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Soldering Is Easy!

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

CORNFIELD ELECTRONICS
useful electronics for a better world

Learn To Solder

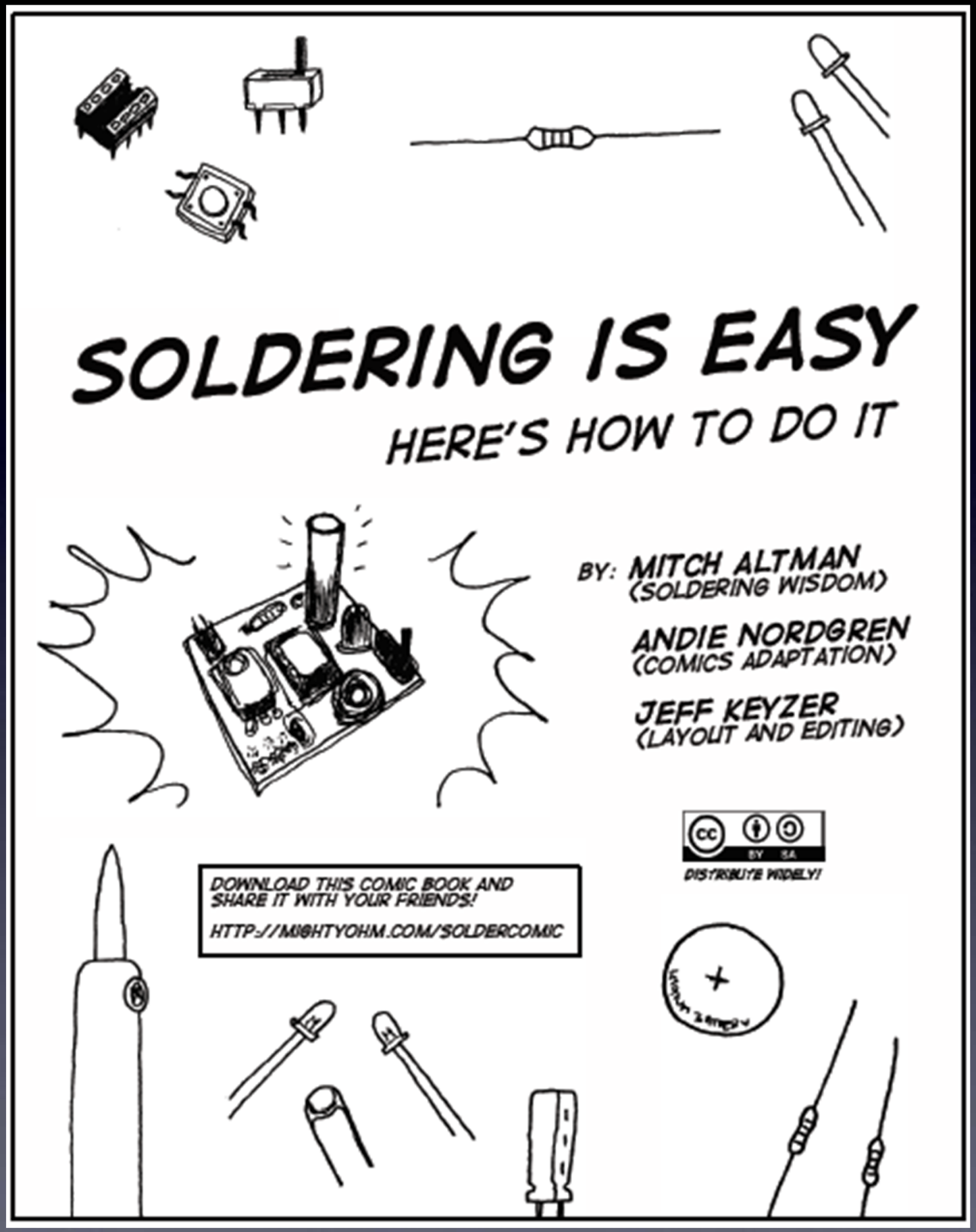
The following photos will
show you how to solder.

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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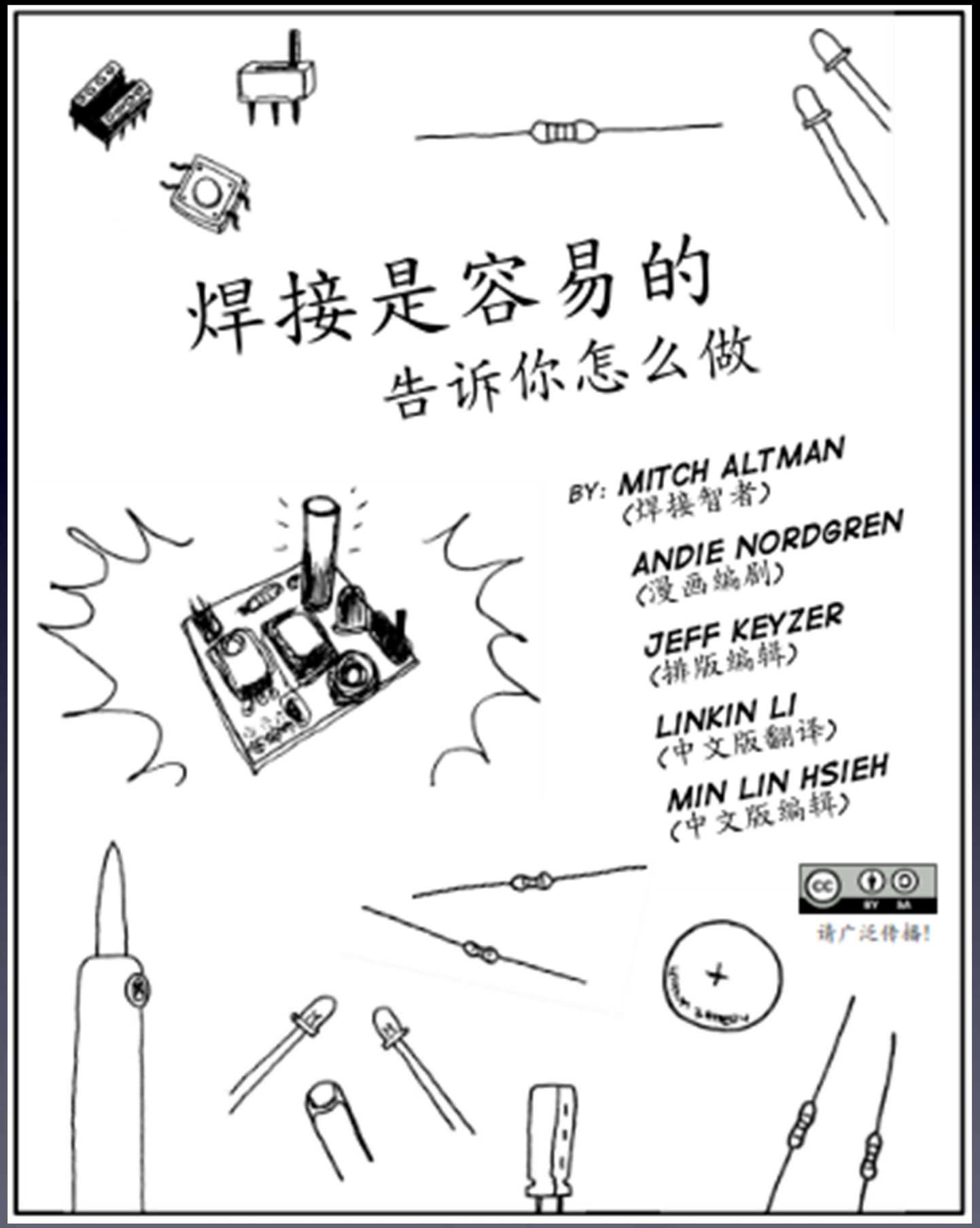

