19-Apr-2025

I Can Solder Badge kit

Mitch Altman

Chief Scientist, **Cornfield Electronics**, San Francisco, CA
Inventor of **TV-B-Gone** universal remote controls
Co-founder of **3Ware** (successful Silicon Valley startup)
Pioneer of **VR** (in the mid-1980s)
Founding mentor at **HAX** (1st and biggest hardware accelerator)
Co-founder of **Noisebridge** (San Francisco hackerspace)
email: **mitch@CornfieldElectronics.com**
site: **www.CornfieldElectronics.com**
facebook: **maltman23**
flickr: **maltman23**
WeChat: **mitchaltman**
Fediverse: **@maltman23@mastodon.social**
Patreon: mitchaltman

Unhandled Eggception
Easterhegg 2025

CORNFIELD ELECTRONICS

I Can Solder Badge kit

Assembly Instructions

mitch@CornfieldElectronics.com



CORNFIELD ELECTRONICS

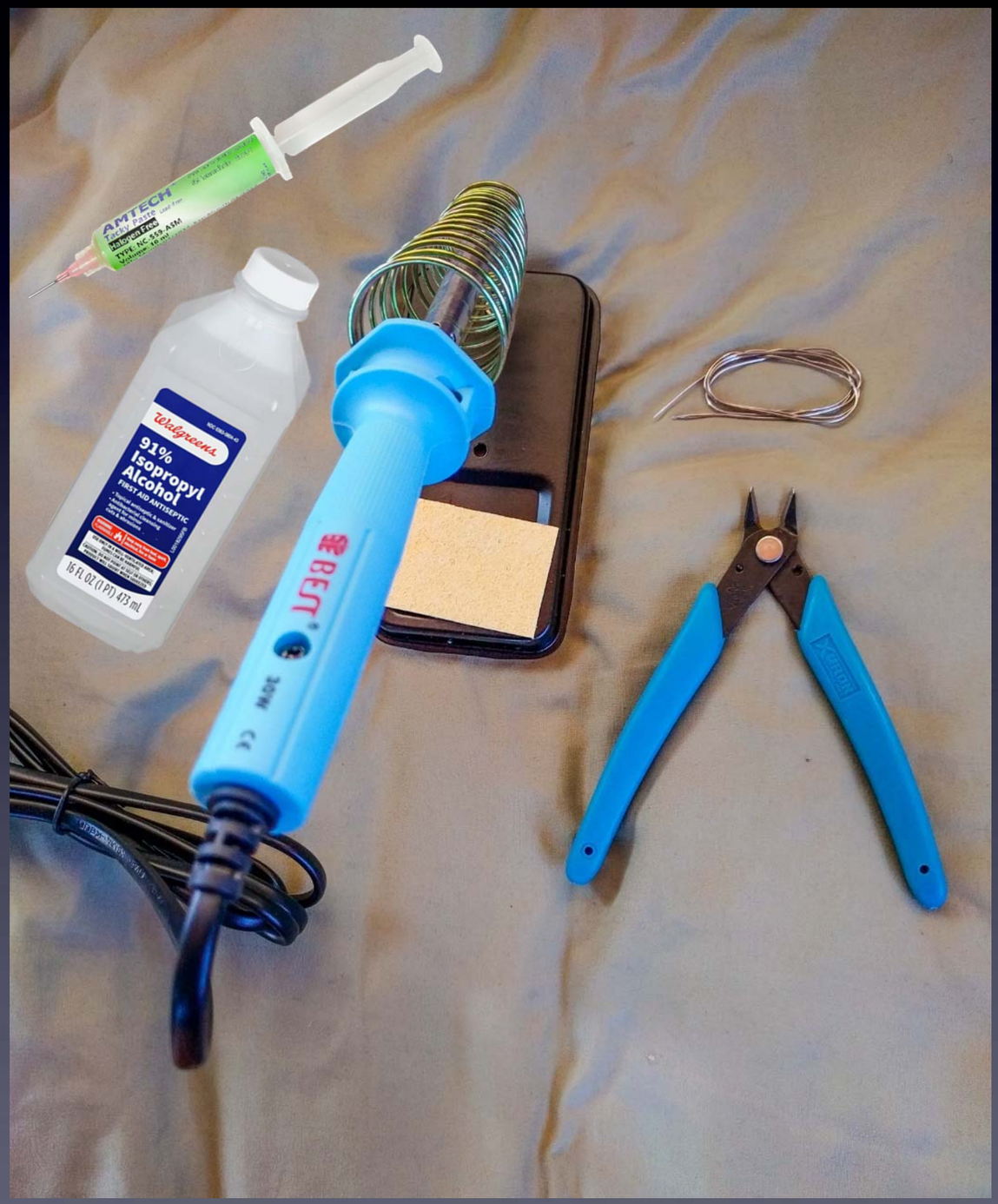
Blinky light and White flashlight

Syllabus

- How to solder
- Wear a blinky-light everywhere you go!

(Don’t bring these home)

Tools



Learn To Solder



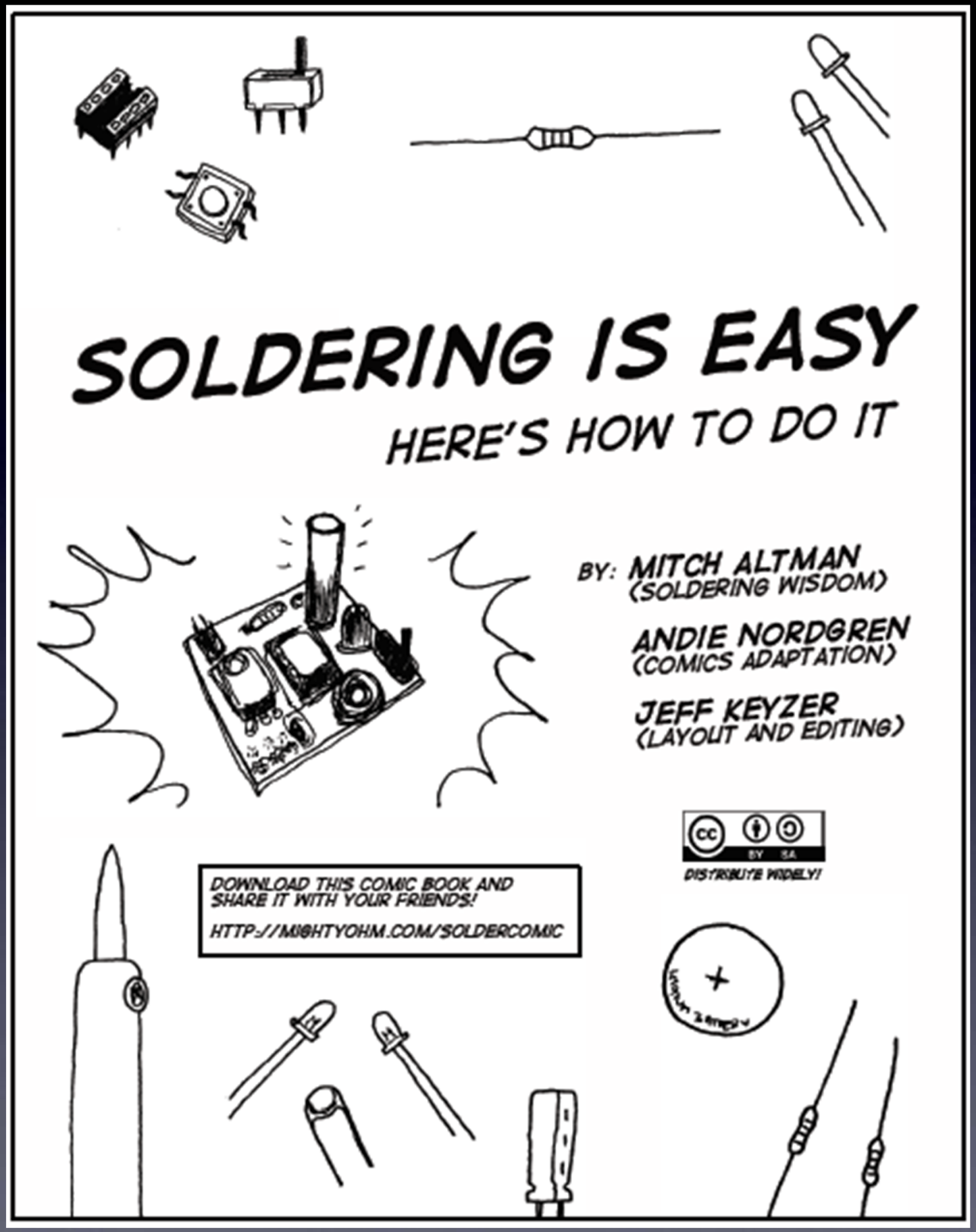
The following photos will
show you how to solder.

But feel free to download
the “Soldering Is Easy” comic book
for free!

(In many different languages.)

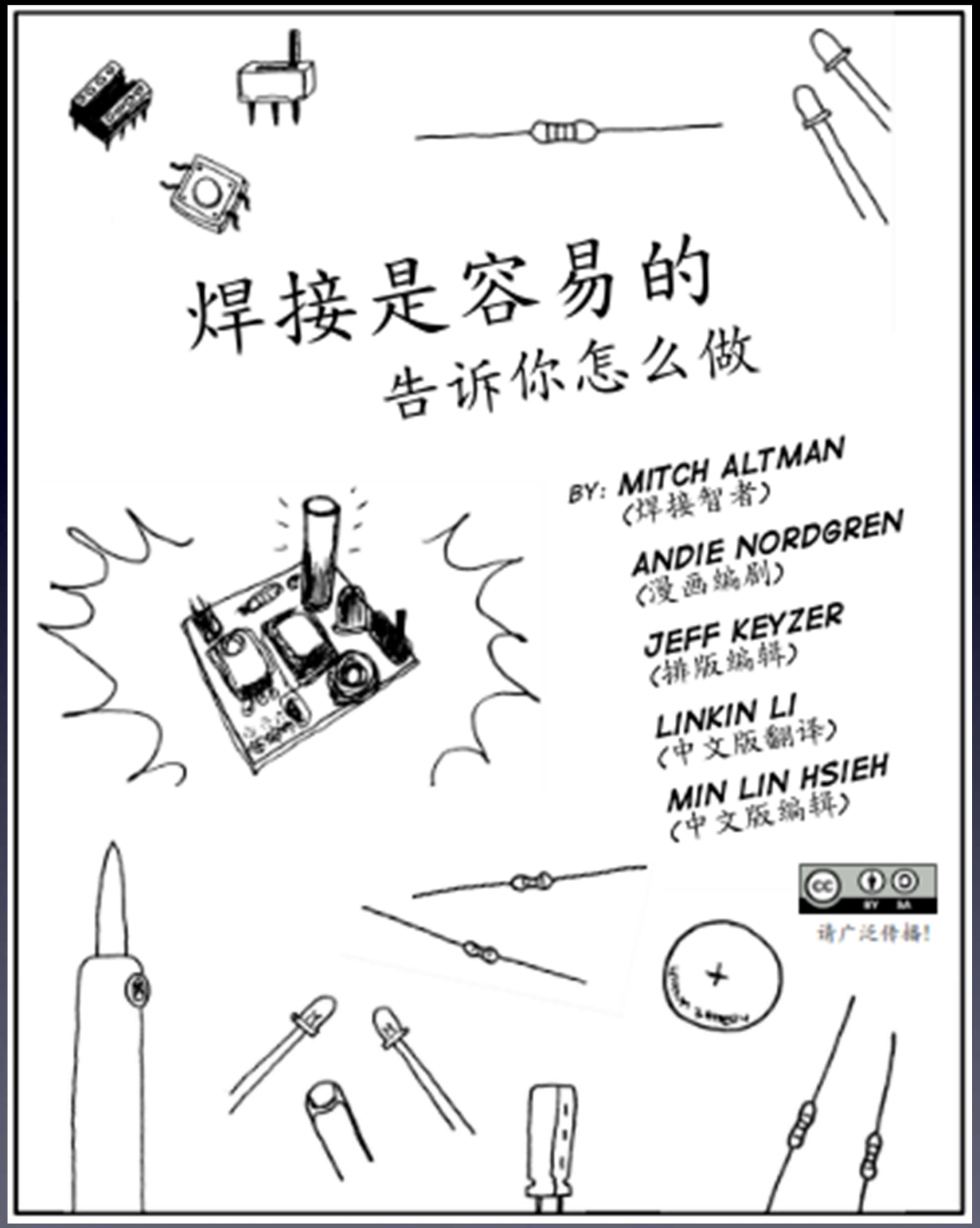
download for free at:
http://mightyohm.com/soldercomic

Learn To Solder



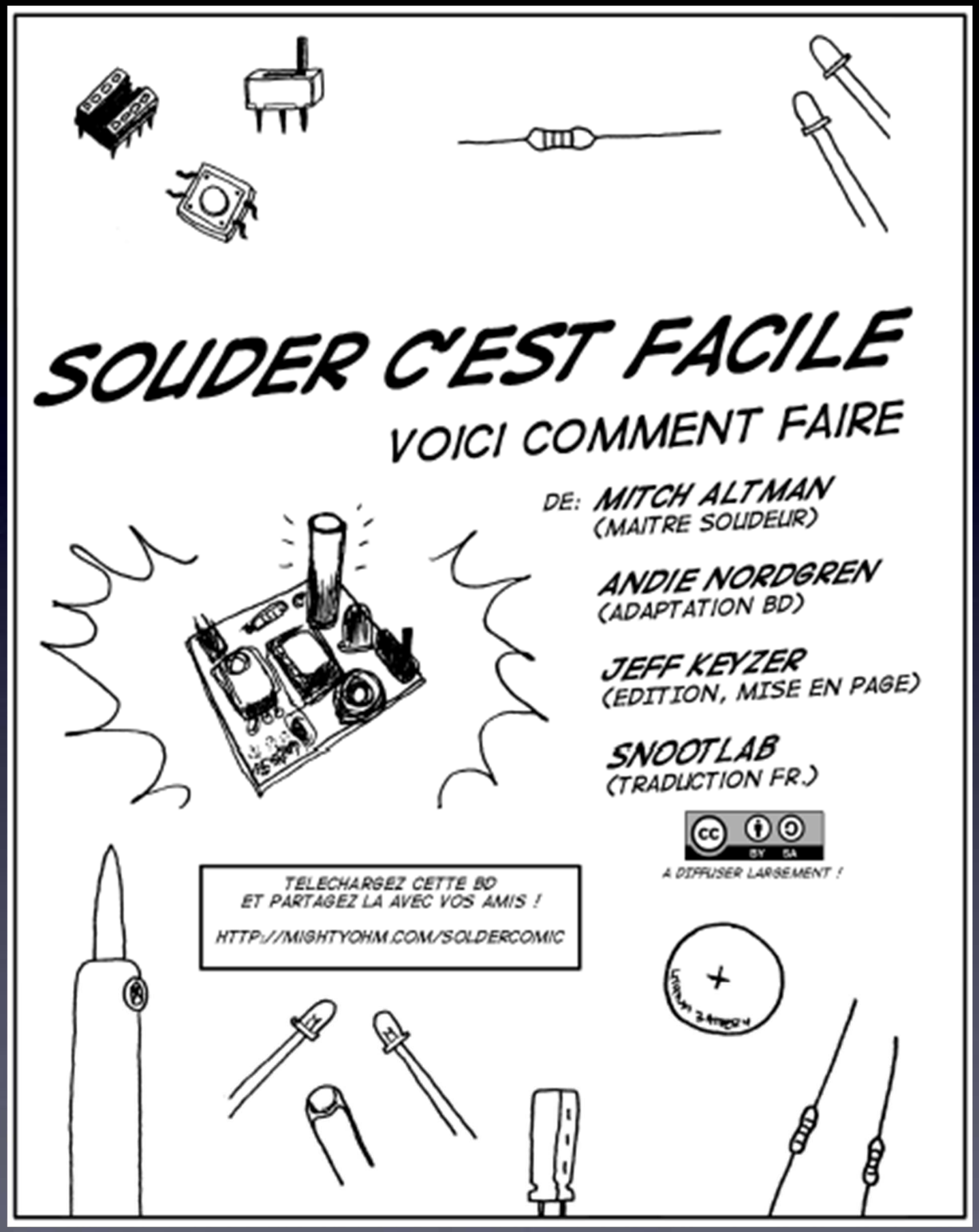
download for free at:
http://mightyohm.com/soldercomic
(In many different languages.)

Learn To Solder



download for free at:
http://mightyohm.com/soldercomic
(In many different languages.)

