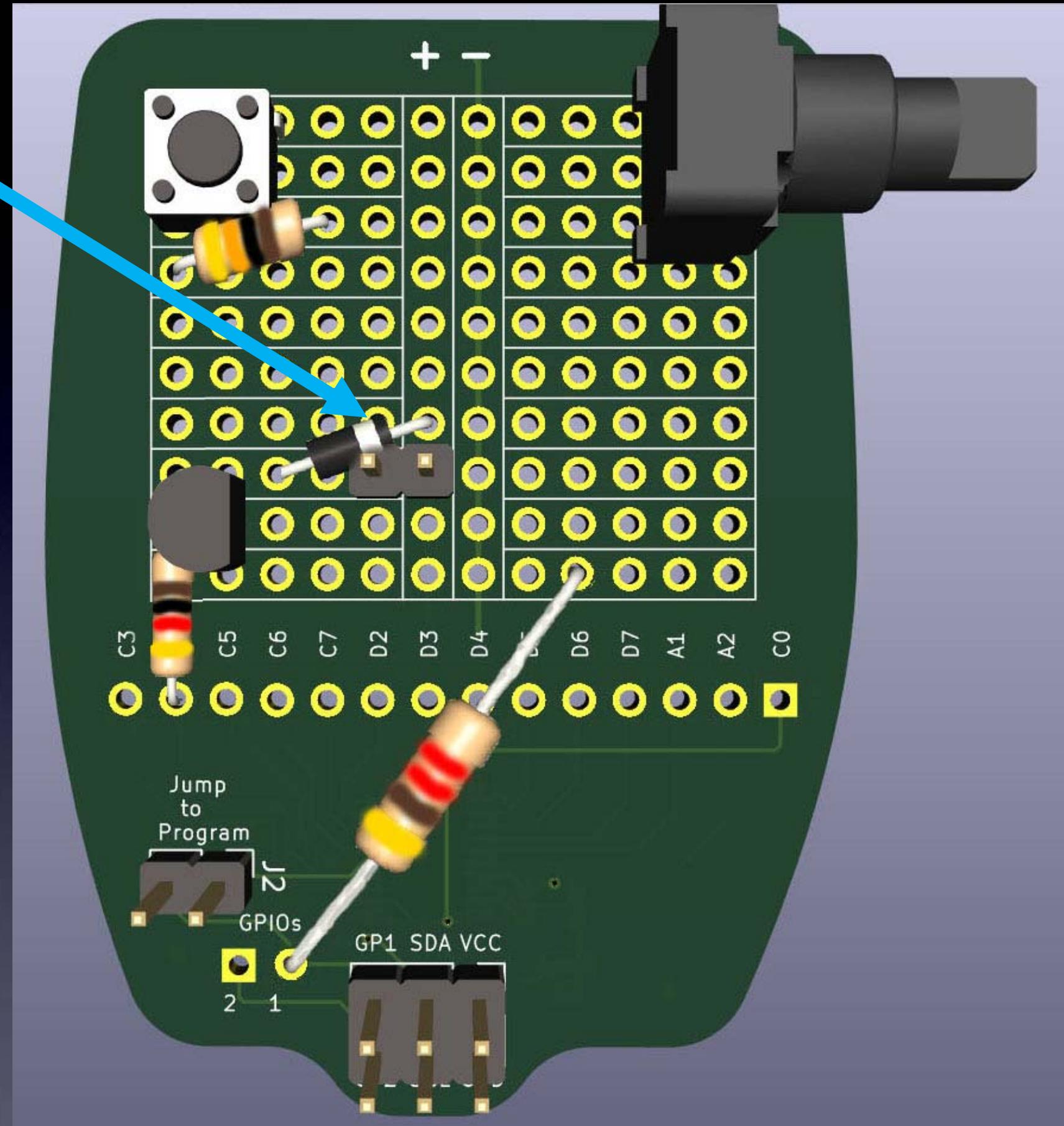
D3:
Pads
to use

“+” side

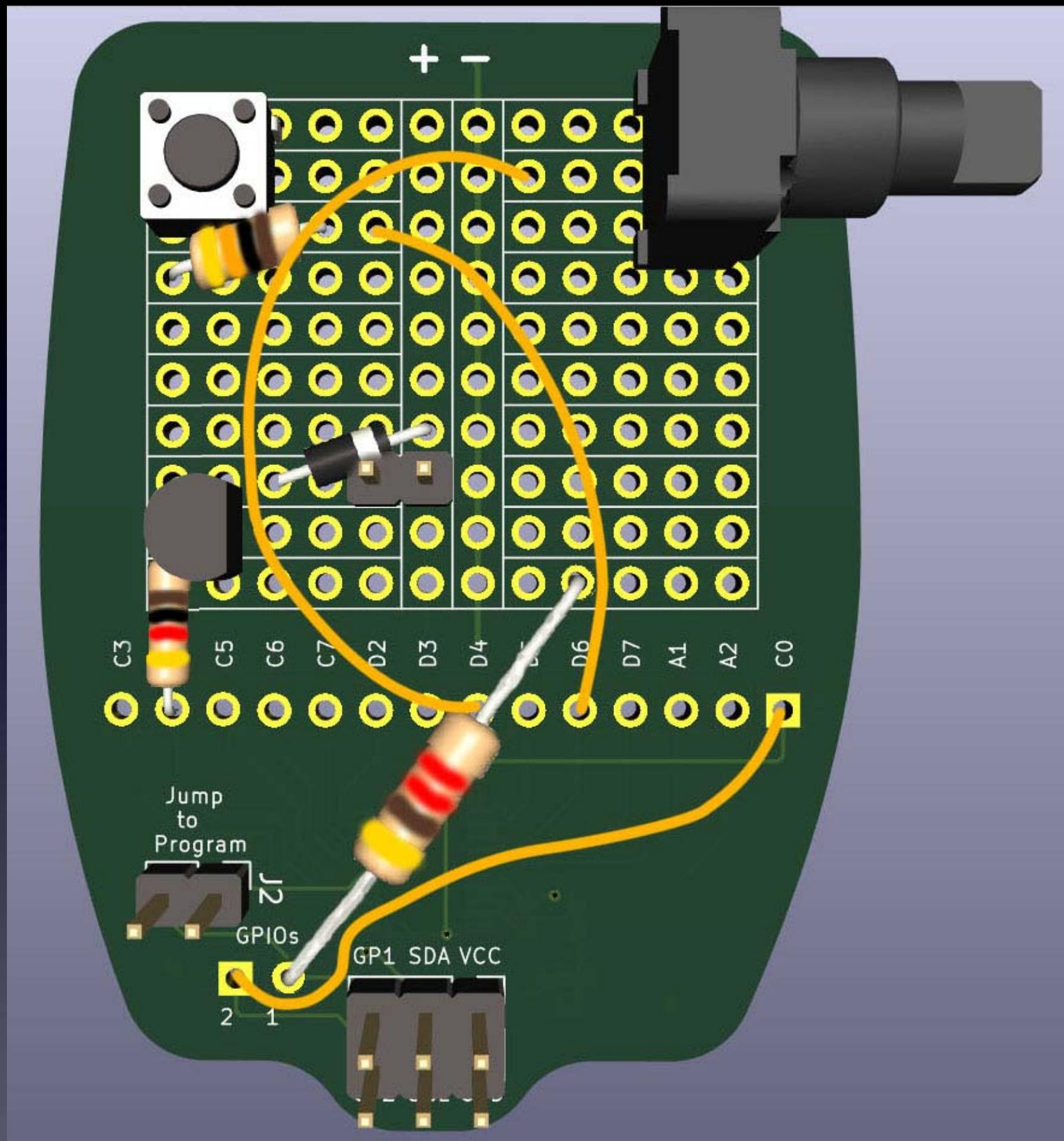