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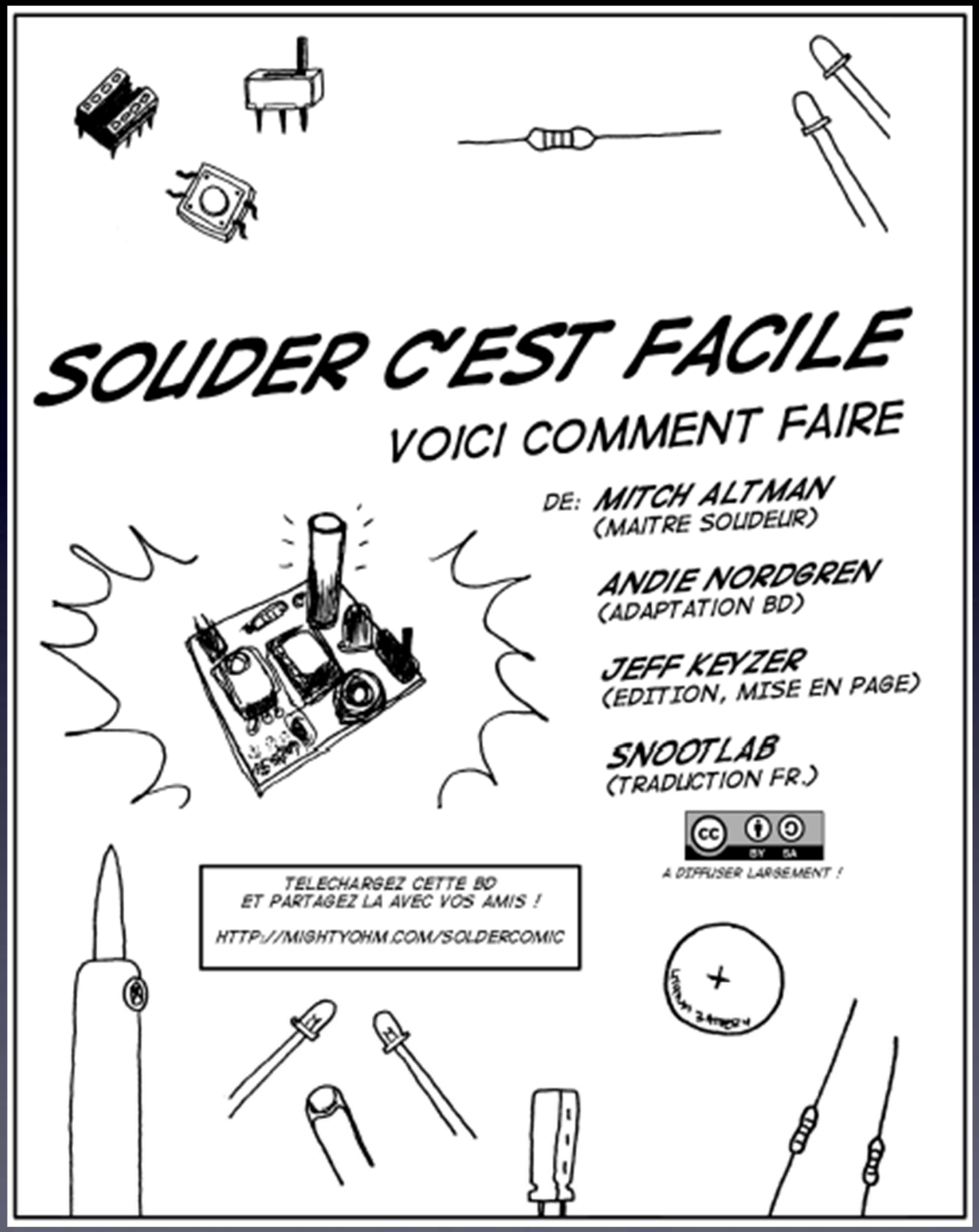

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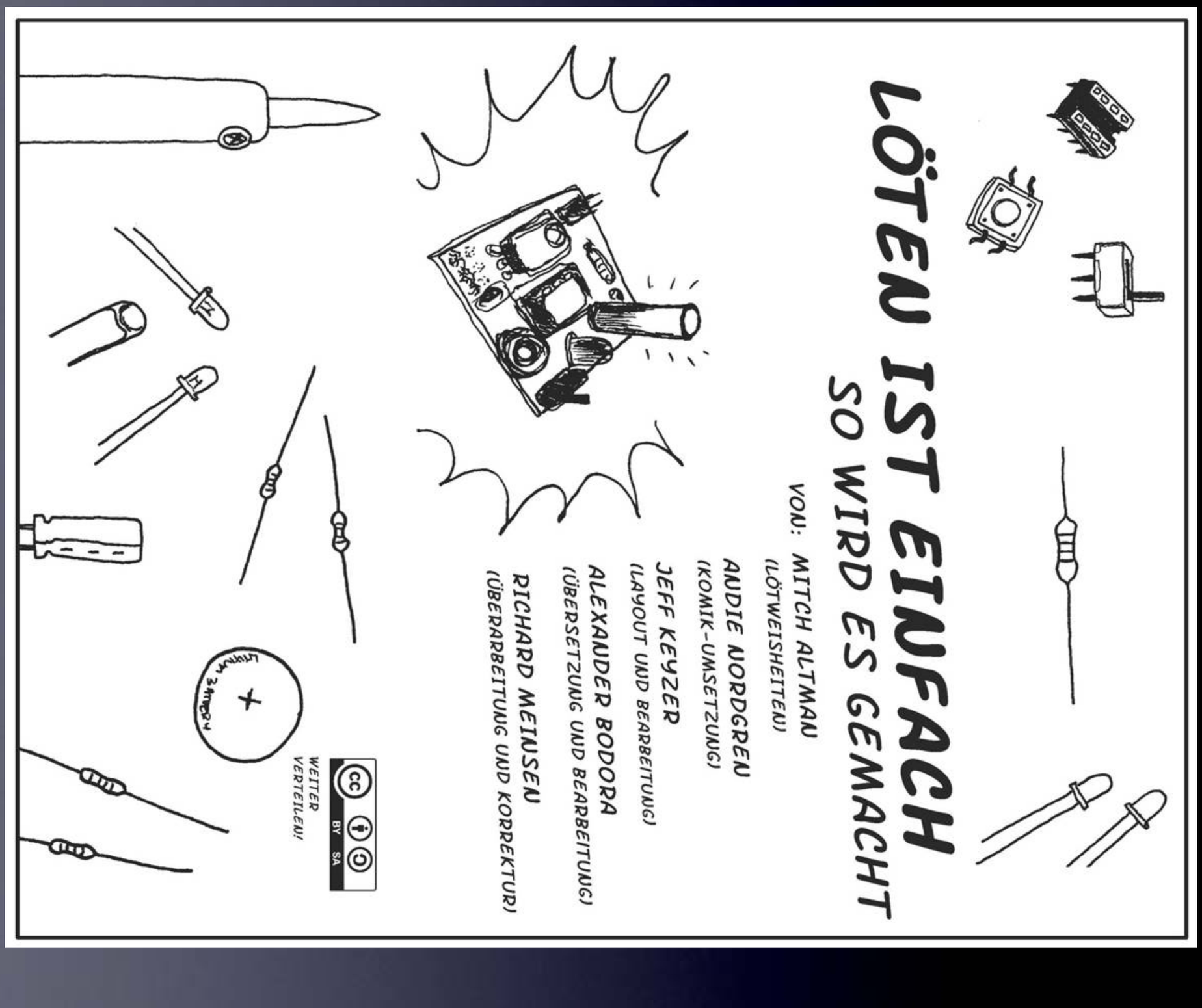