Learn To Solder



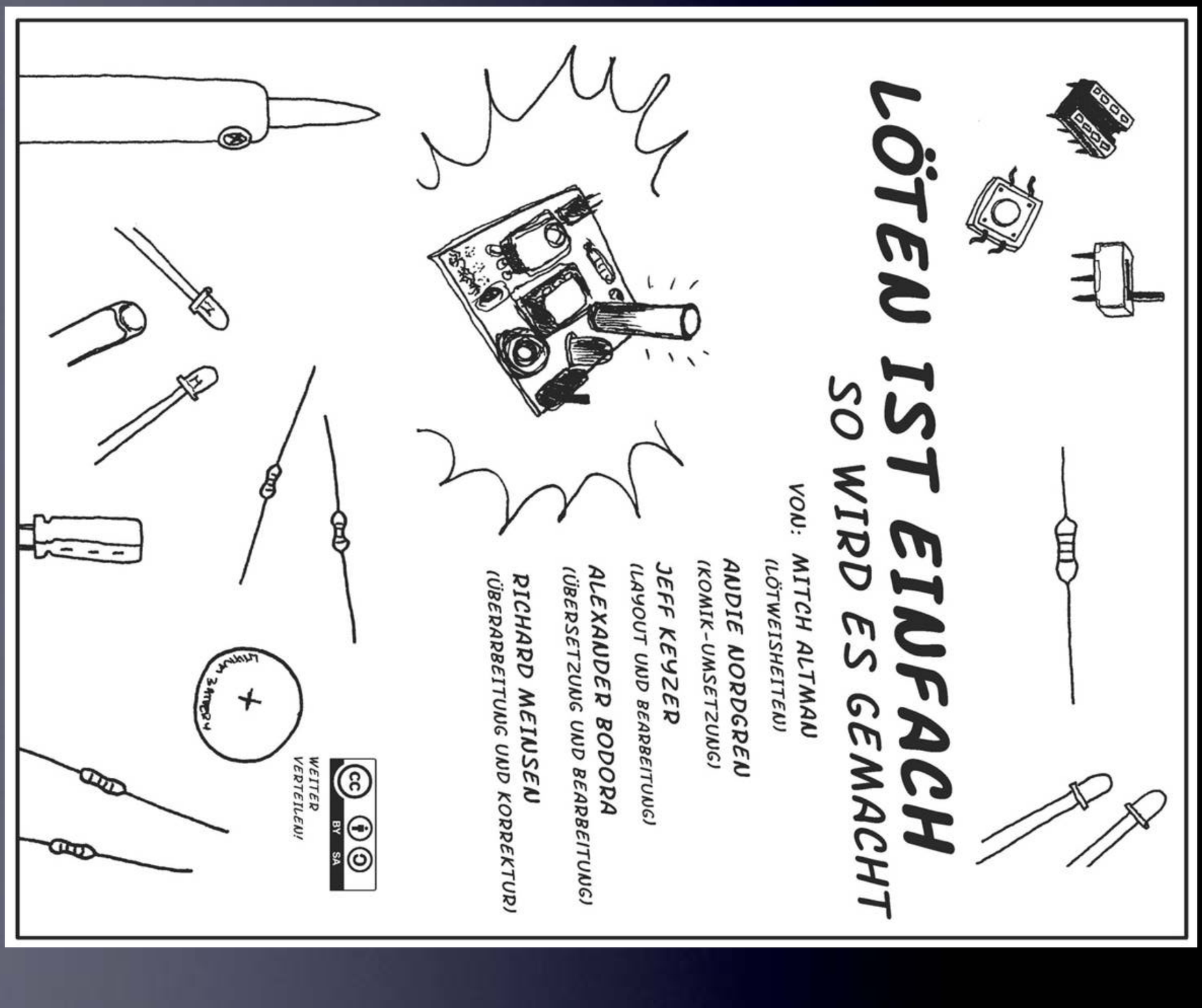
download for free at:
http://mightyohm.com/soldercomic
(In many different languages.)

Learn To Solder



download for free at:
http://mightyohm.com/soldercomic
(In many different languages.)

Learn To Solder



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

(In many different languages.)





All of the parts



The board we'll solder the parts to (front)



The board we'll solder the parts to (back)





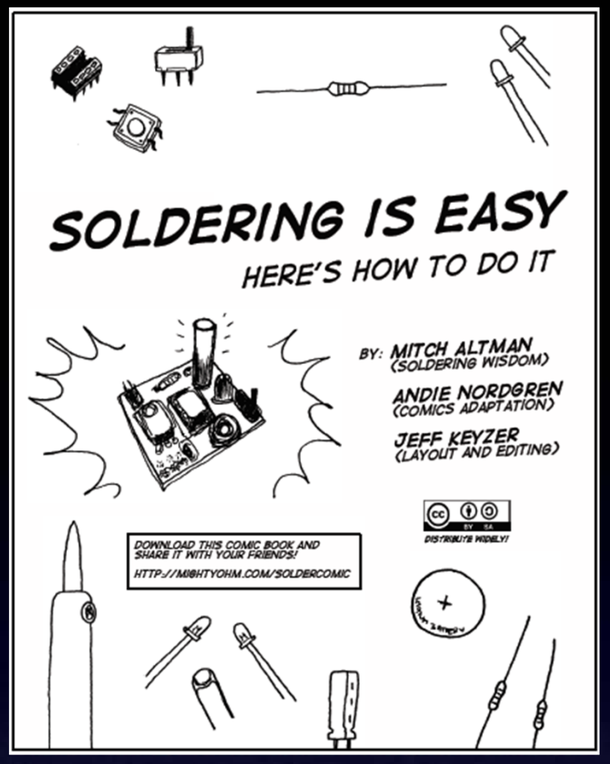
Note:
Since we will use
Lead-Free solder
it is helpful
to also have
flux paste in a syringe
And Isopropyl Alcohol



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

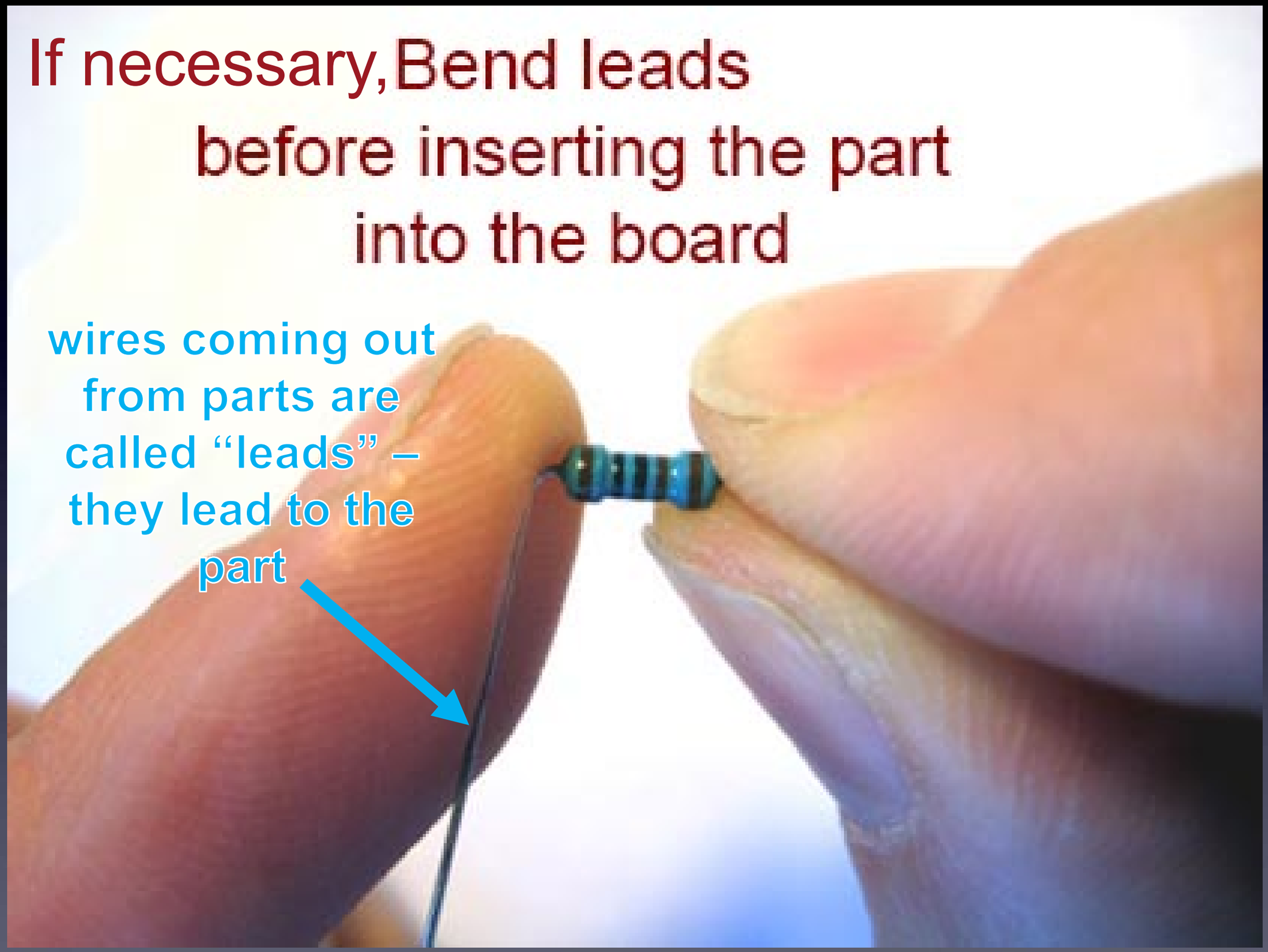
Learn To Solder



The following slides will
show you how to solder a resistor.

There is no resistor in this kit.
But the soldering procedure is the
same for all of the parts in this kit.

The “I Can Solder Badge” kit has no resistors



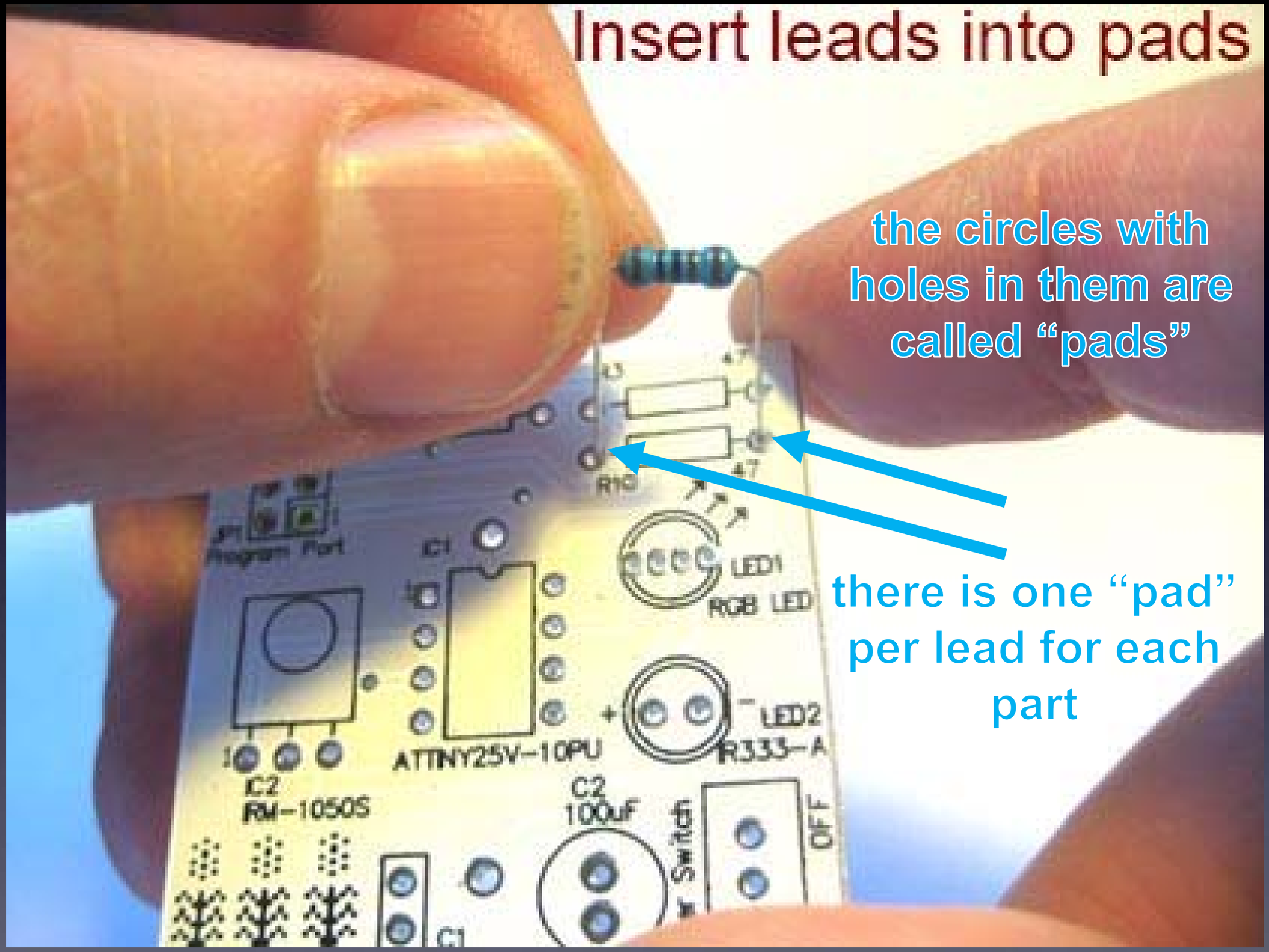
(but, the parts in this kit are soldered the same way)

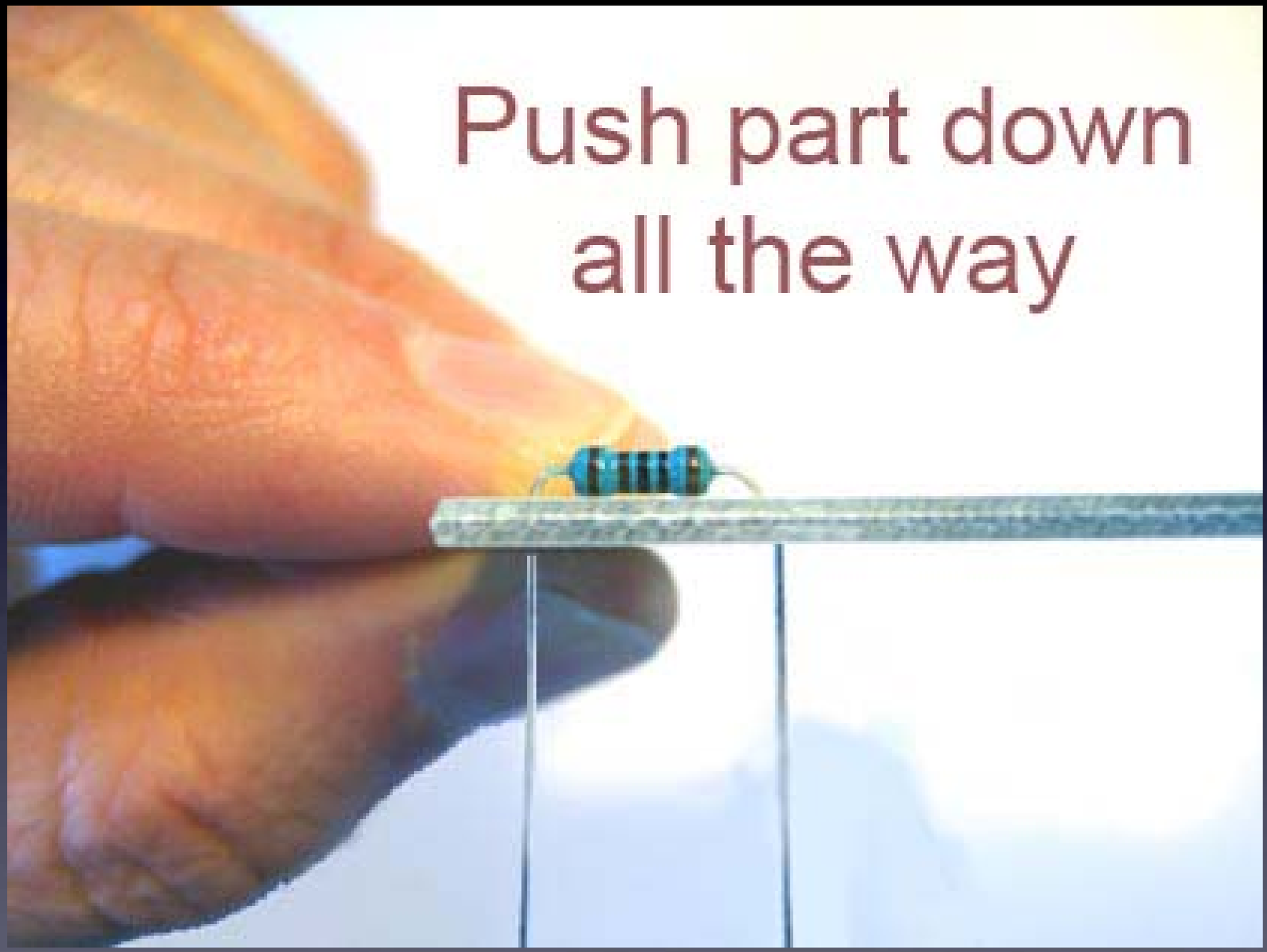
The “I Can Solder Badge” kit has no resistors

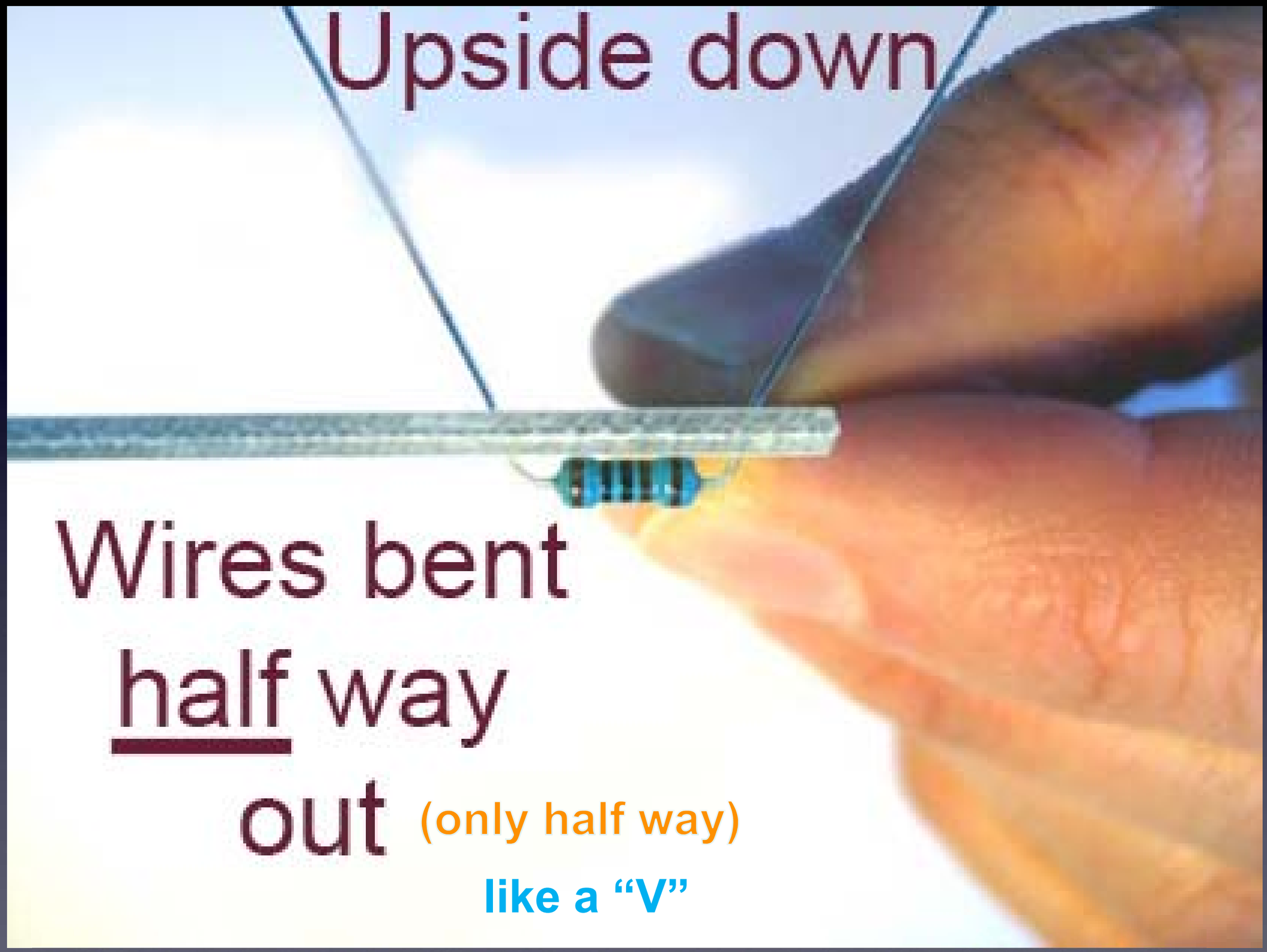


this is how a resistor will look *before* inserting it into the board

LEDs for this kit go into the board like this resistor




Push part down
all the way



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



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)

(60/40 is also good)

63/37 rosin core,

0.031” (0.8mm) diameter (or smaller)

<u>Note</u>:

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
(<u>not</u> "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:



AMTECH NC-559-ASM



99%

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

And Isopropyl Alcohol

Another good kind of solder for DIY electronics:

This is another good Lead-Free solder I have found!