D3

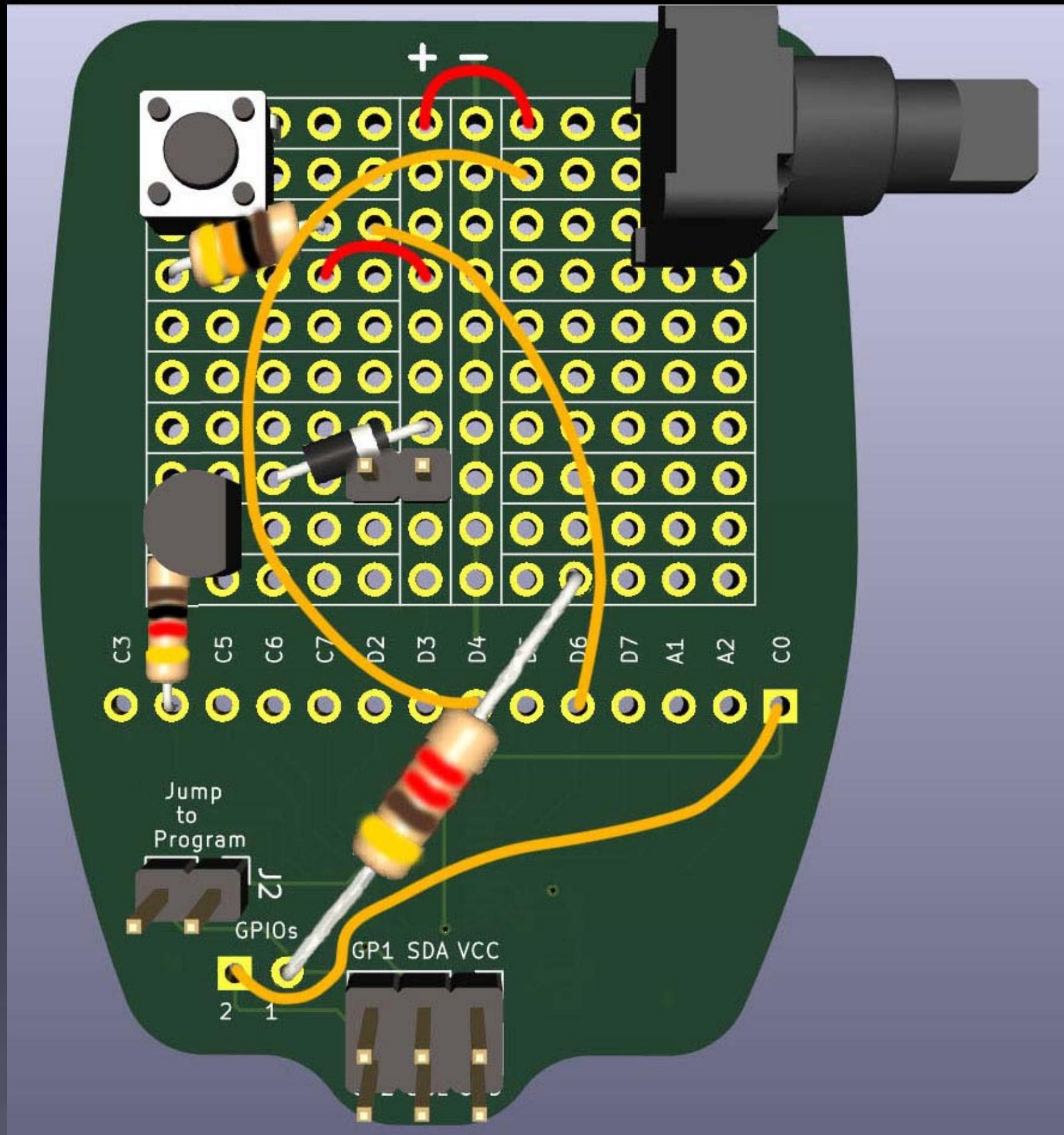
"-" side



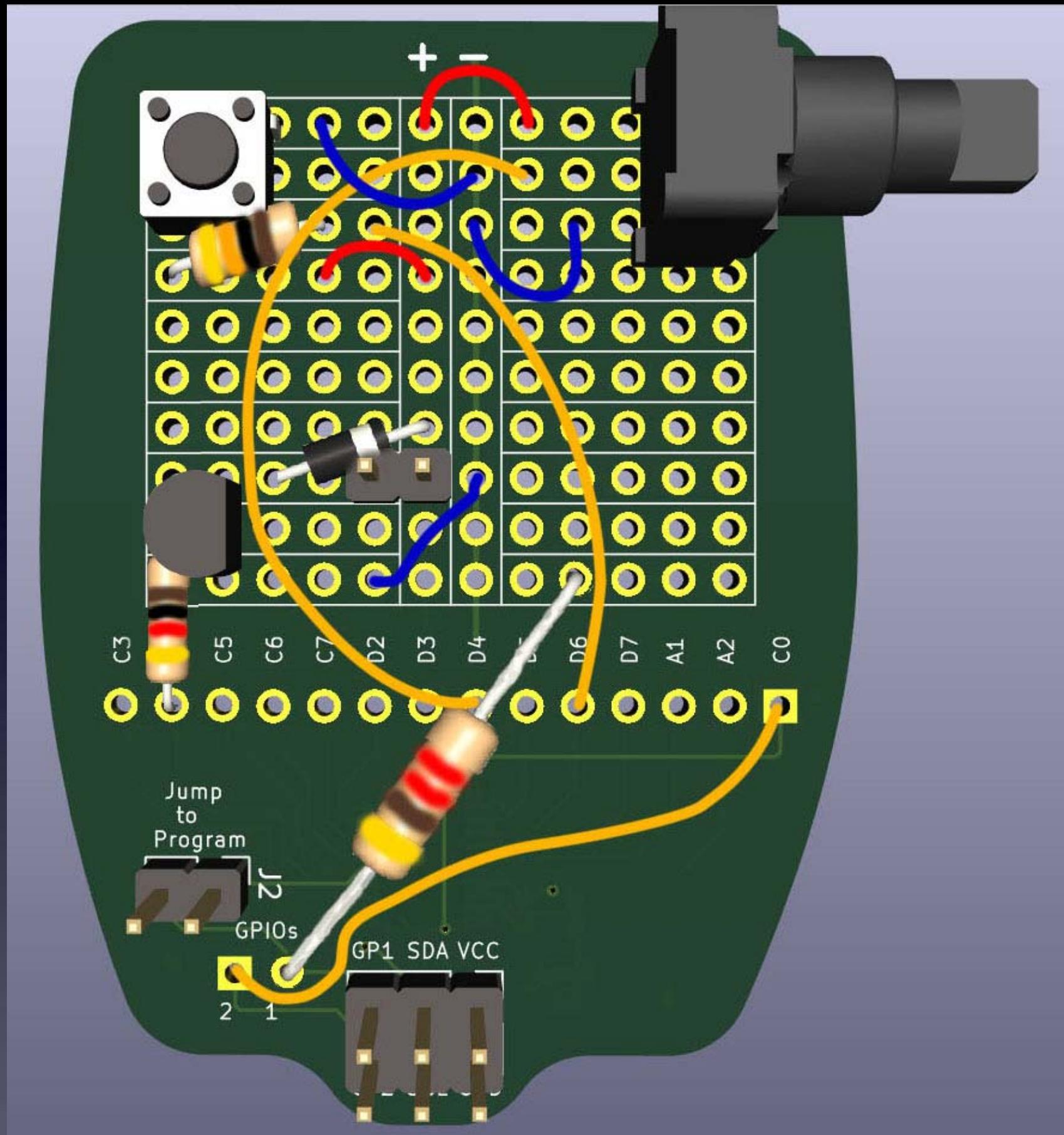
D3



3 Yellow wires