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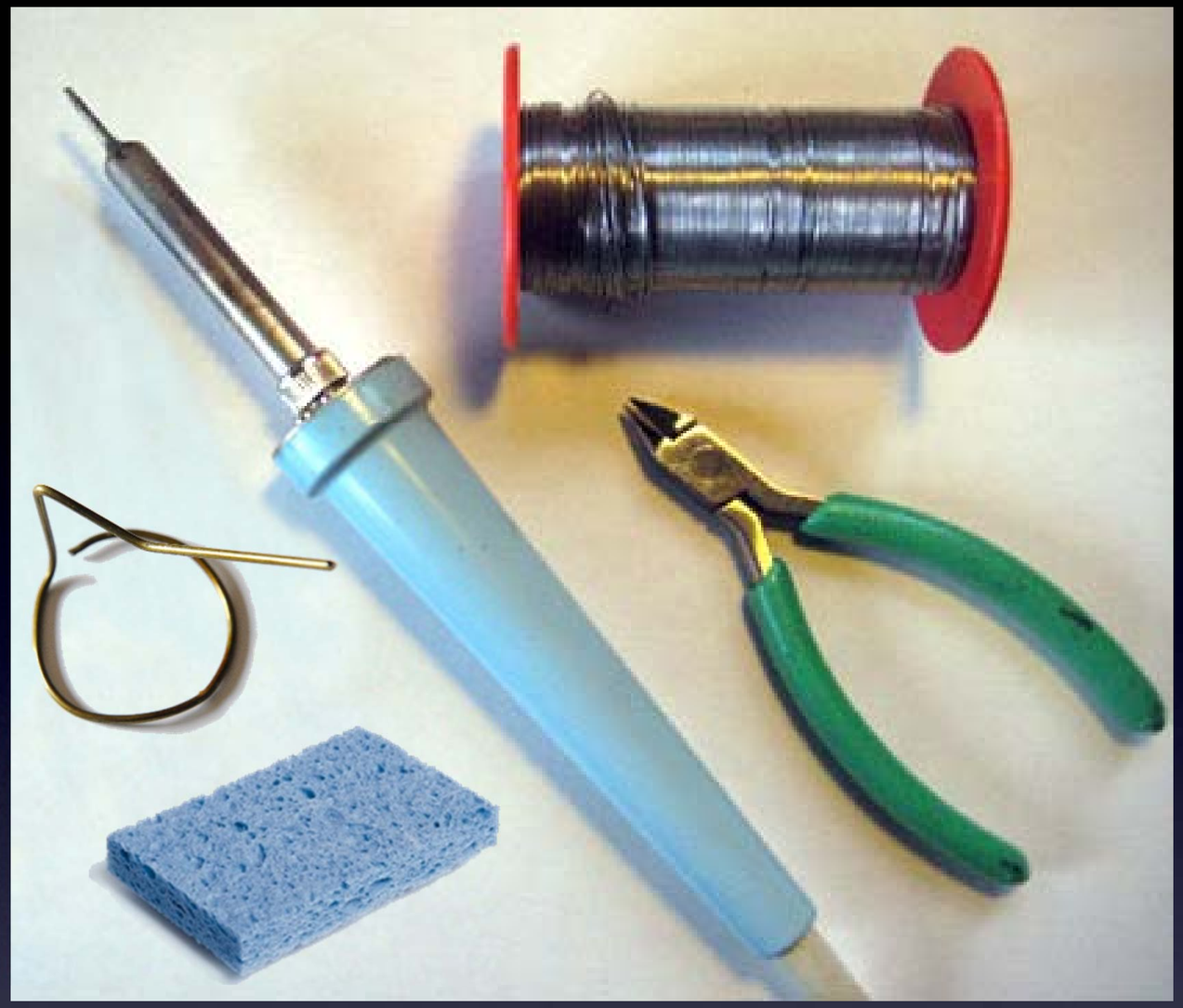
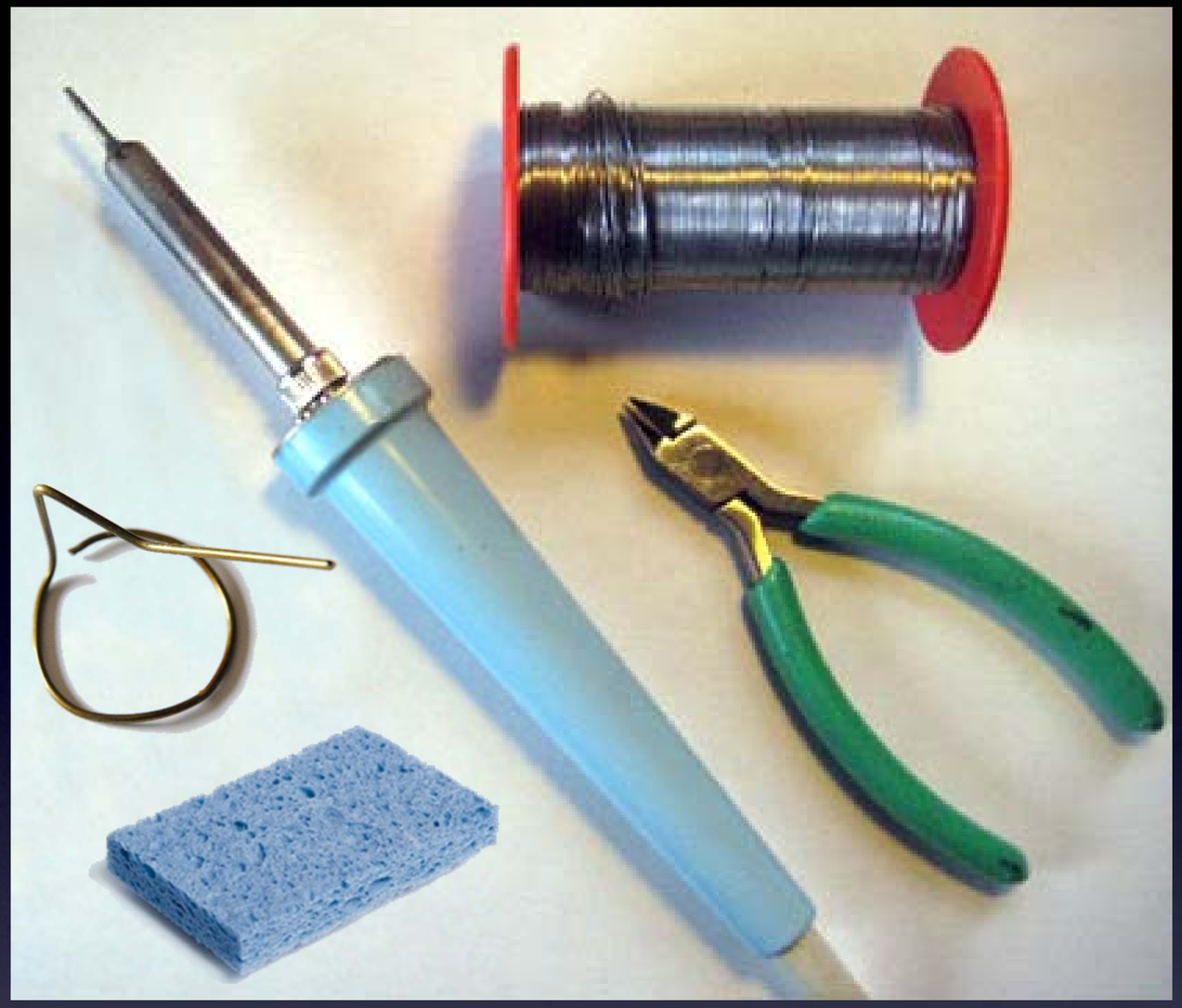


The tools you'll need:

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



Note:

If you use Lead-Free solder
it is very helpful
to also have
flux paste in a syringe
And Isopropyl Alcohol