Duratool
D01685 Rosin

0.7mm diameter

(as good as the Kester K100LD Rosin)

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)

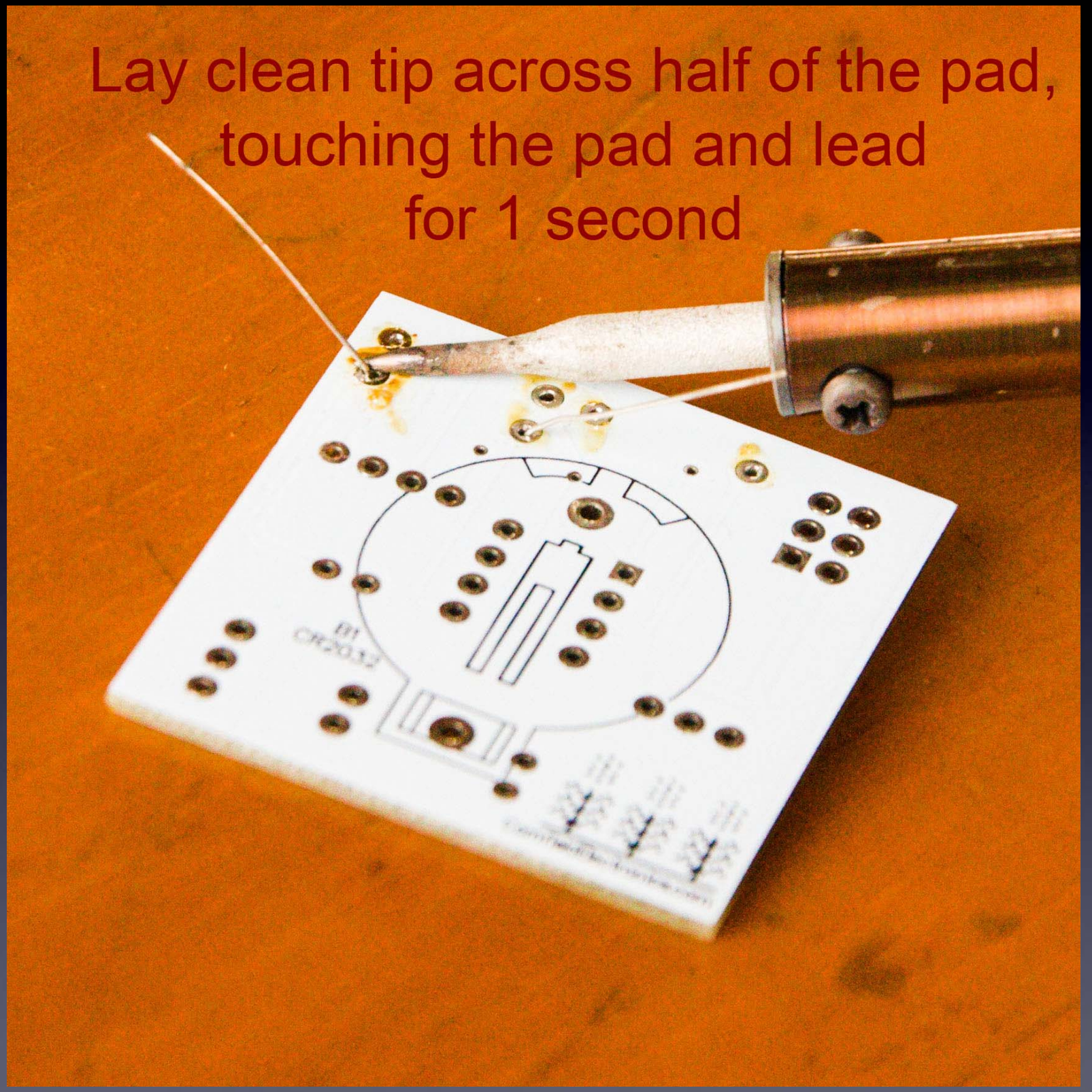
Bang (lightly) 3 times,

Swipe, Rotate, Swipe (on the sponge):

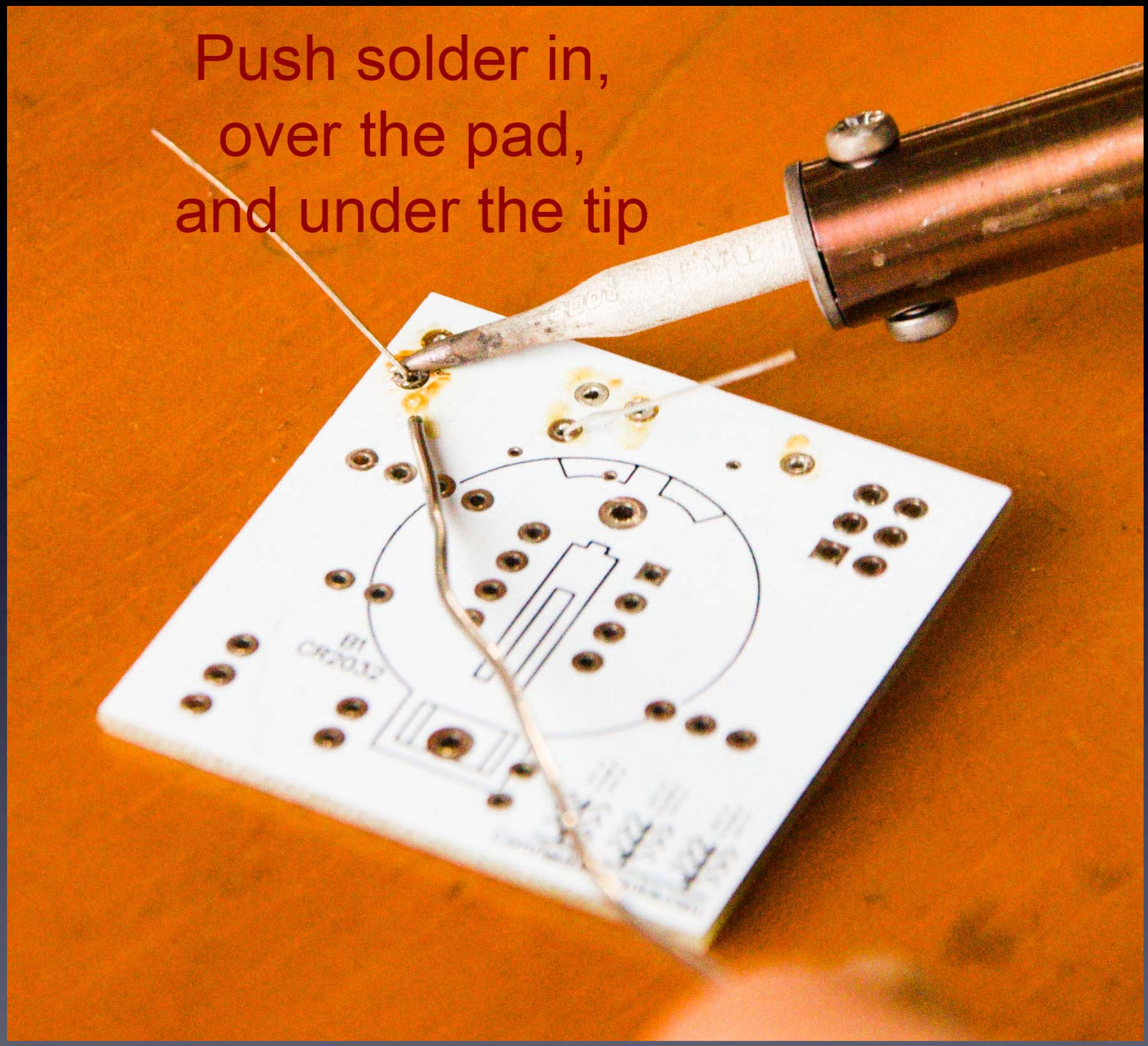
Keep the tip shiny silver!

knock solder off the tip

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

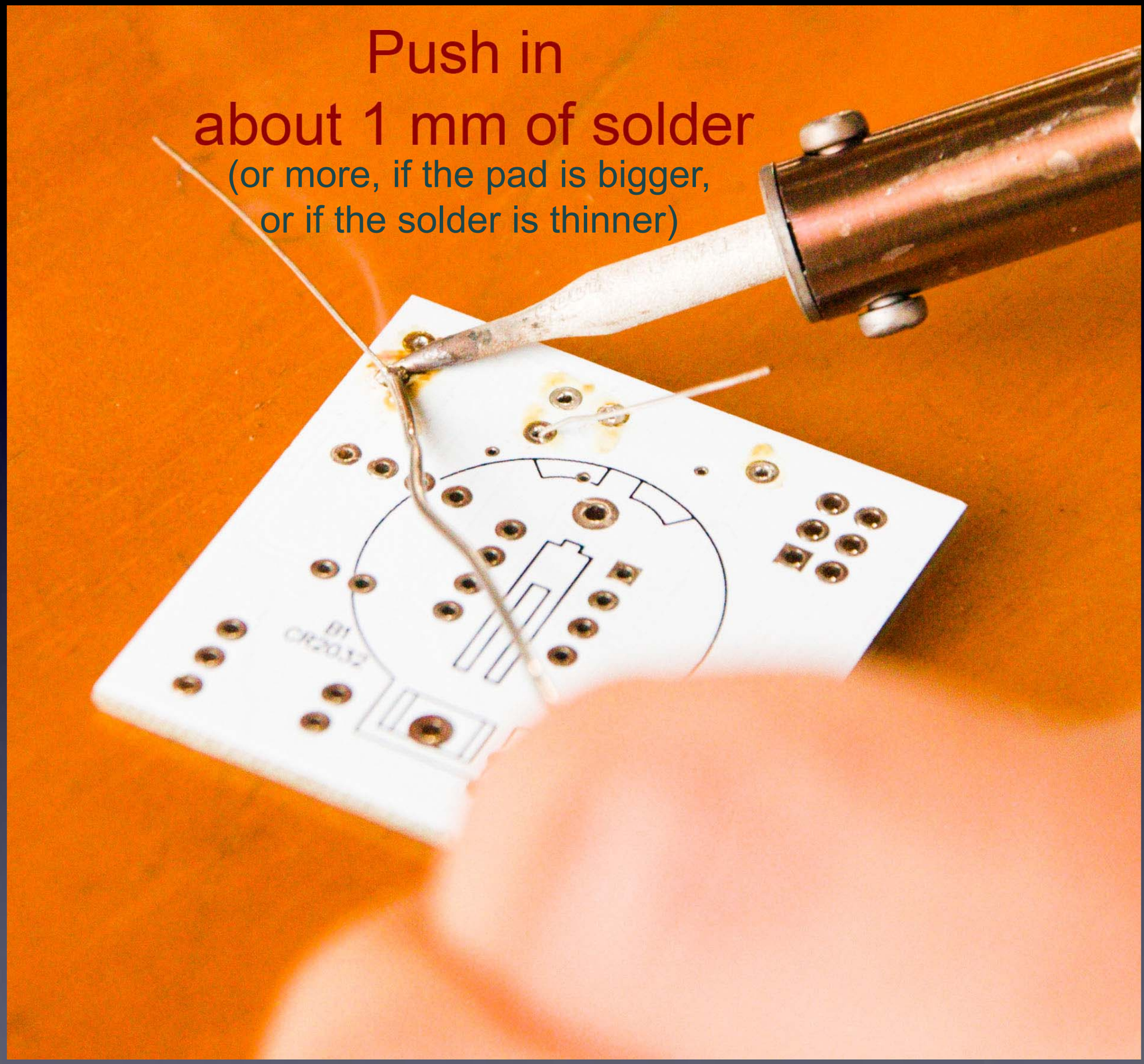


Do this quickly (slowly doesn't work well) – solder in & out in about 1 second

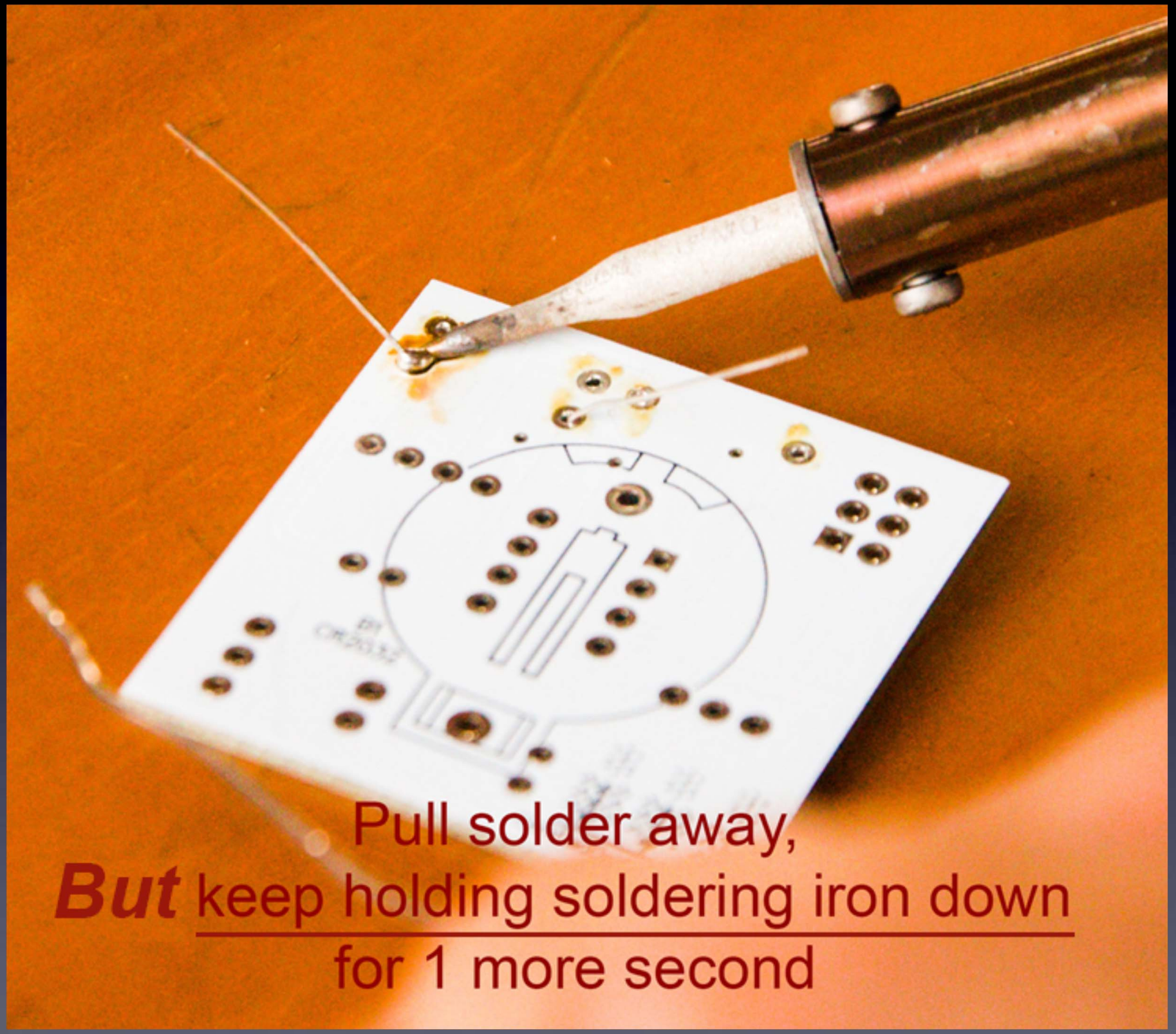


Make sure solder melts on the <u>underside</u> of the soldering iron tip
(not the side or top of the soldering iron tip)!