2 Red wires

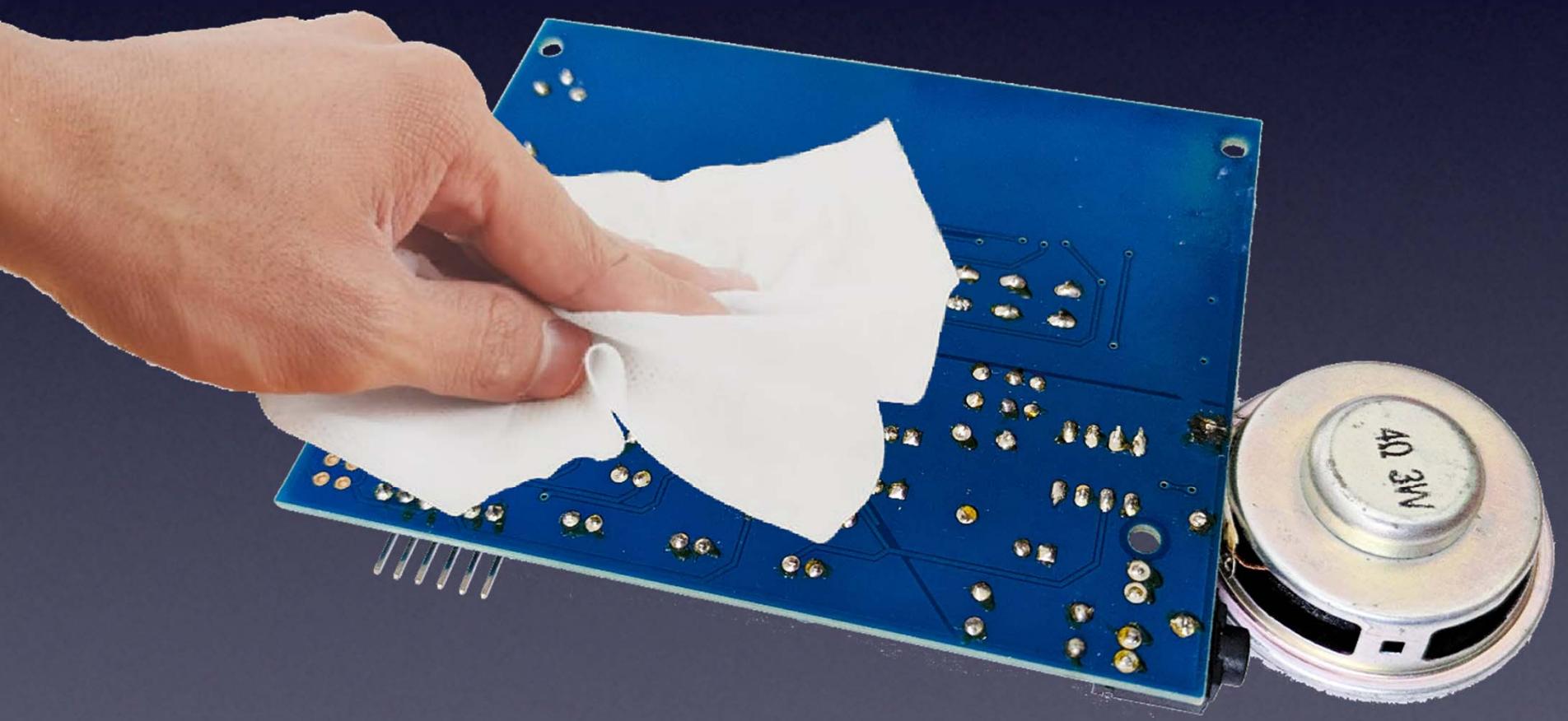


3 Blue wires

If you used any ***flux paste*** for