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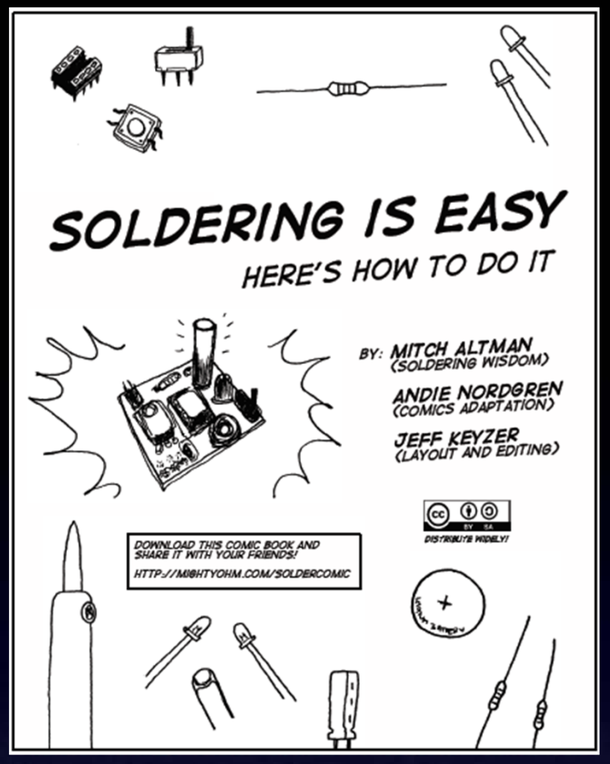
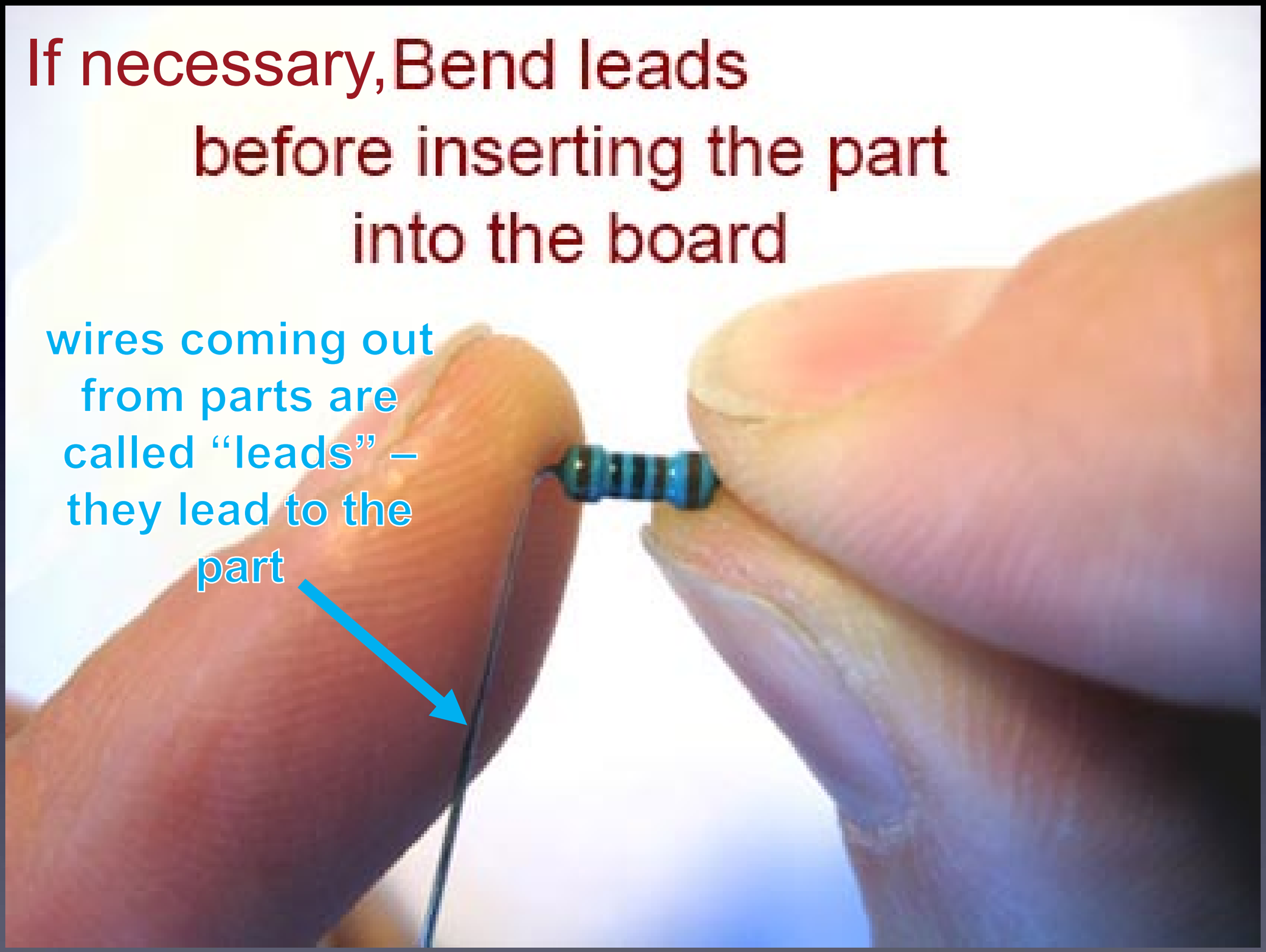


The following photos will
show you how to solder a resistor.

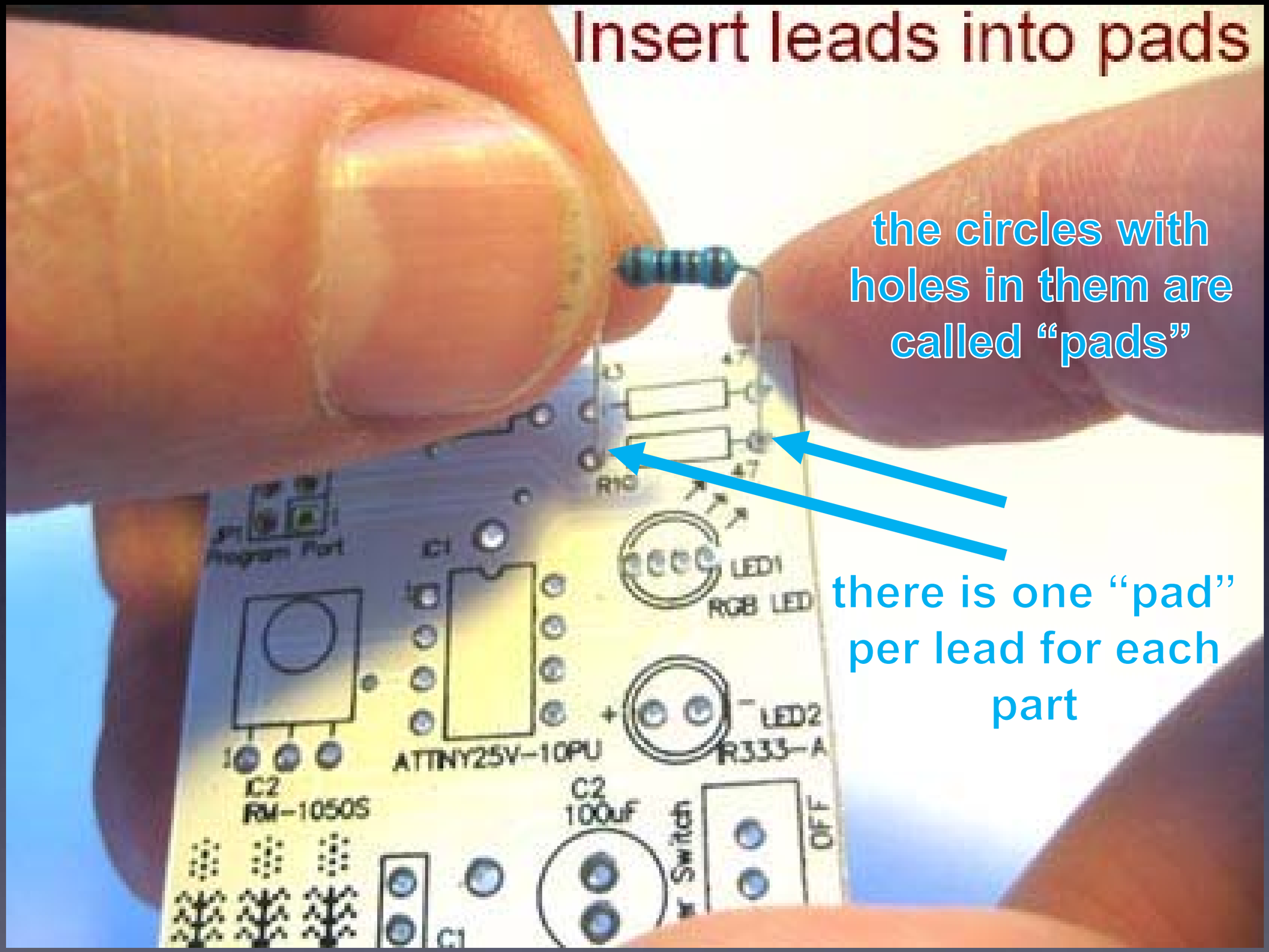
There are no resistors in some kits.
But the soldering procedure is the
same for all parts.