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



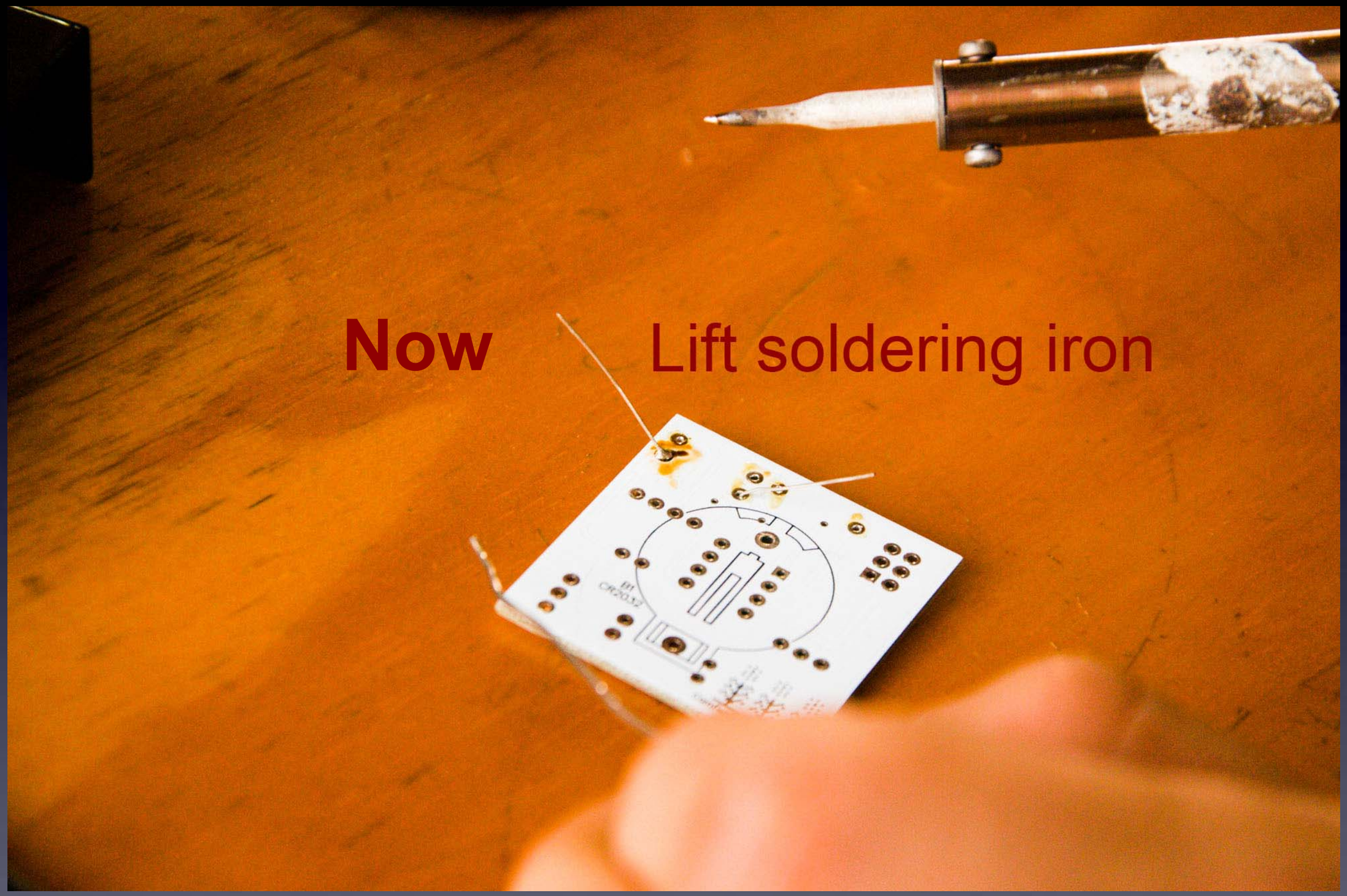
Make sure solder melts on the <u>underside</u> of the soldering iron tip
(not the side or top of the soldering iron tip)!

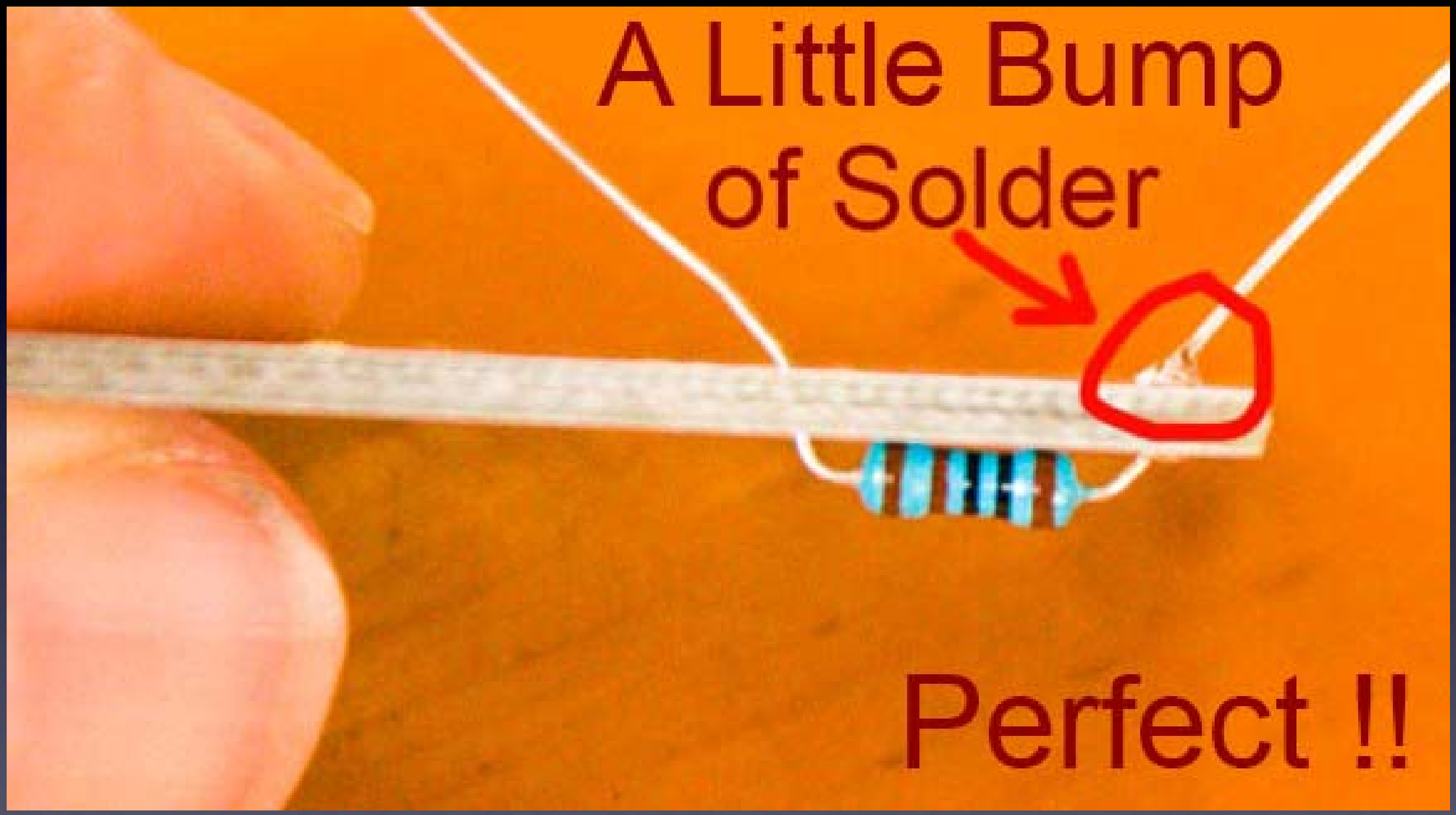

Pull solder away,
But keep holding soldering iron down
for 1 more second

Secret #2:

Keep hot tip down

1 second
for solder to flow !!


Now
Lift soldering iron



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 !

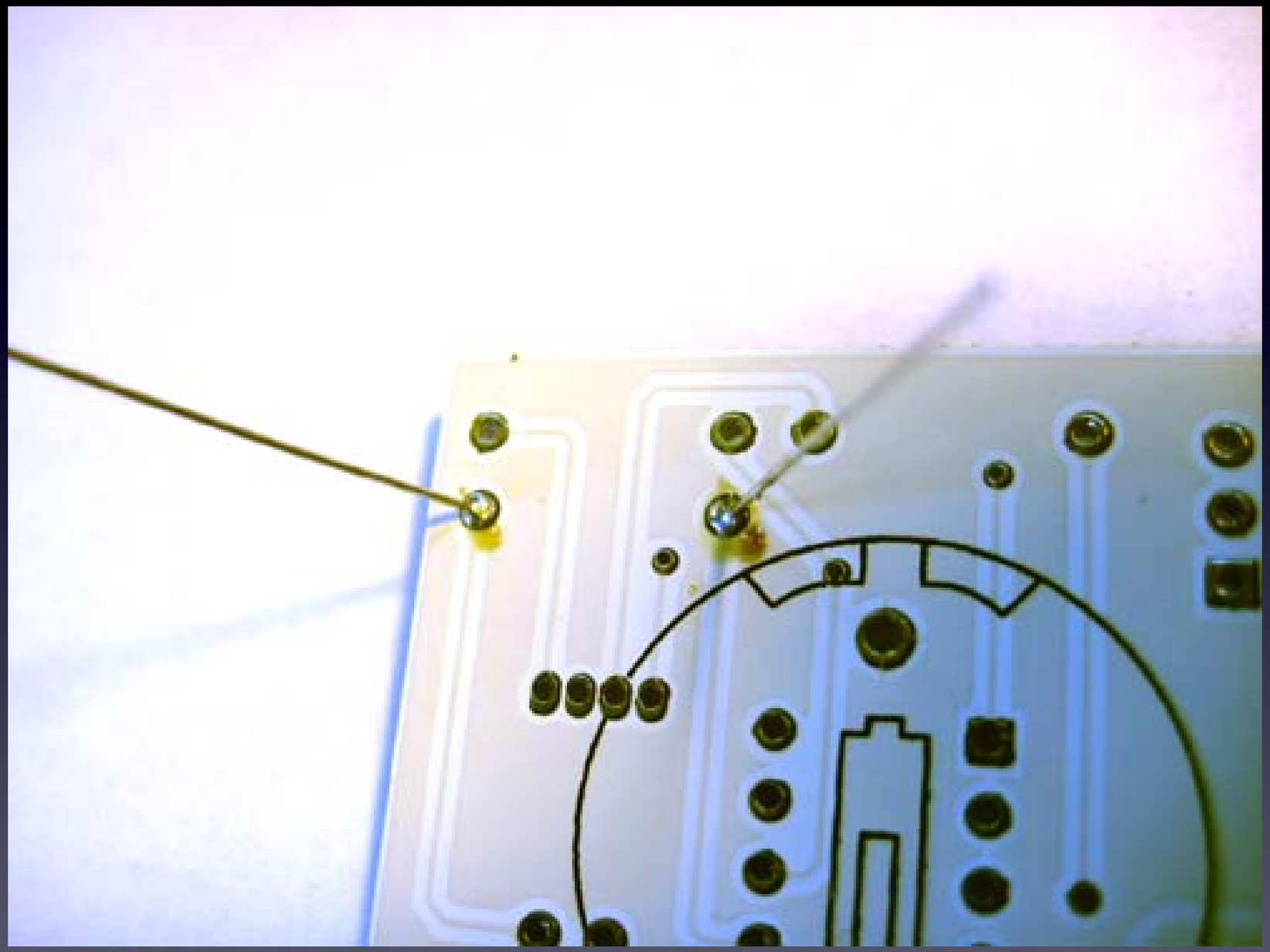
The Rhythm !

and speed (about 1 second per step)



Lift Tip

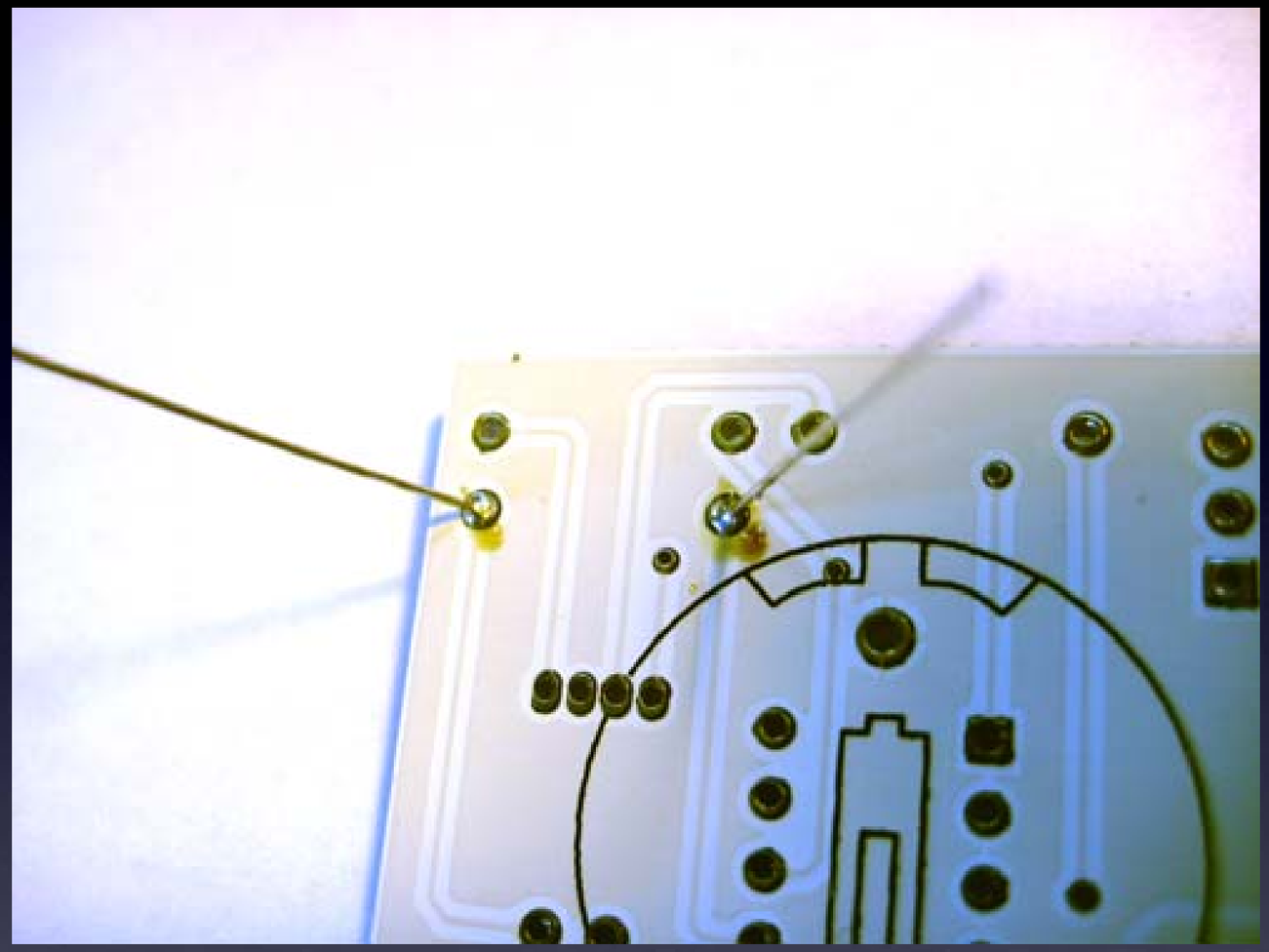
Solder all of the leads of the part to the board



For this part, there are two leads

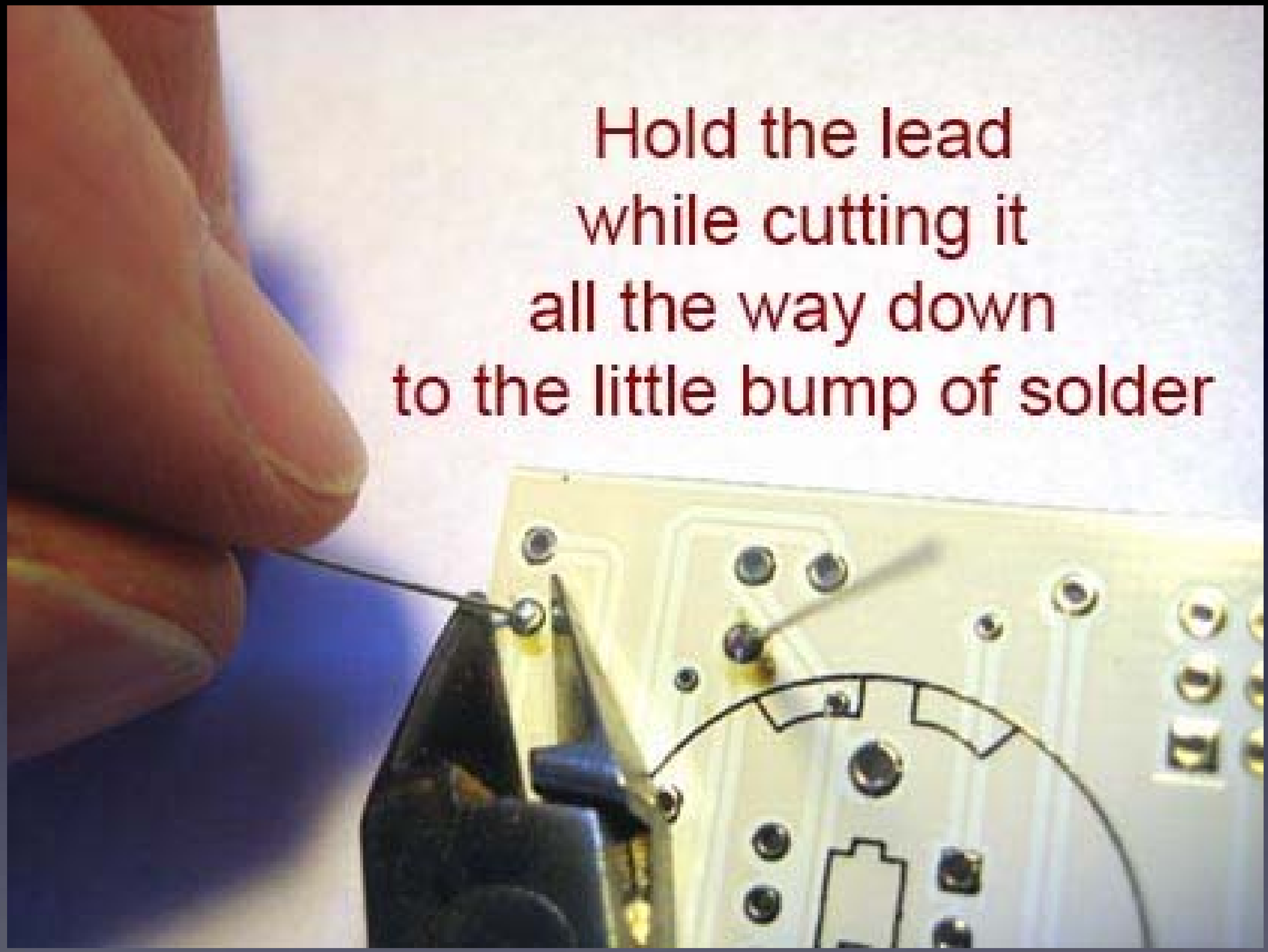
Here you can see two good solder connections

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



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.)