re-working problems

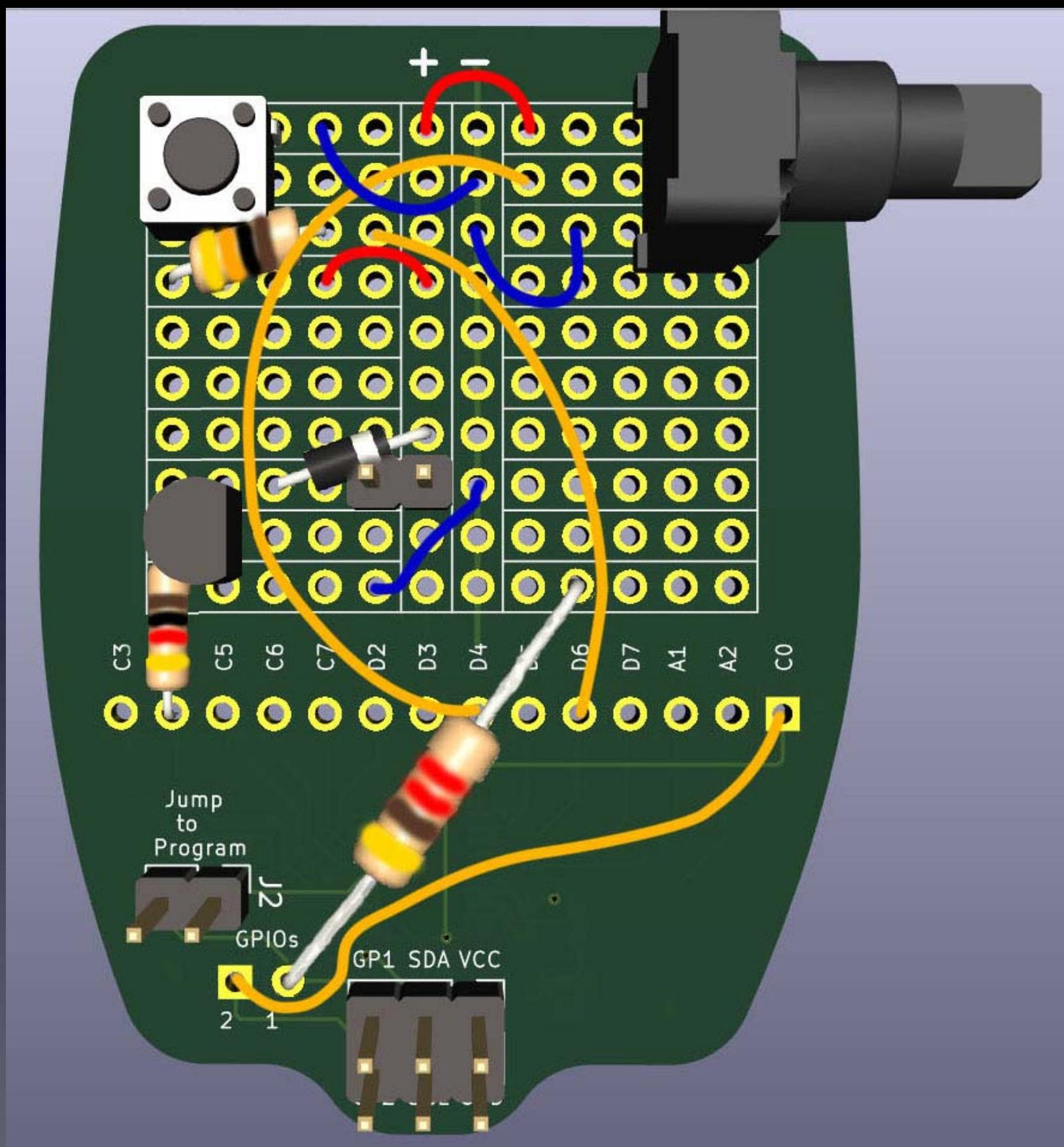


The bottom of the PCB will be sticky from the flux