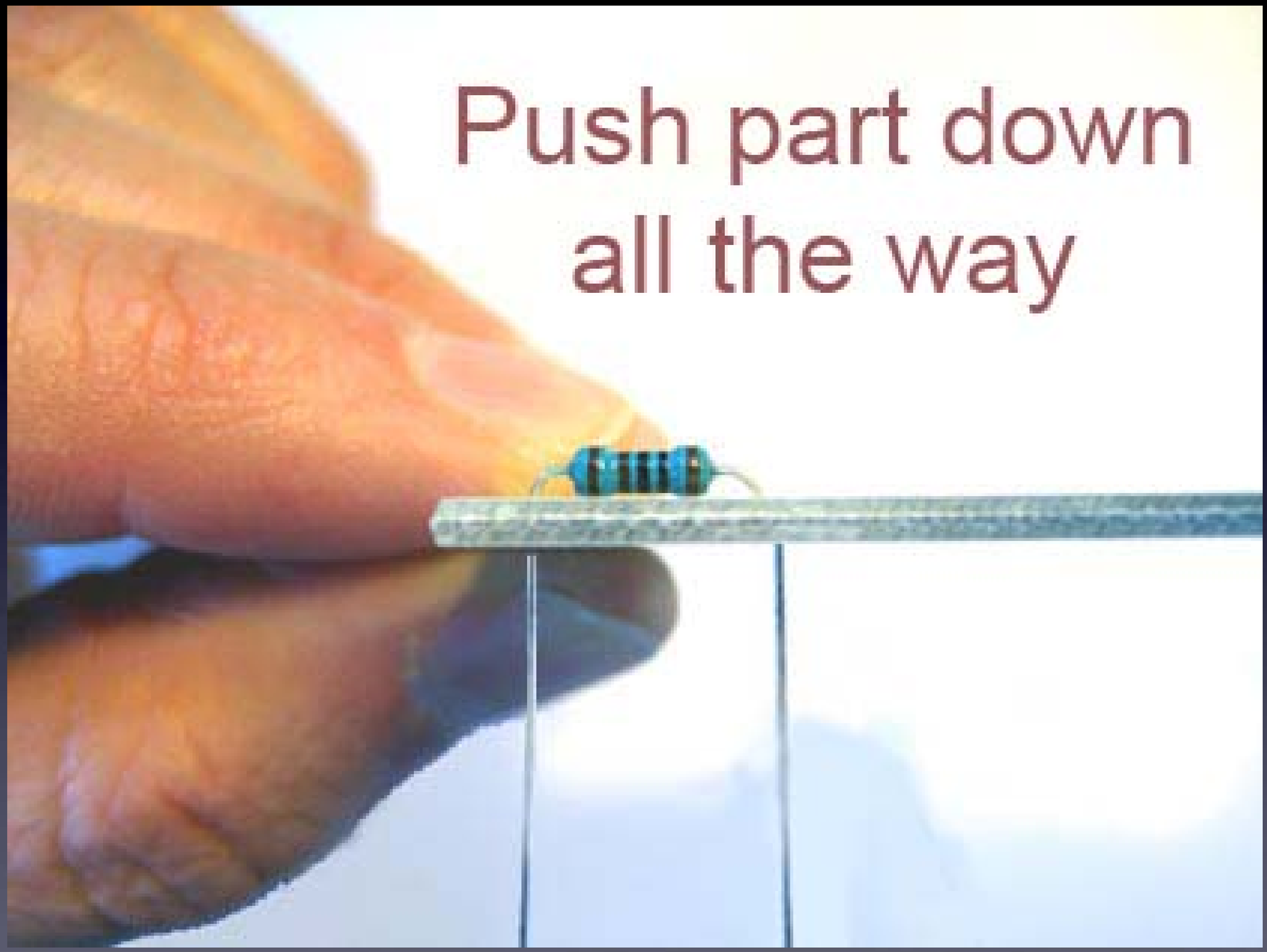
Some parts, such as resistors, need their leads bent first

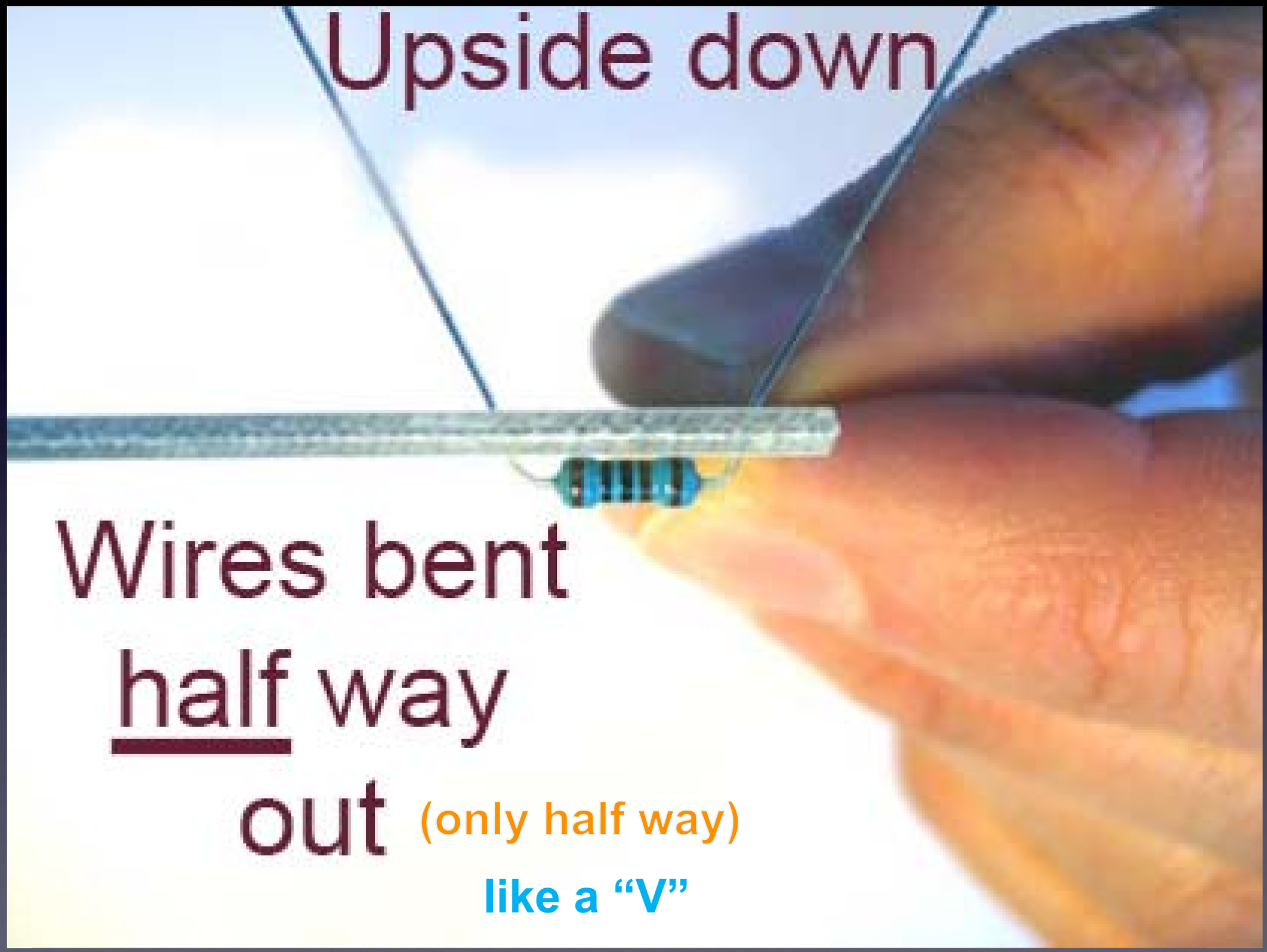


Most kits have resistors, like this part:

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


Insert leads into pads
the circles with holes in them are called “pads”
there is one “pad” per lead for each part
R10
47
LED1
RGB LED
IC1
ATTINY25V-10PU
LED2
R333-A
IC2
RM-1050S
C2
100uF
C1
OFF


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!

A decent kind of solder for DIY electronics:

This is the only good Lead-Free solder I have found!

(after years of searching)

Chip Quik **Germanium-Doped** Solder

Sn99/Cu0.7/Ni0.05/Ge0.006

0.031” diameter (0.8mm)

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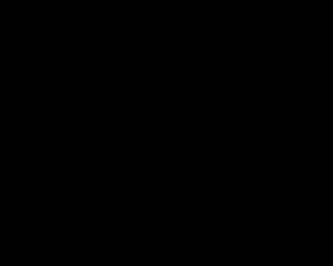

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Note:

If you use *Lead-Free* solder
it is *very 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)