No wires sticking out



A closer look at 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

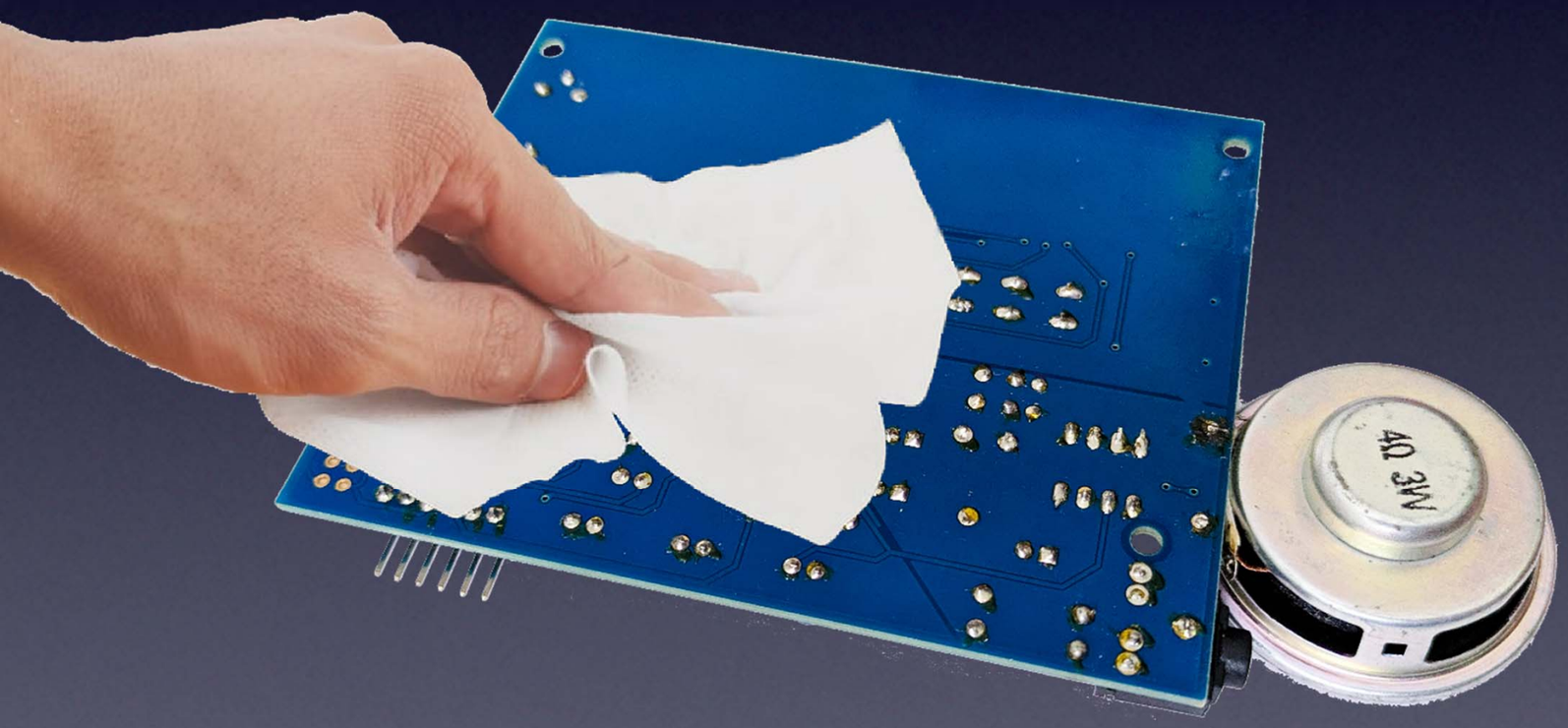


And it will look like this when you’re done.

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 put in the batteries,

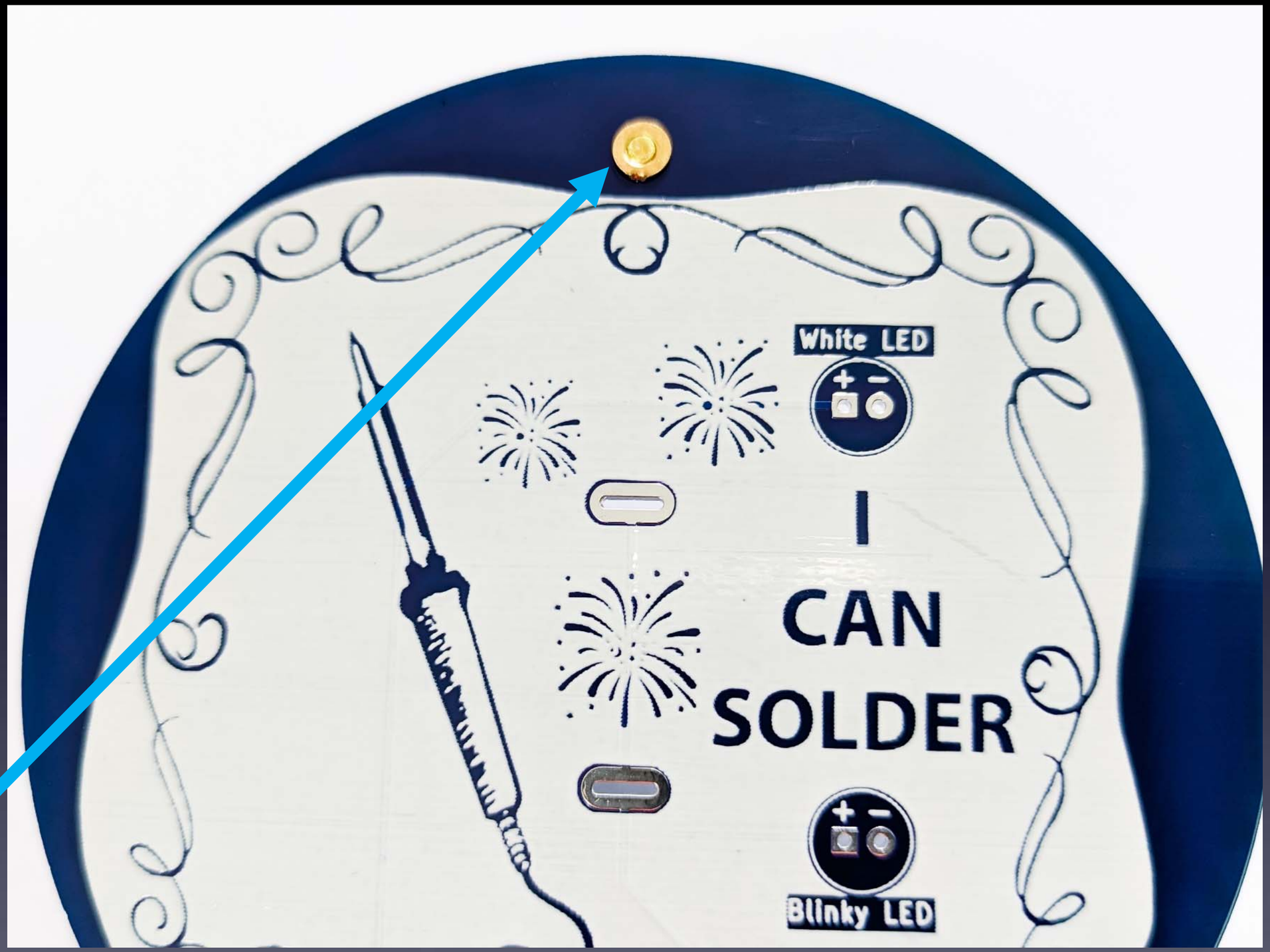
Turn it on,

And it works!

(Or you start debugging.)

Let’s start!

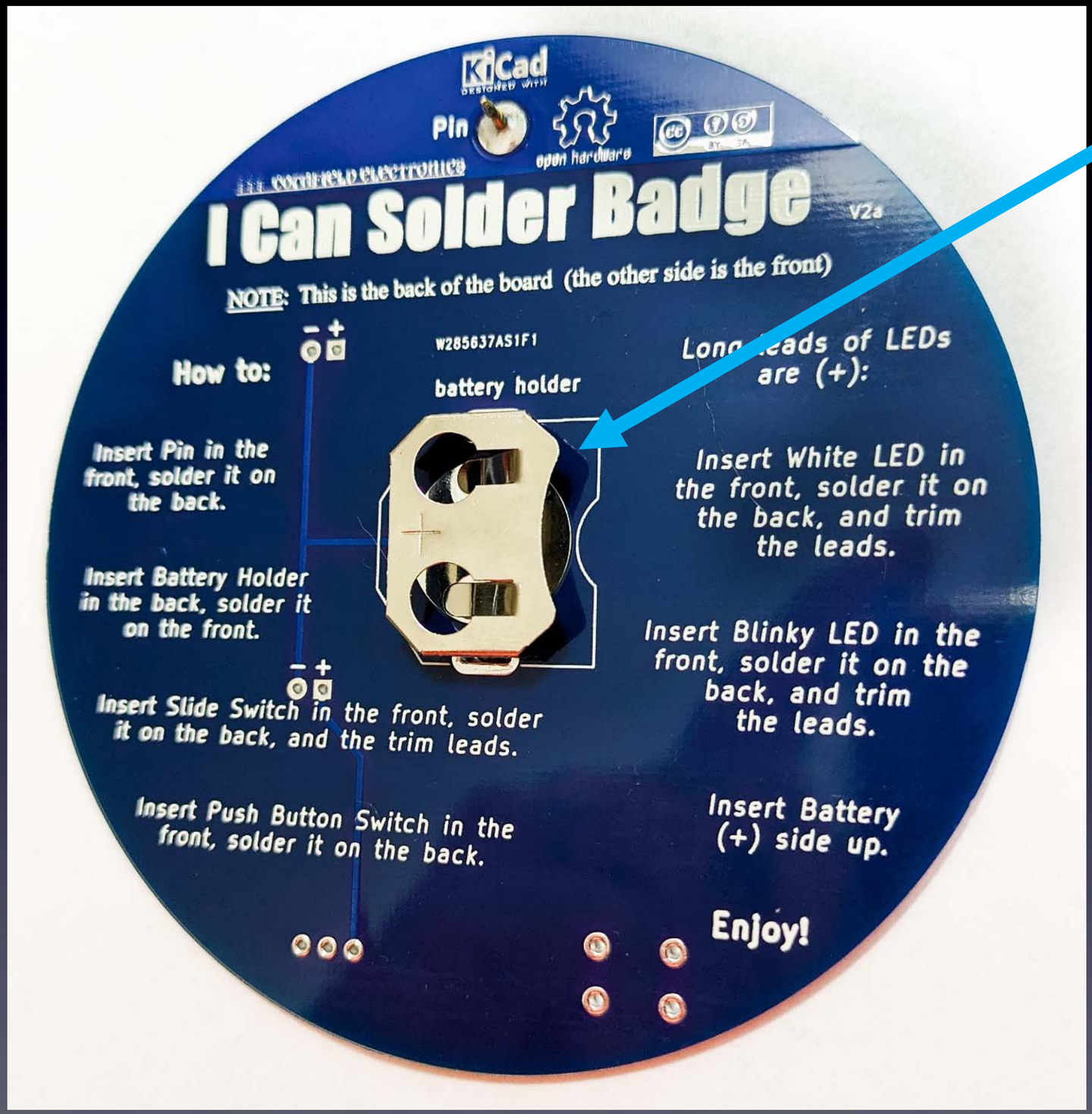
Insert Pin in the front



Solder Pin on the back

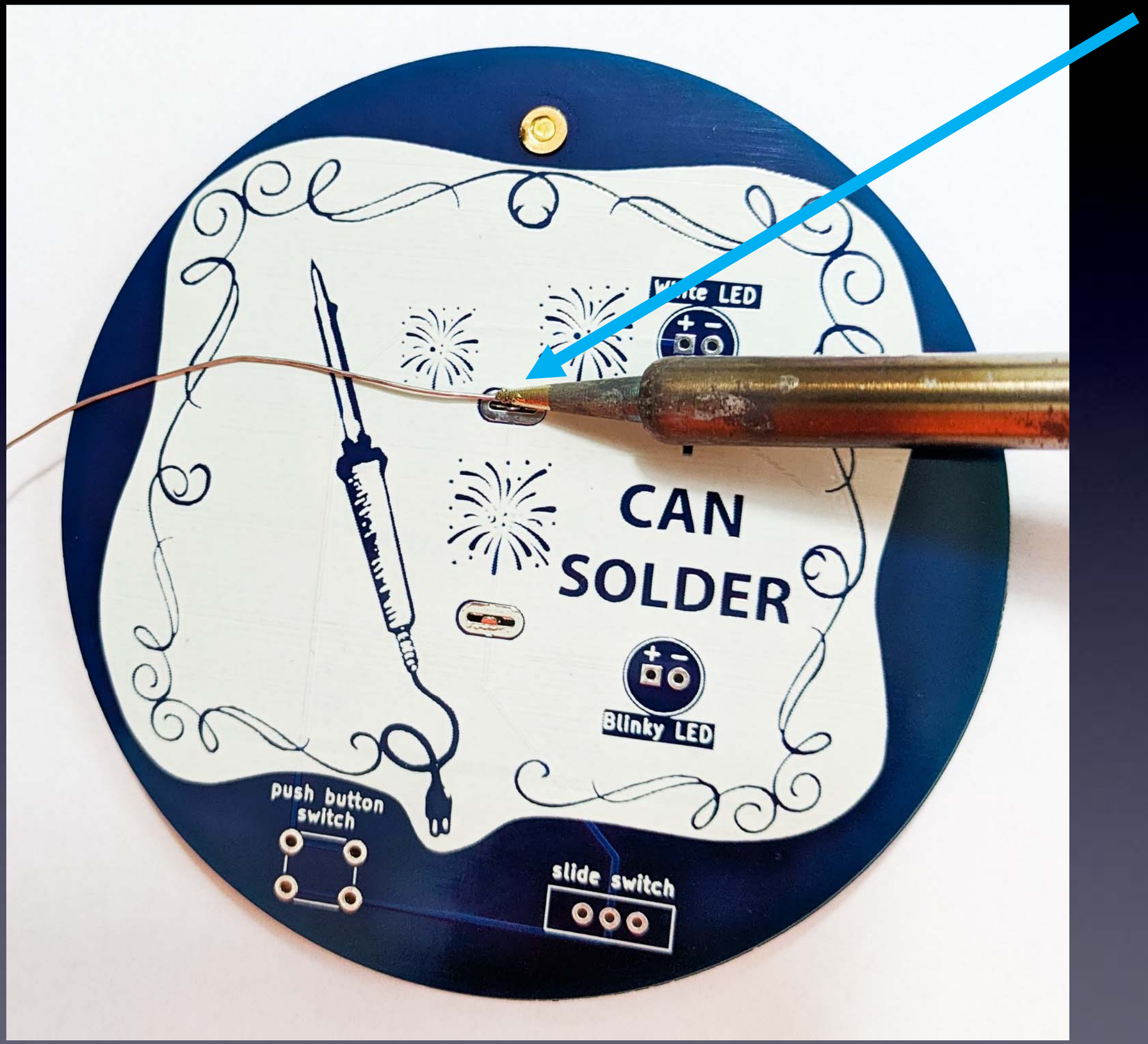


Insert Battery Holder in the back

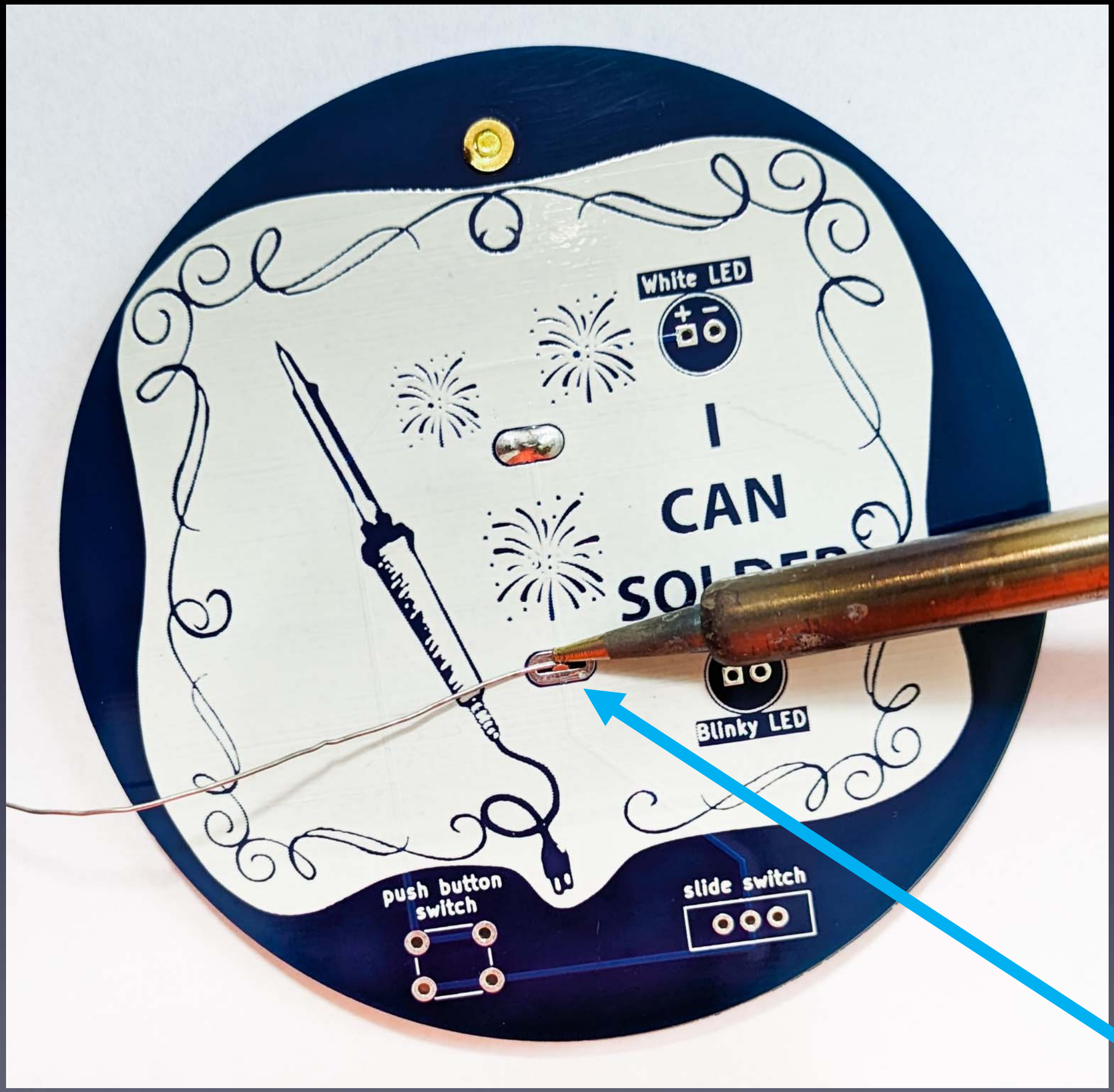


The correct orientation of the battery holder is like this photo

Solder Battery Holder on the front (1st pad)