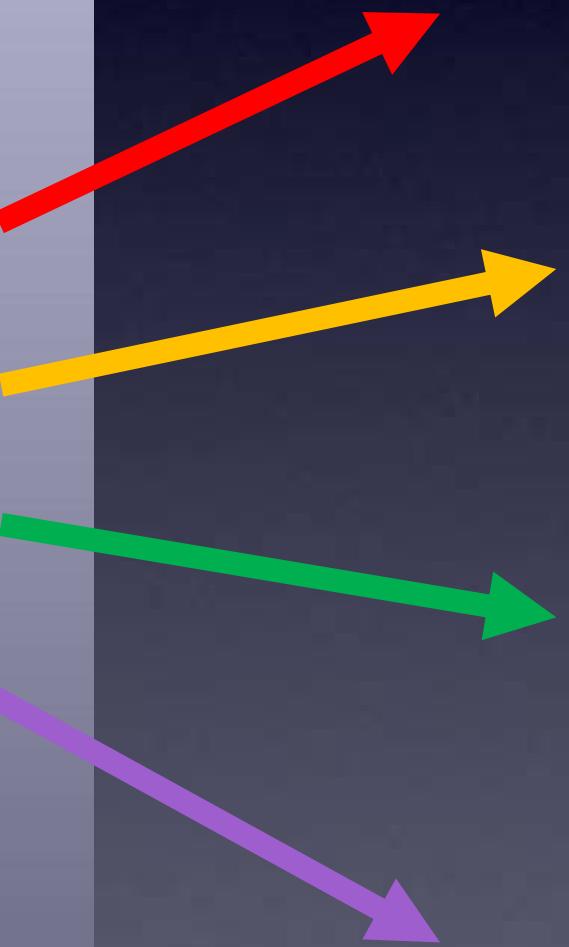
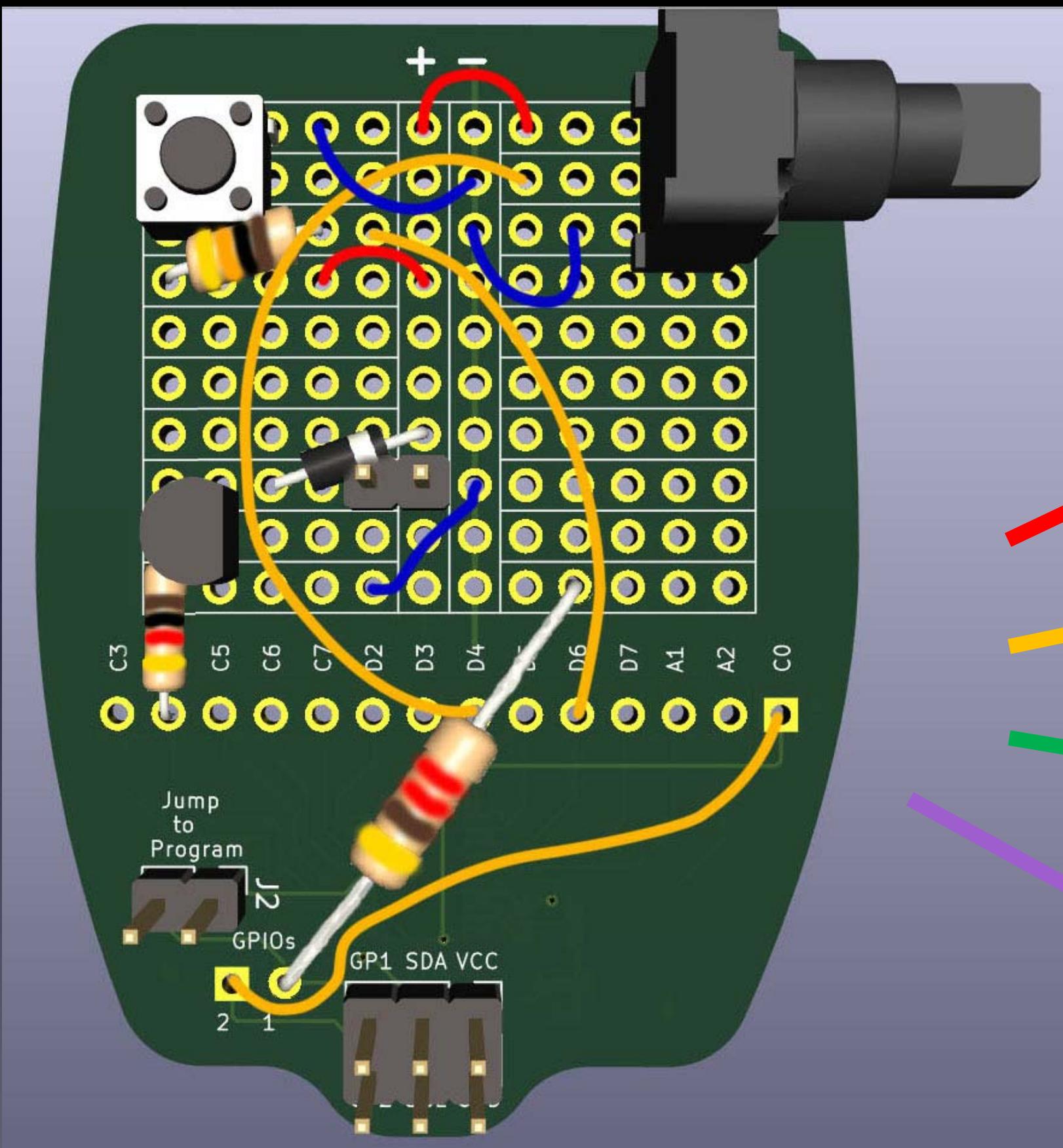


You can clean it with a cloth
wet with Isopropyl Alcohol

Done!



Let's make noise!



Please Remember:

to

Wash your hands
after soldering

Satisfying-Senseless-Sonic Add-On (SSSAO)

workshop

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