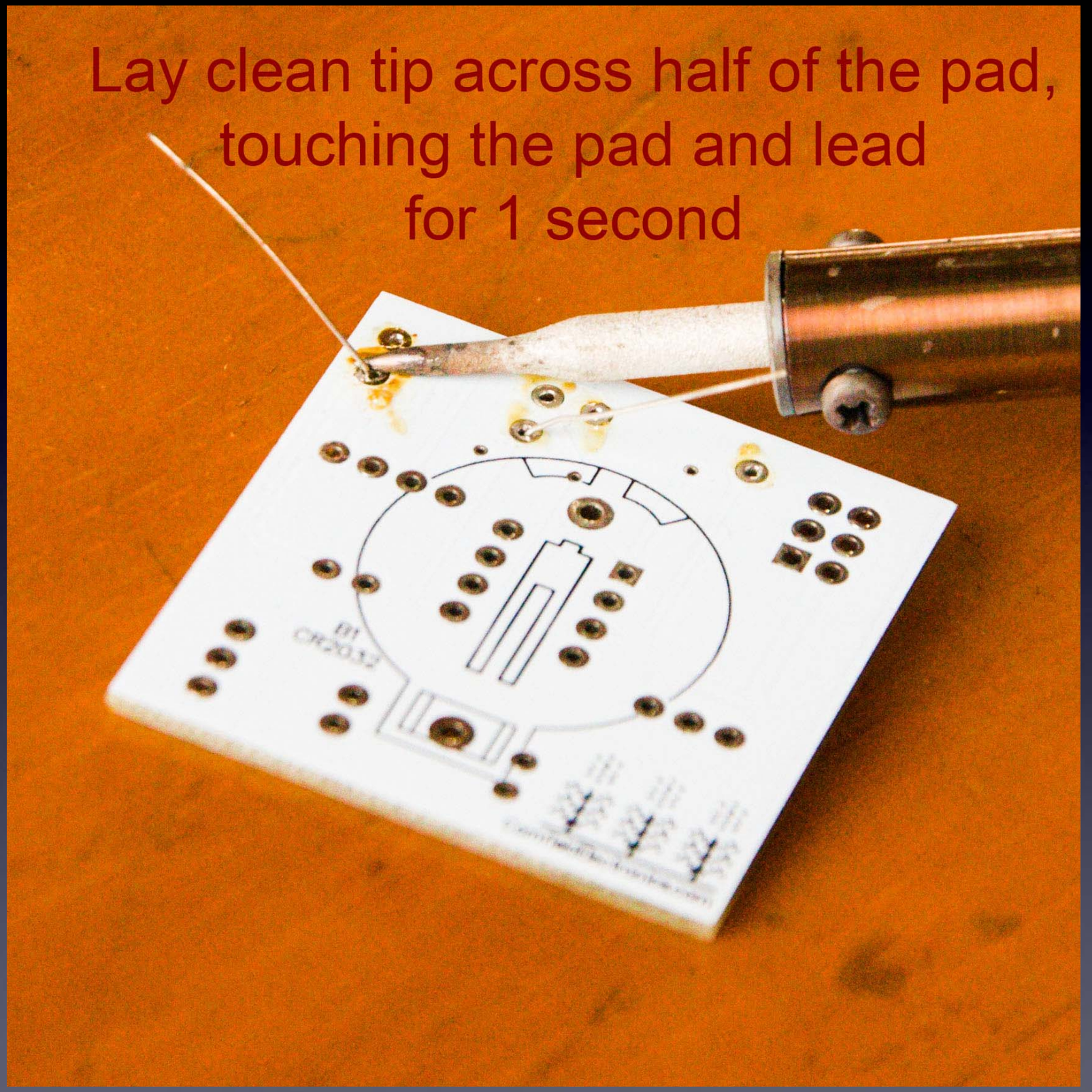
Bang (lightly) 3 times,

Swipe, Rotate, Swipe (on the sponge):

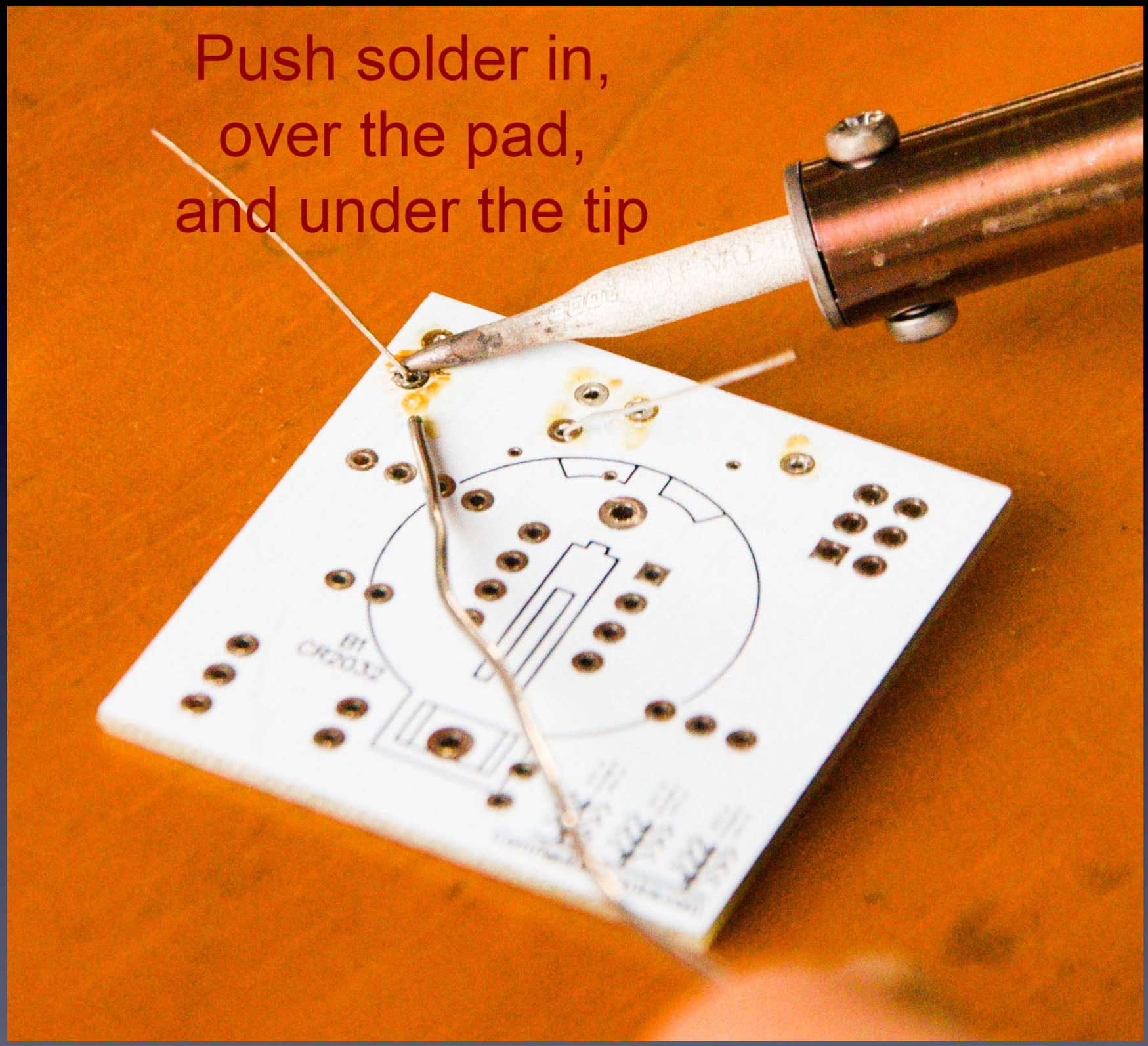
Keep the tip shiny silver!

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 <u>underside</u> of the soldering iron tip
(not the side or top of the soldering iron tip)!

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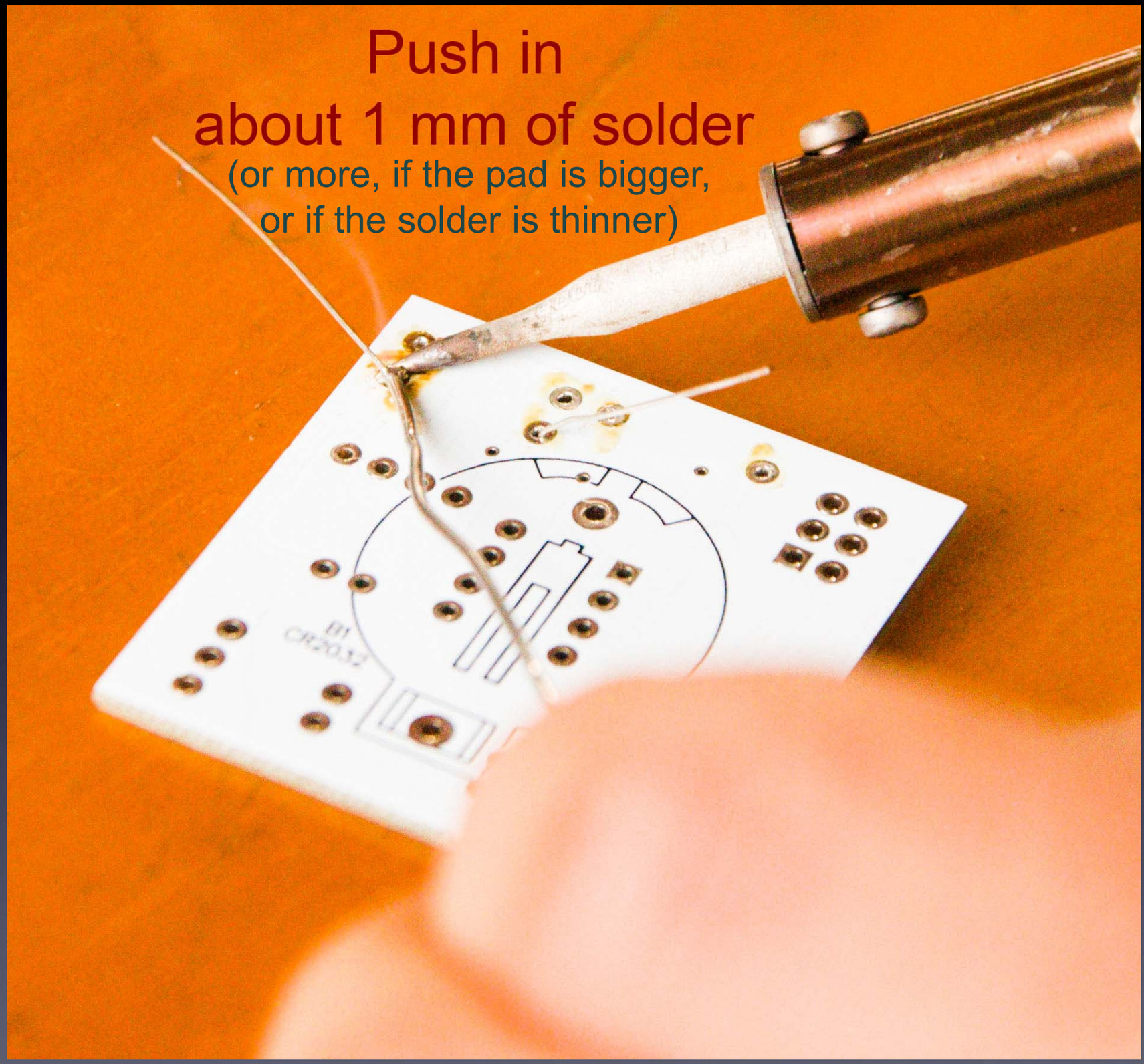