Solder Battery Holder on the front (2nd pad)



Insert Slide Switch in the front



Orientation does not matter

Solder Slide Switch on the back (1st pad)



Solder Slide Switch on the back (2nd pad)



Solder Slide Switch on the back (3rd pad)



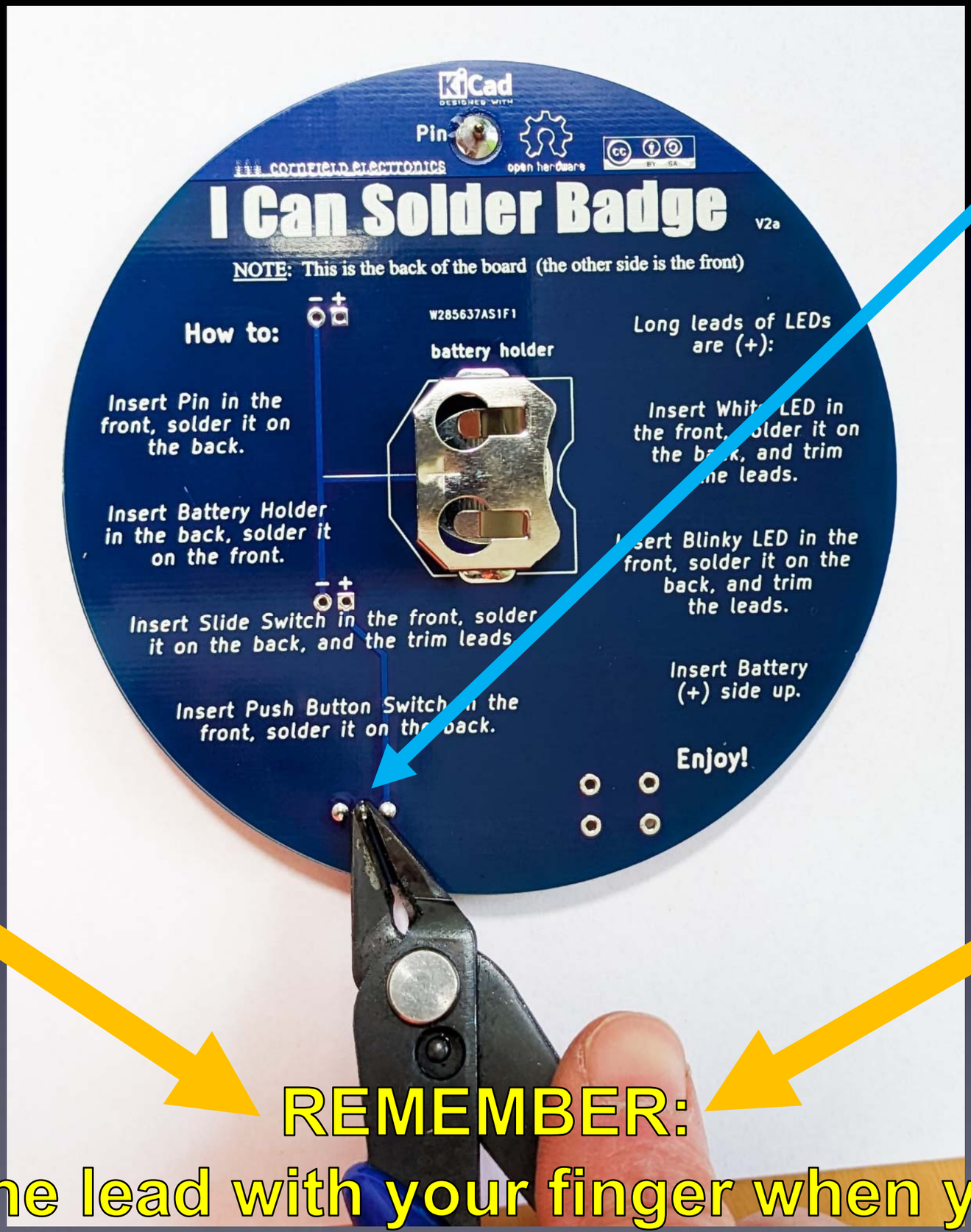
Trim Slide Switch leads (1st lead)



REMEMBER:

Cover the lead with your finger when you cut !

Trim Slide Switch leads (2nd lead)



REMEMBER:

Cover the lead with your finger when you cut !

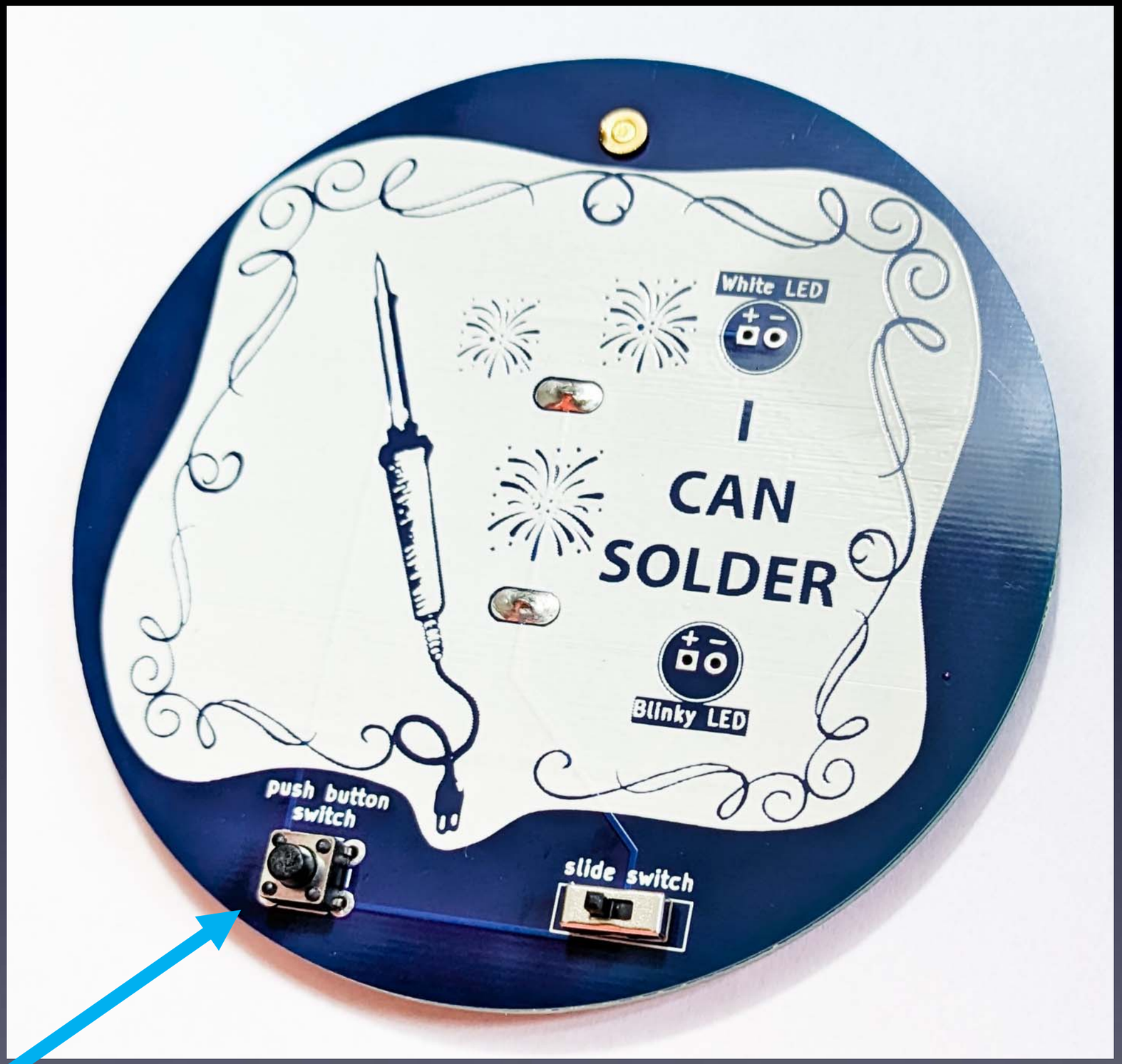
Trim Slide Switch leads (3rd lead)



REMEMBER:

Cover the lead with your finger when you cut !

Insert Push Button Switch in the front



It fits in two ways, and either way is OK

Solder Push Button Switch on the back (1st pad)



Solder Push Button Switch on the back (2nd pad)



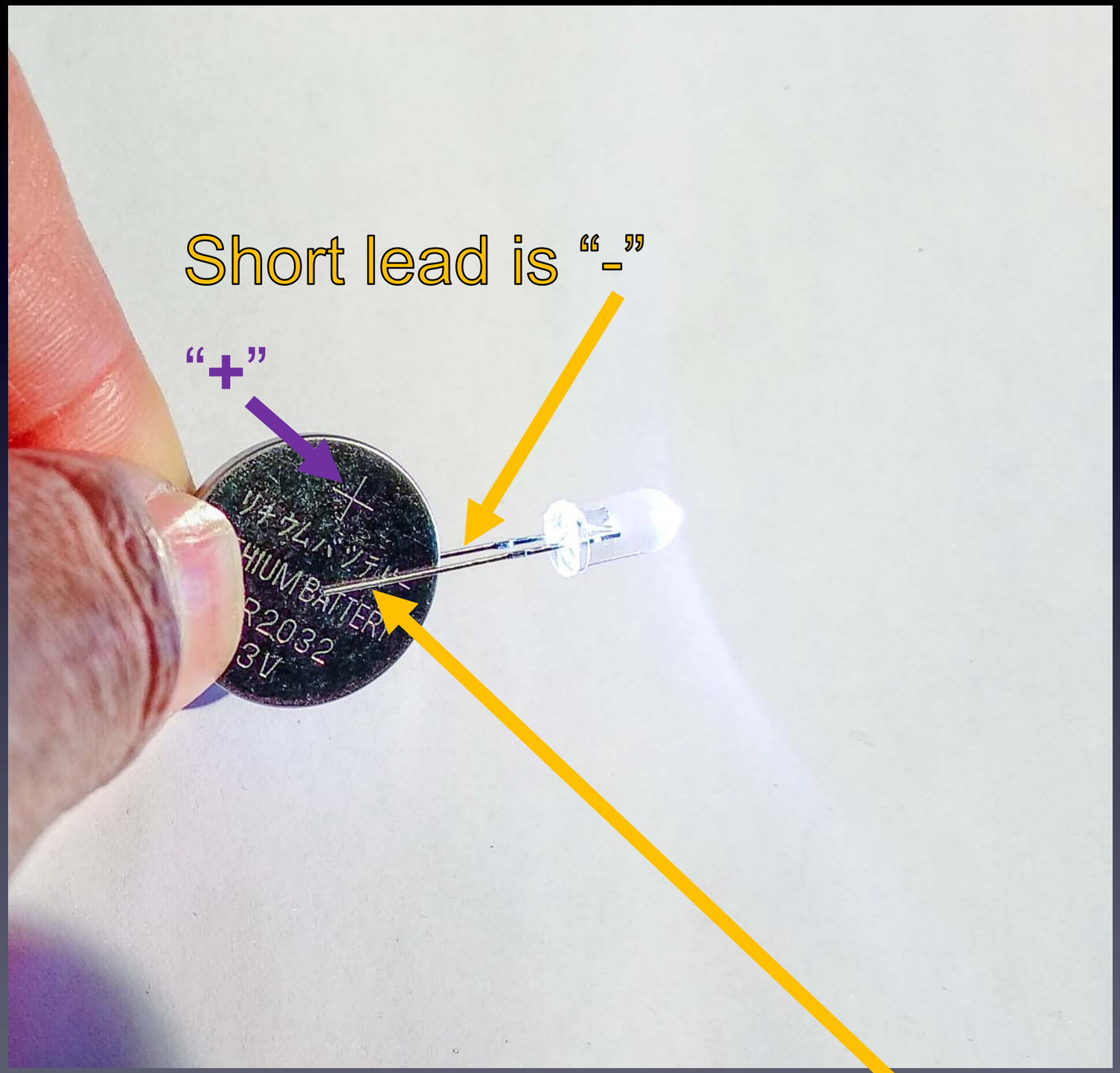
Solder Push Button Switch on the back (3rd pad)



Solder Push Button Switch on the back (4th pad)