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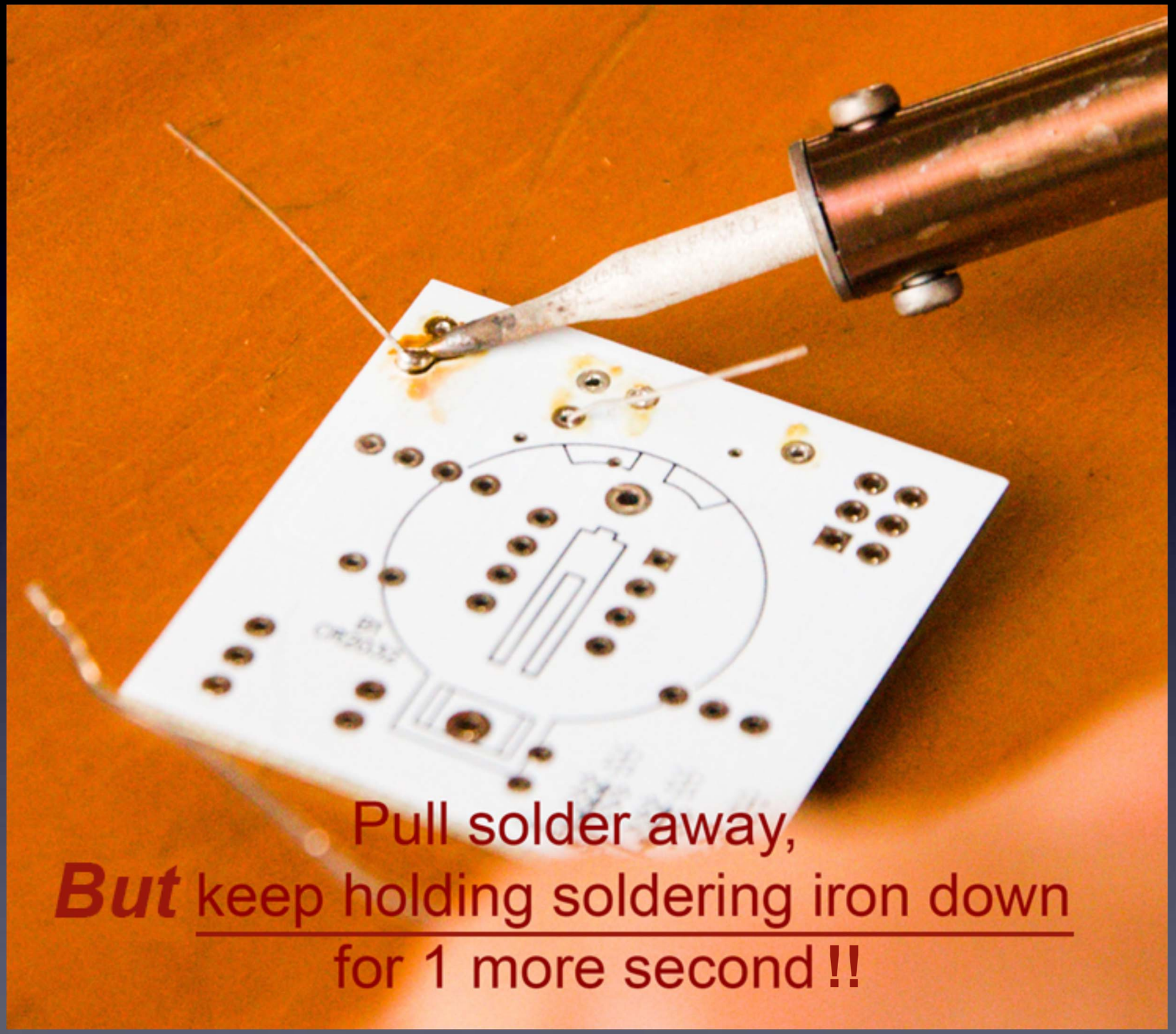
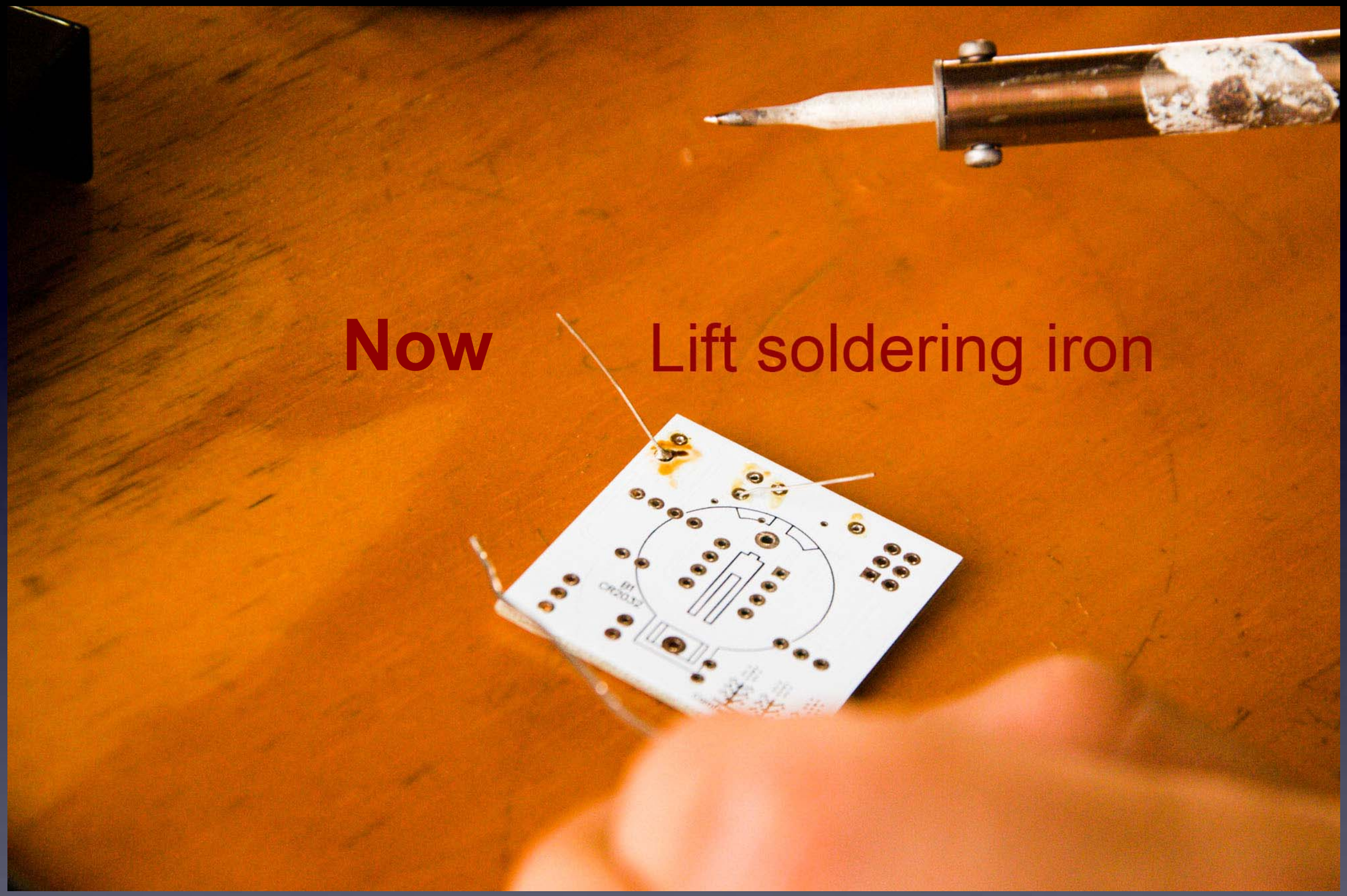
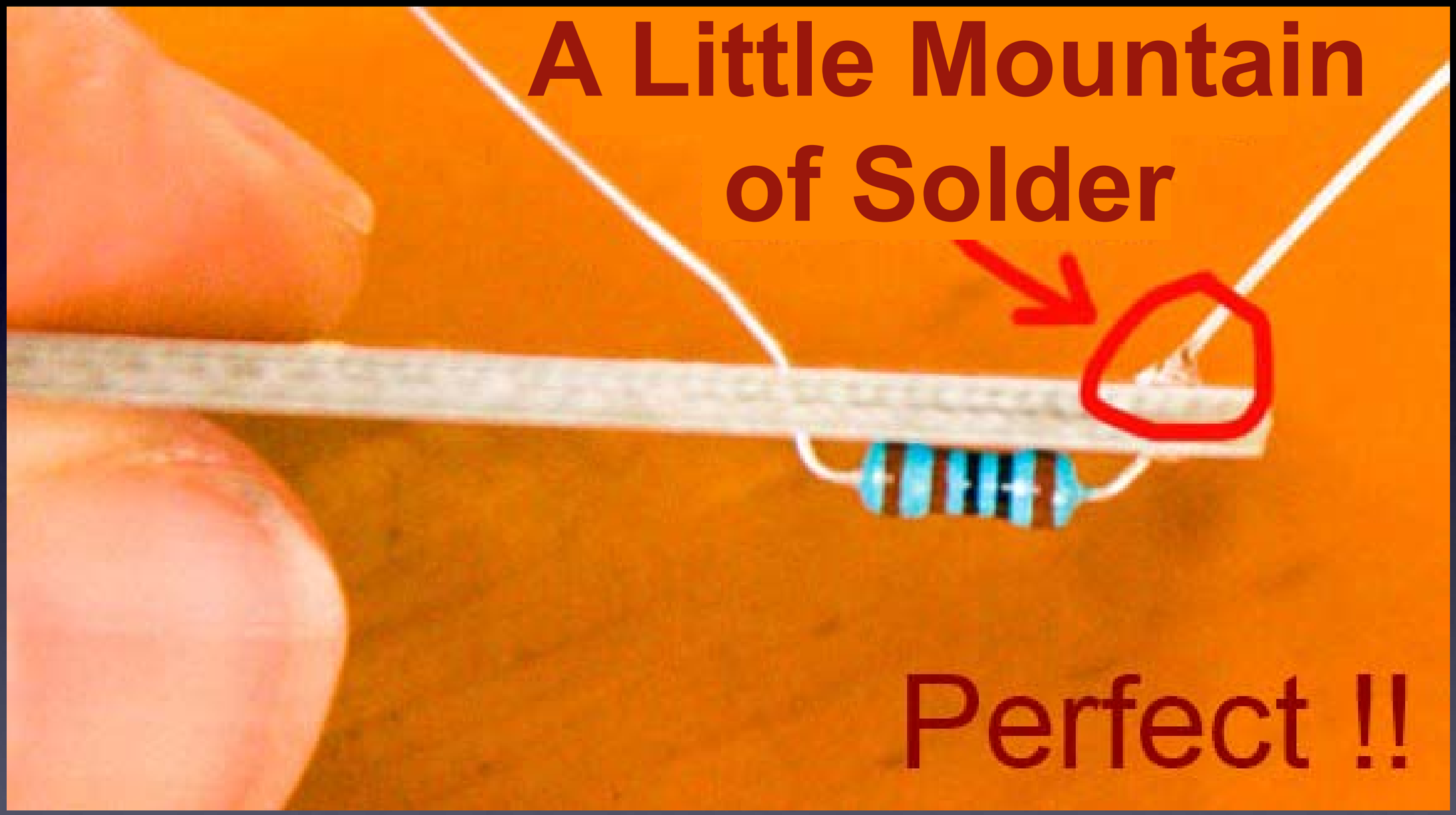