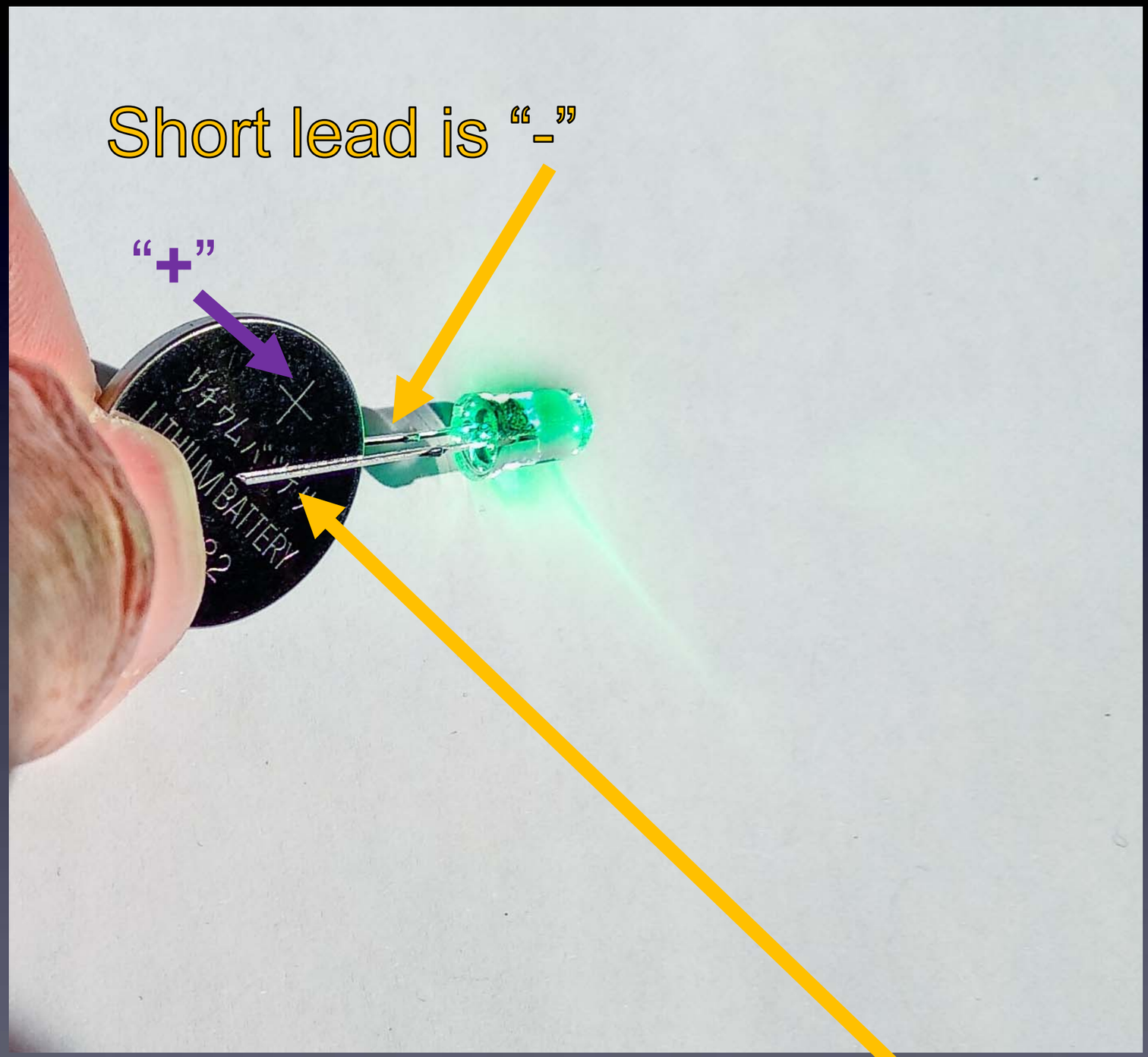


Test each LED to see which is the White LED and which is the Blinky LED



White LED

Test each LED to see which is the White LED and which is the Blinky LED

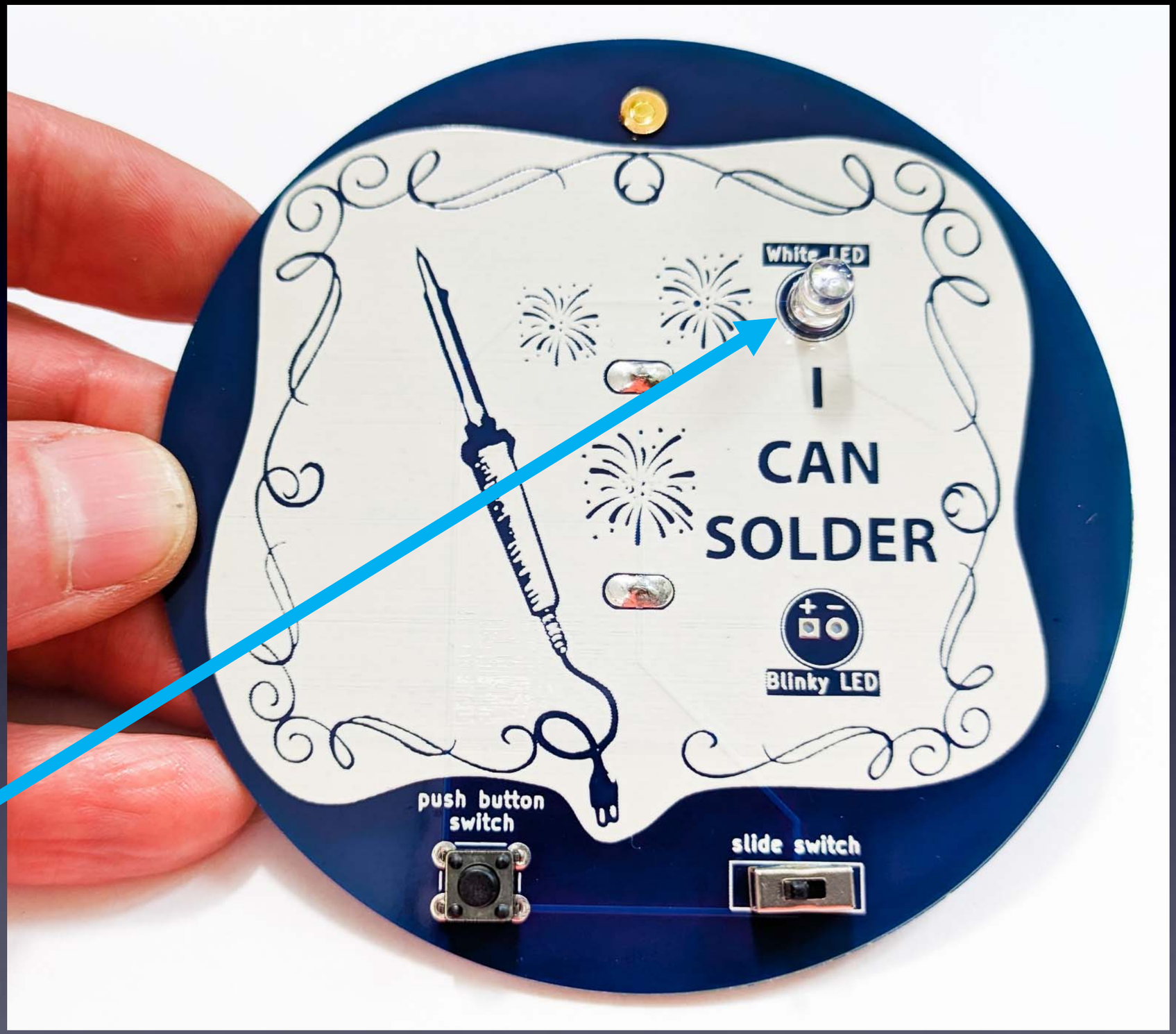


Blinky LED

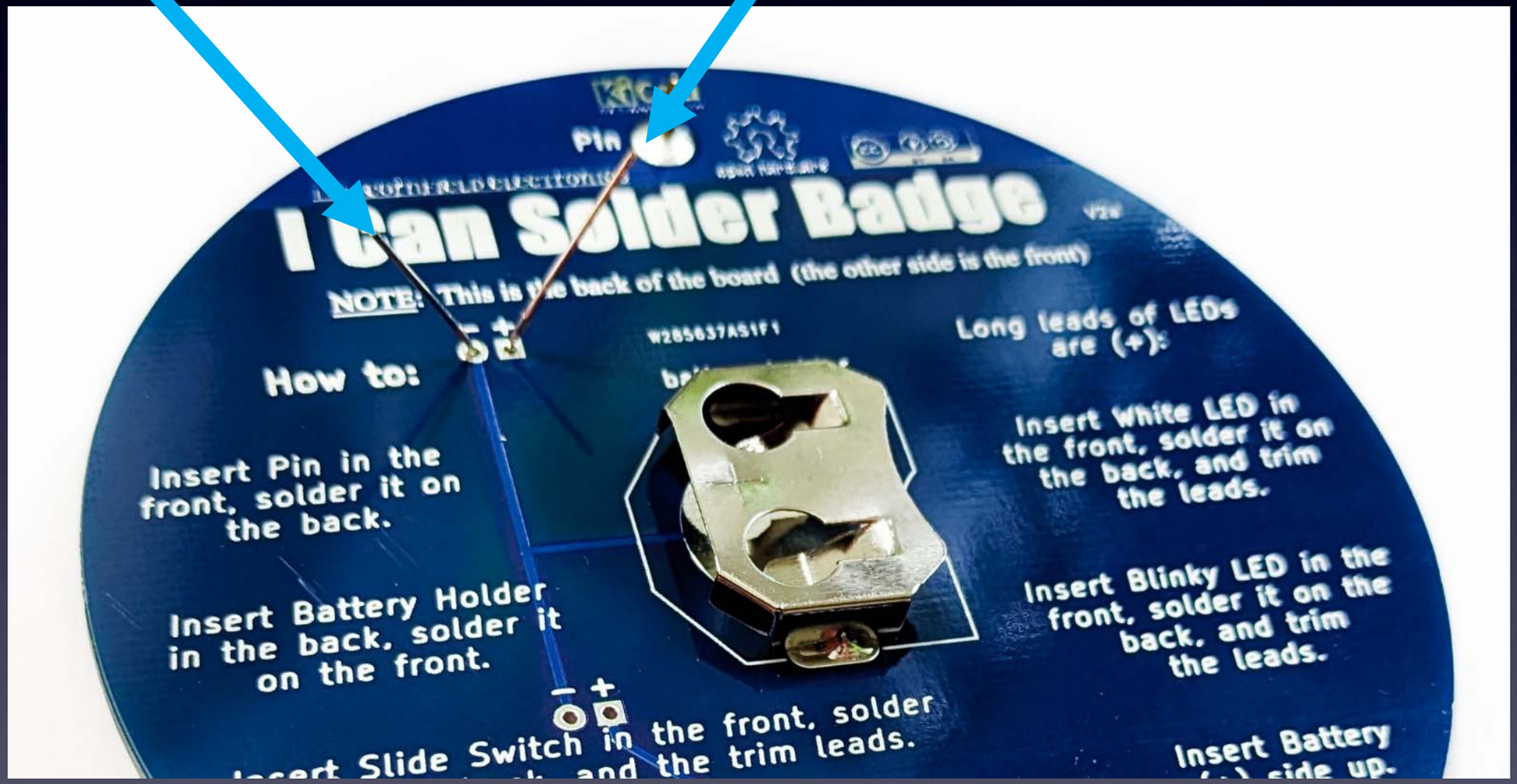
Insert White LED in the front



Insert White LED in the front



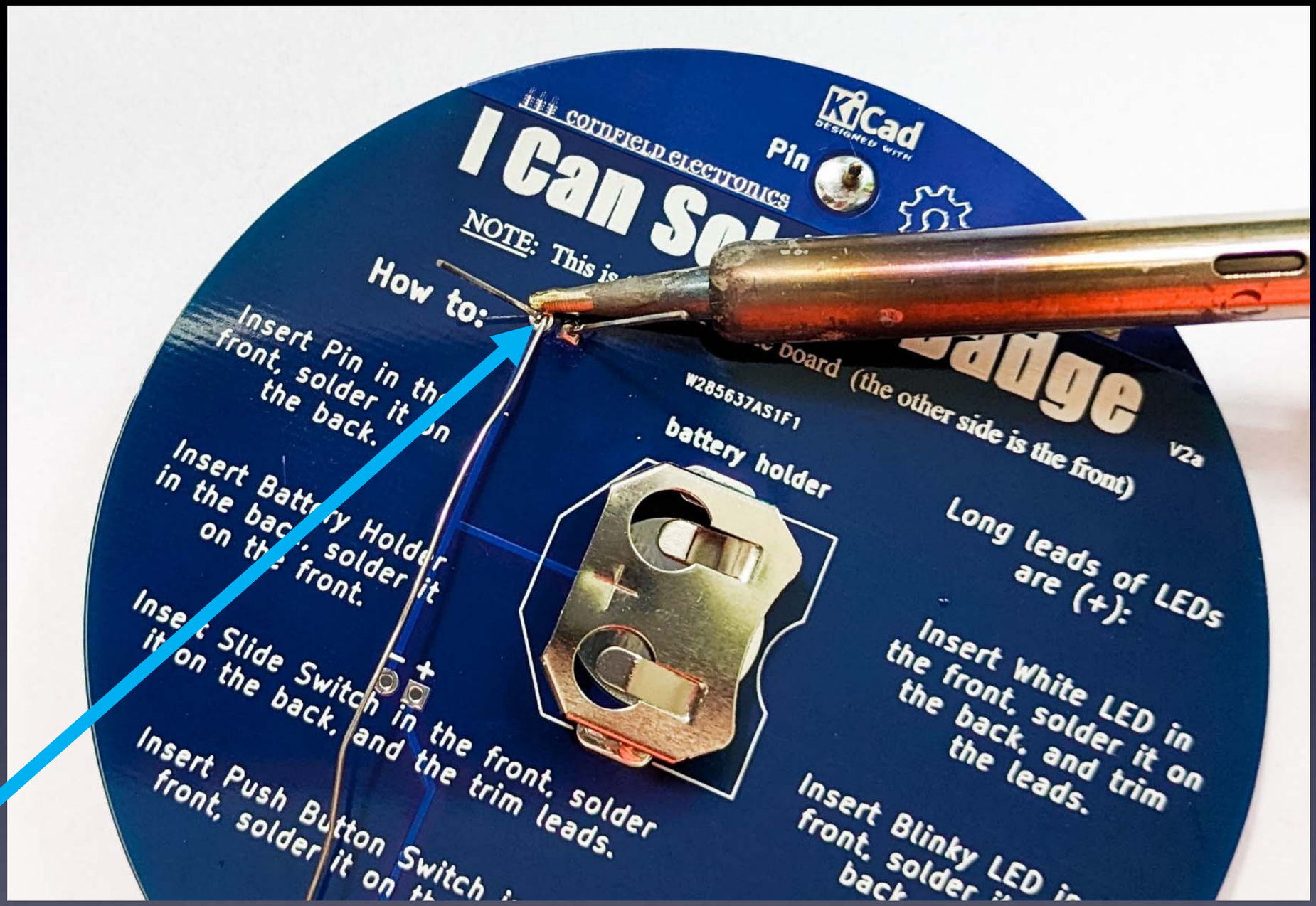
Leads of White LED bent like a “V”



Solder White LED on the back (1st pad)



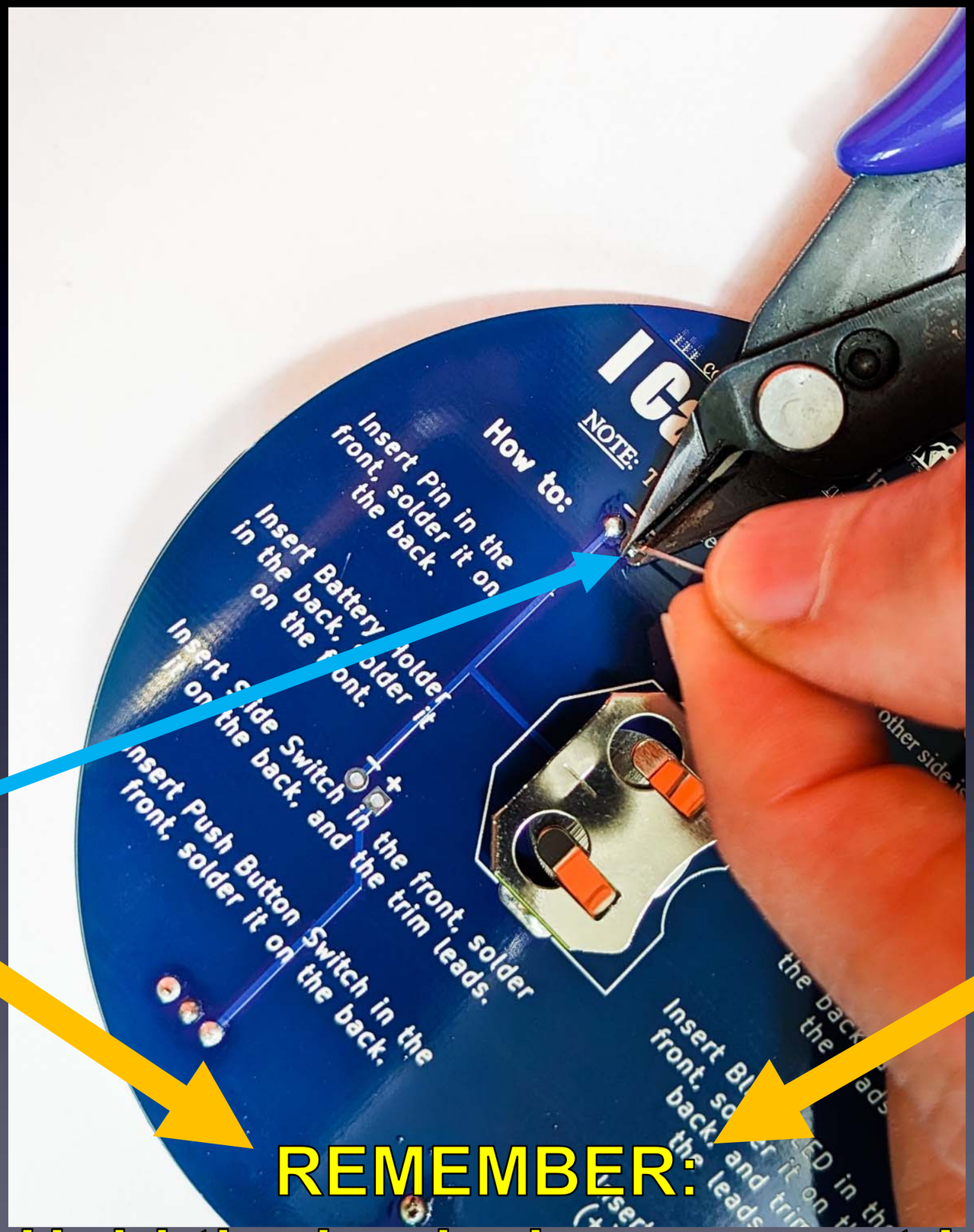
Solder White LED on the back (2nd pad)



Trim White LED leads (1st lead)



Trim White LED leads (2nd lead)



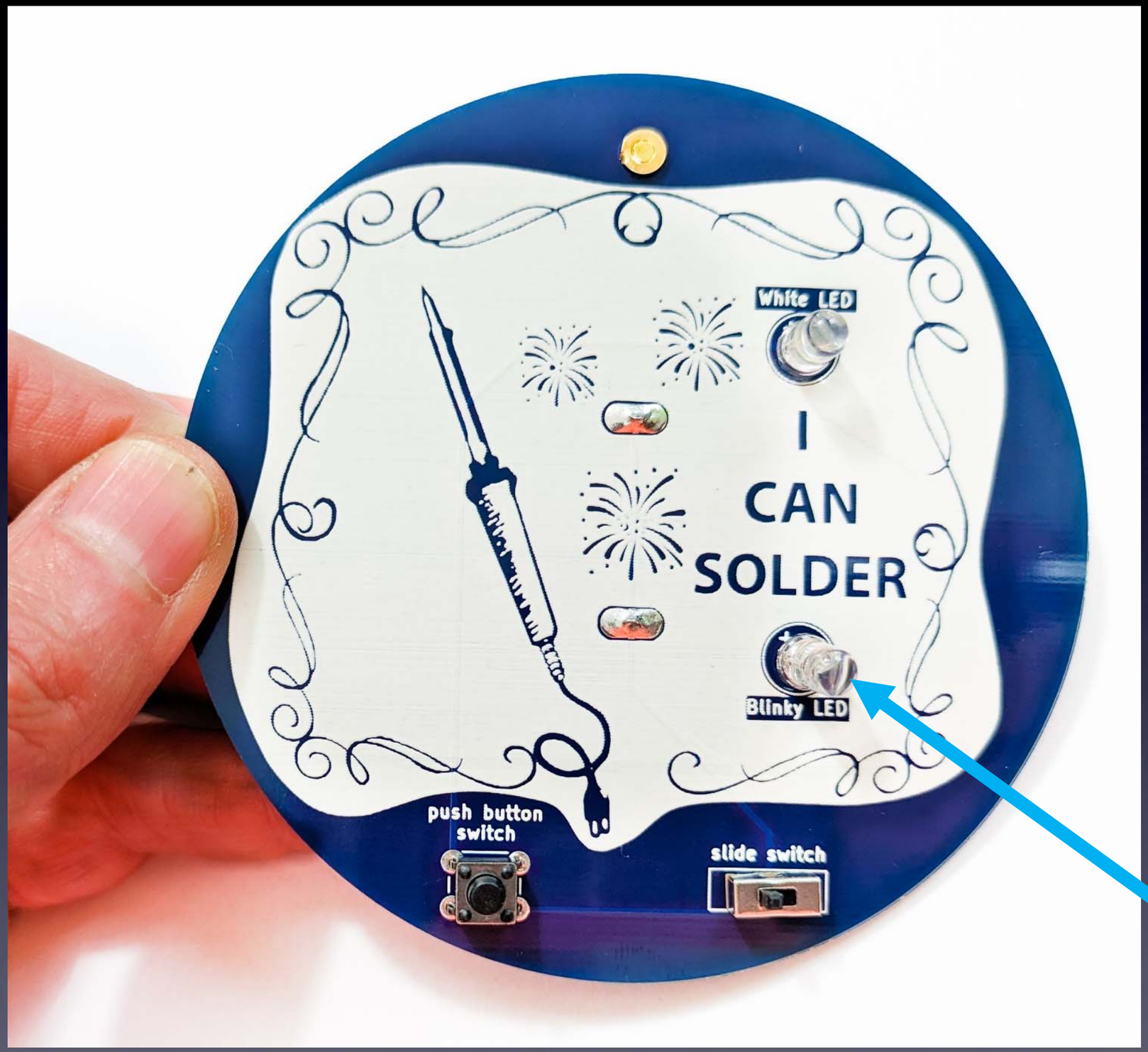
Insert Blinky LED in the front



Short lead is “-”

Long lead is “+”

Insert Blinky LED in the front



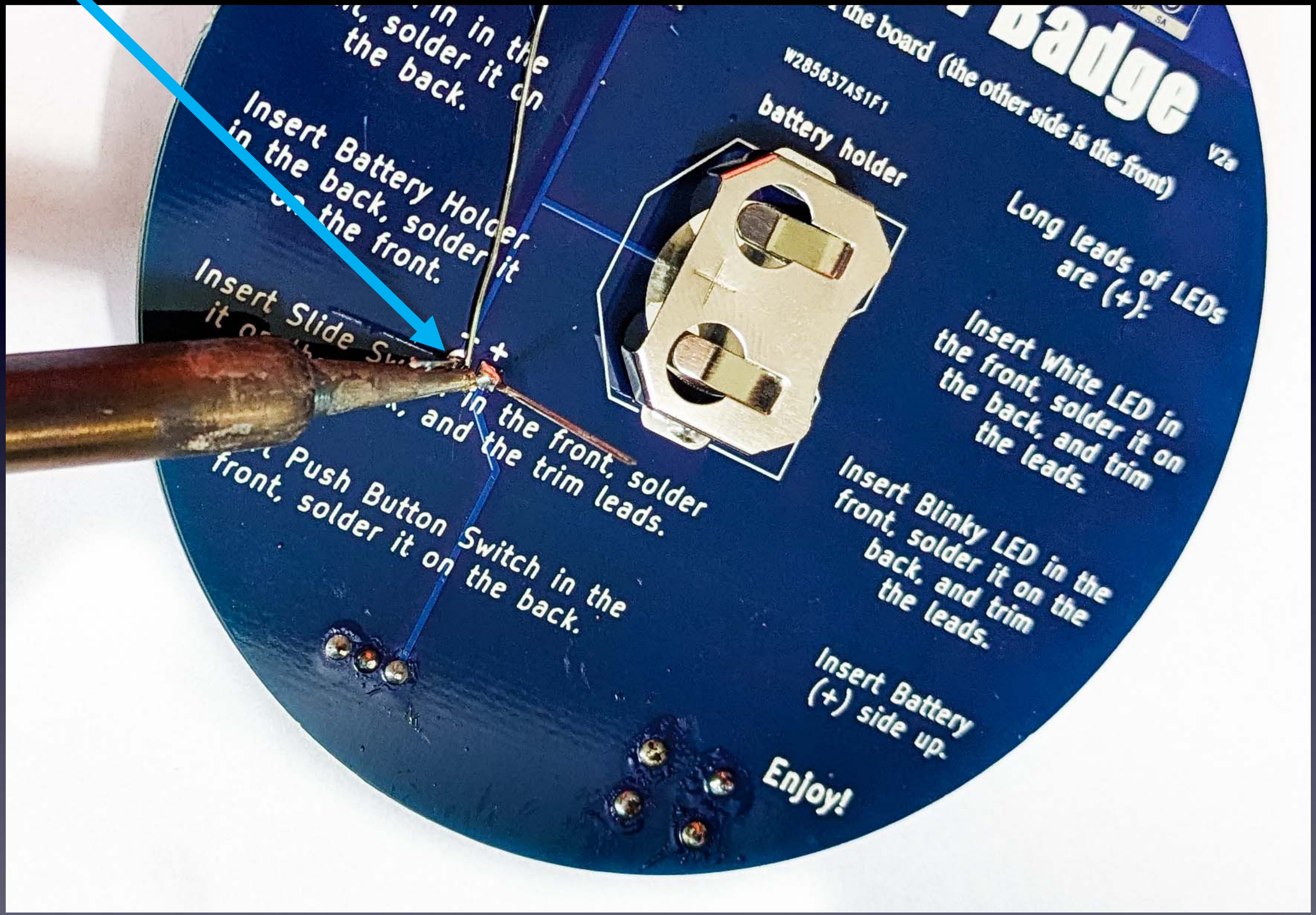
Leads of Blinky LED bent like a “V”



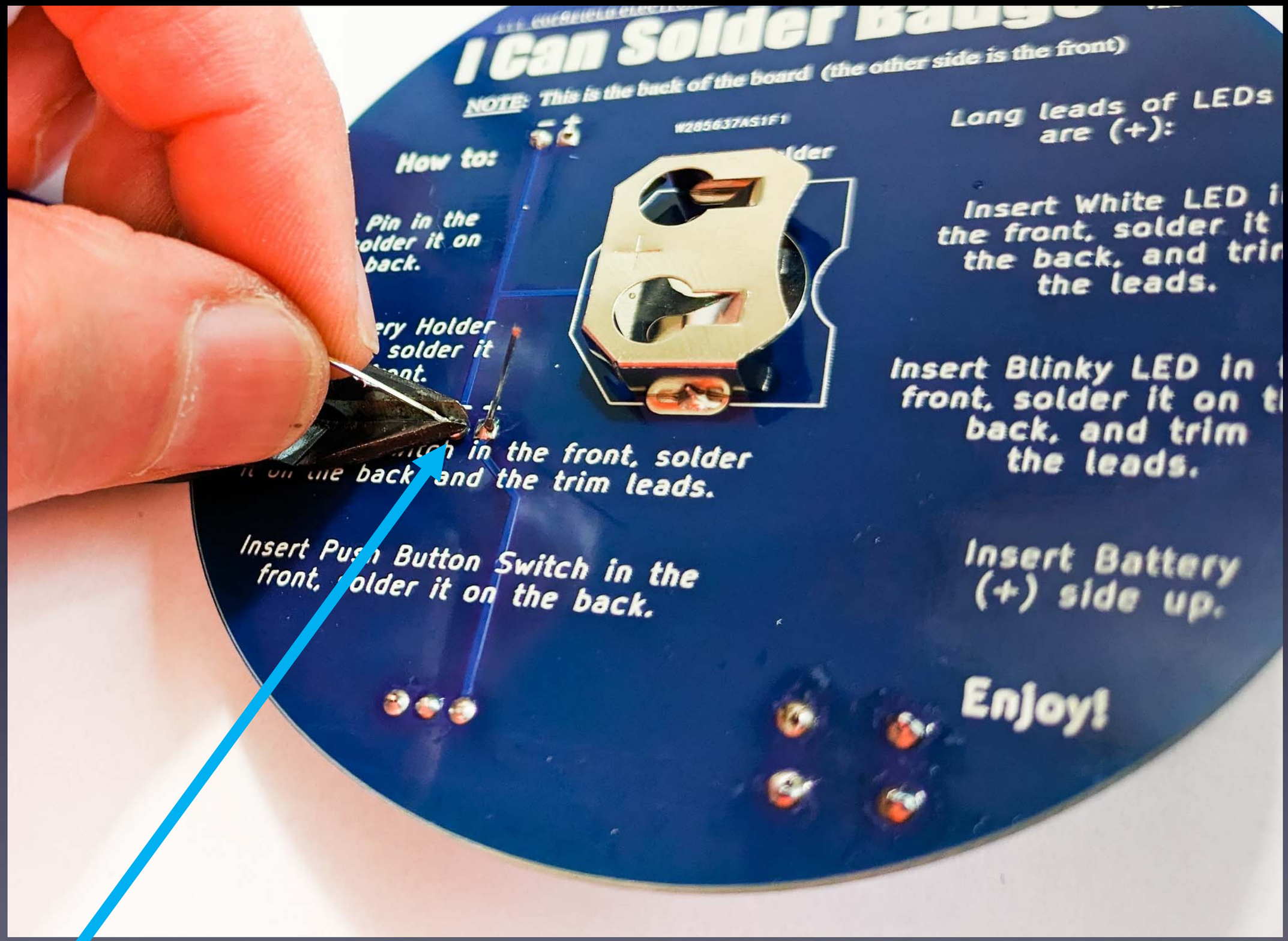
Solder Blinky LED on the back (1st pad)



Solder Blinky LED on the back (2nd pad)



Trim Blinky LED leads (1st lead)



Trim Blinky LED leads (2nd lead)

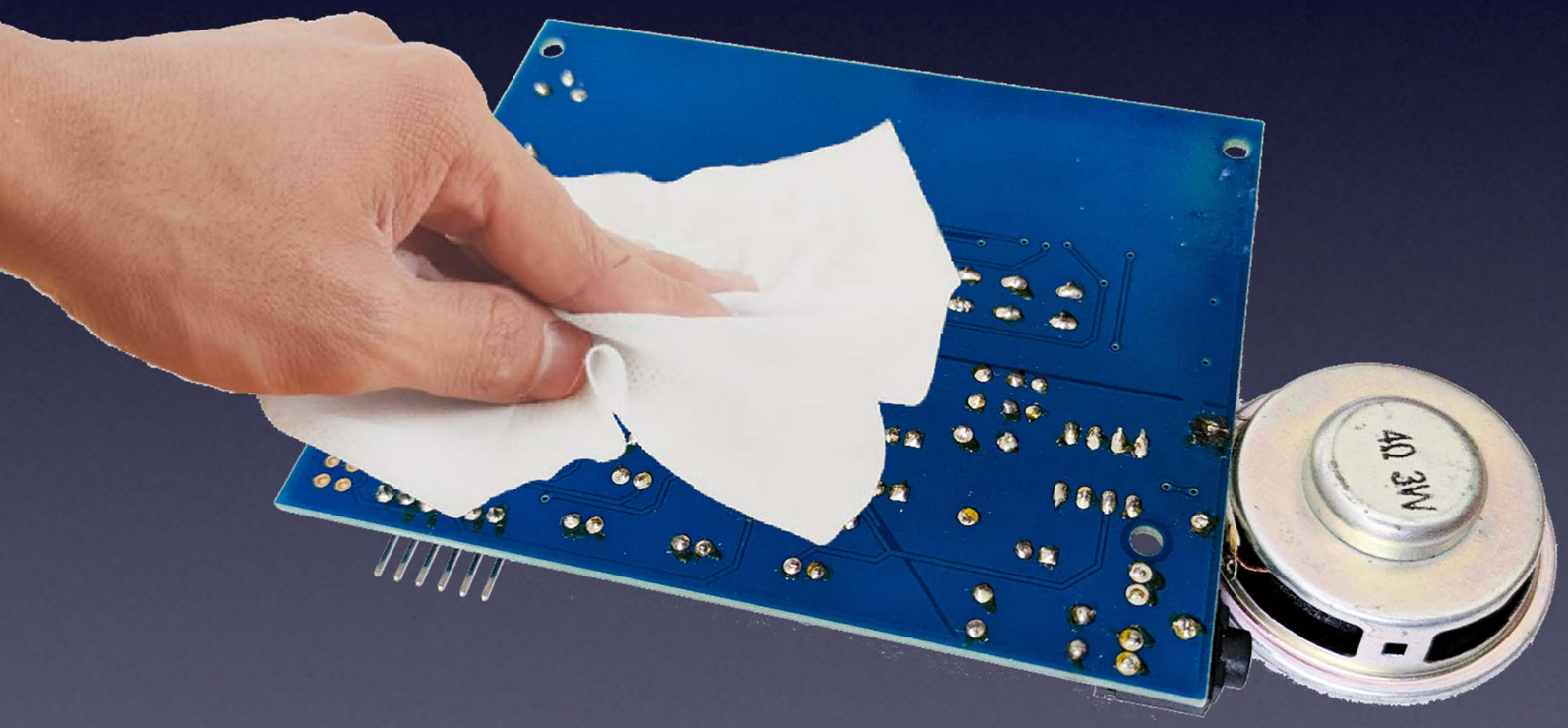


You are
now
finished
soldering!

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

Insert Battery (+) side up



Insert Battery (+) side up



All done!

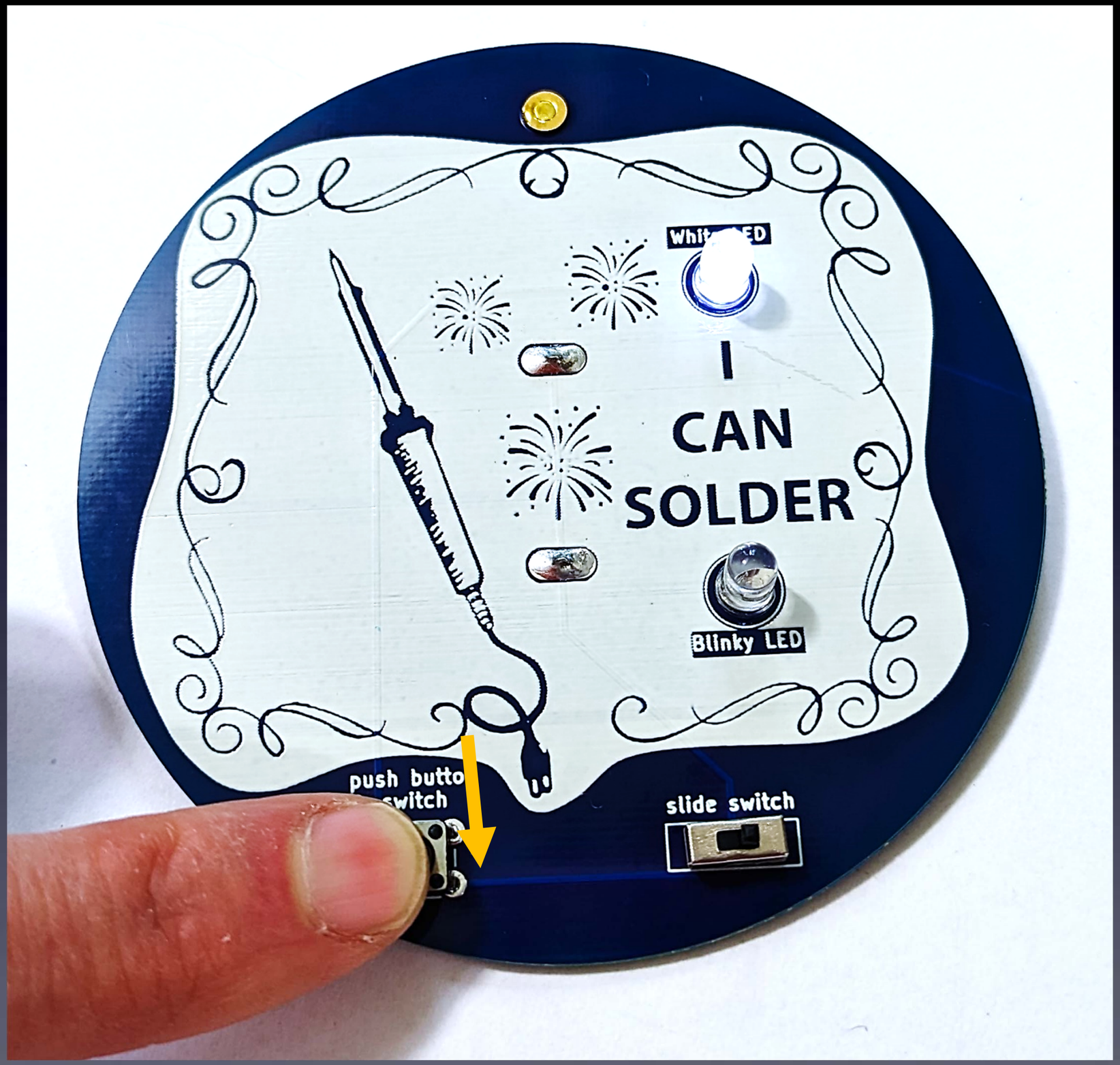


Turn on Blinky LED !



Move Slide Switch to the left to turn on the Blinky LED

Turn on White LED !



Press Push Button Switch to turn on the White LED

Turn on both White and Blinky LED !



Wear it !



Use the clasp





Please Remember:

to

Wash your hands

after soldering

I Can Solder Badge kit

Assembly Instructions

mitch@CornfieldElectronics.com



CORNFIELD ELECTRONICS

Blinky light and White flashlight

19-Apr-2025

I Can Solder Badge kit

Mitch Altman

Chief Scientist, **Cornfield Electronics**, San Francisco, CA
Inventor of **TV-B-Gone** universal remote controls
Co-founder of **3Ware** (successful Silicon Valley startup)
Pioneer of **VR** (in the mid-1980s)
Founding mentor at **HAX** (1st and biggest hardware accelerator)
Co-founder of **Noisebridge** (San Francisco hackerspace)
email: **mitch@CornfieldElectronics.com**
site: **www.CornfieldElectronics.com**
facebook: **maltman23**
flickr: **maltman23**
WeChat: **mitchaltman**
Fediverse: **@maltman23@mastodon.social**
Patreon: mitchaltman

Unhandled Eggception
Easterhegg 2025

CORNFIELD ELECTRONICS