Pull solder away,
But keep holding soldering iron down
for 1 more second !!

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 !

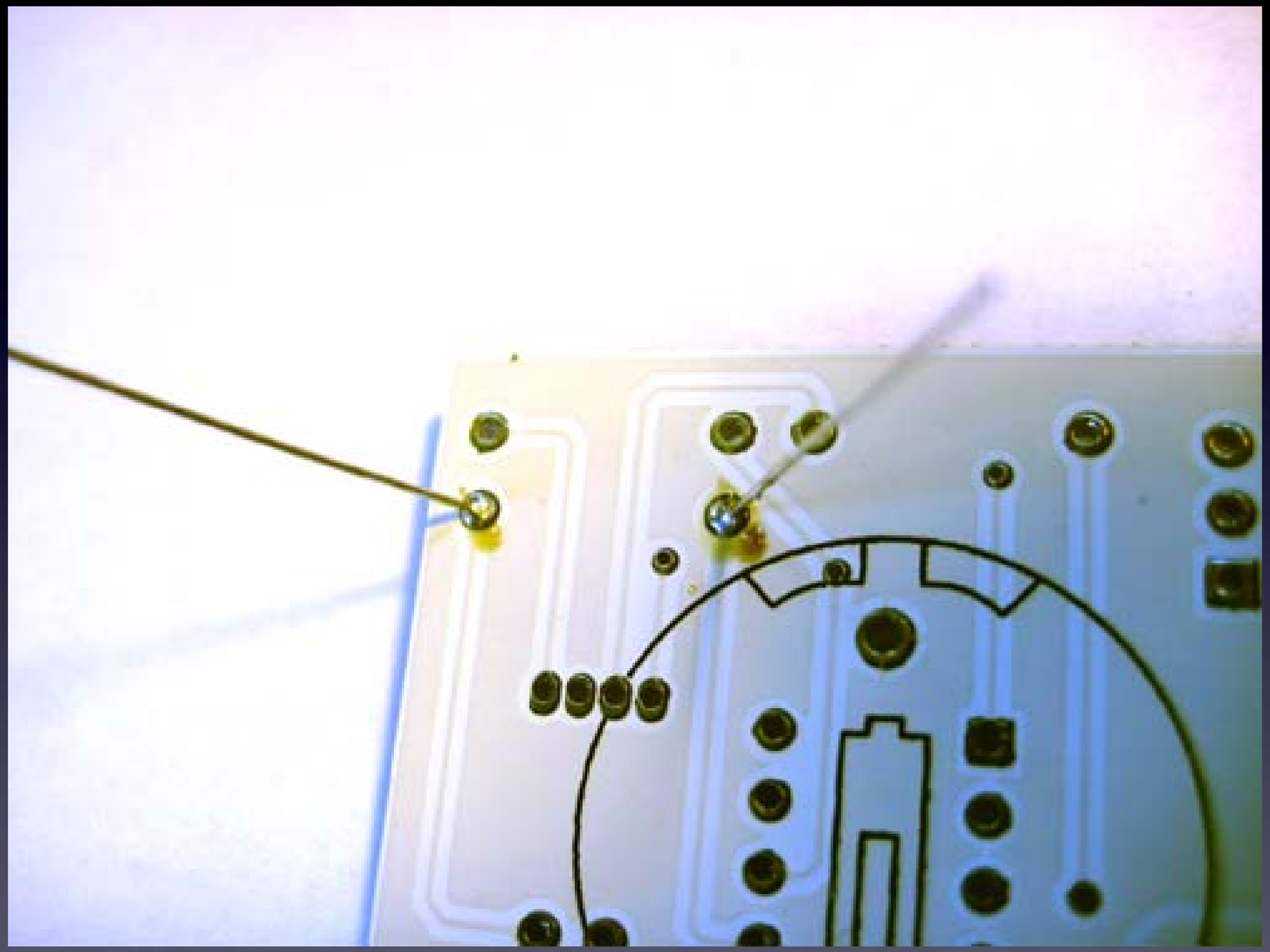
The Rhythm !

and speed (about 1 second per step)

Lift Tip

If you are using solder WITH lead (Pb), you can now

Solder all of the leads of the part to the board

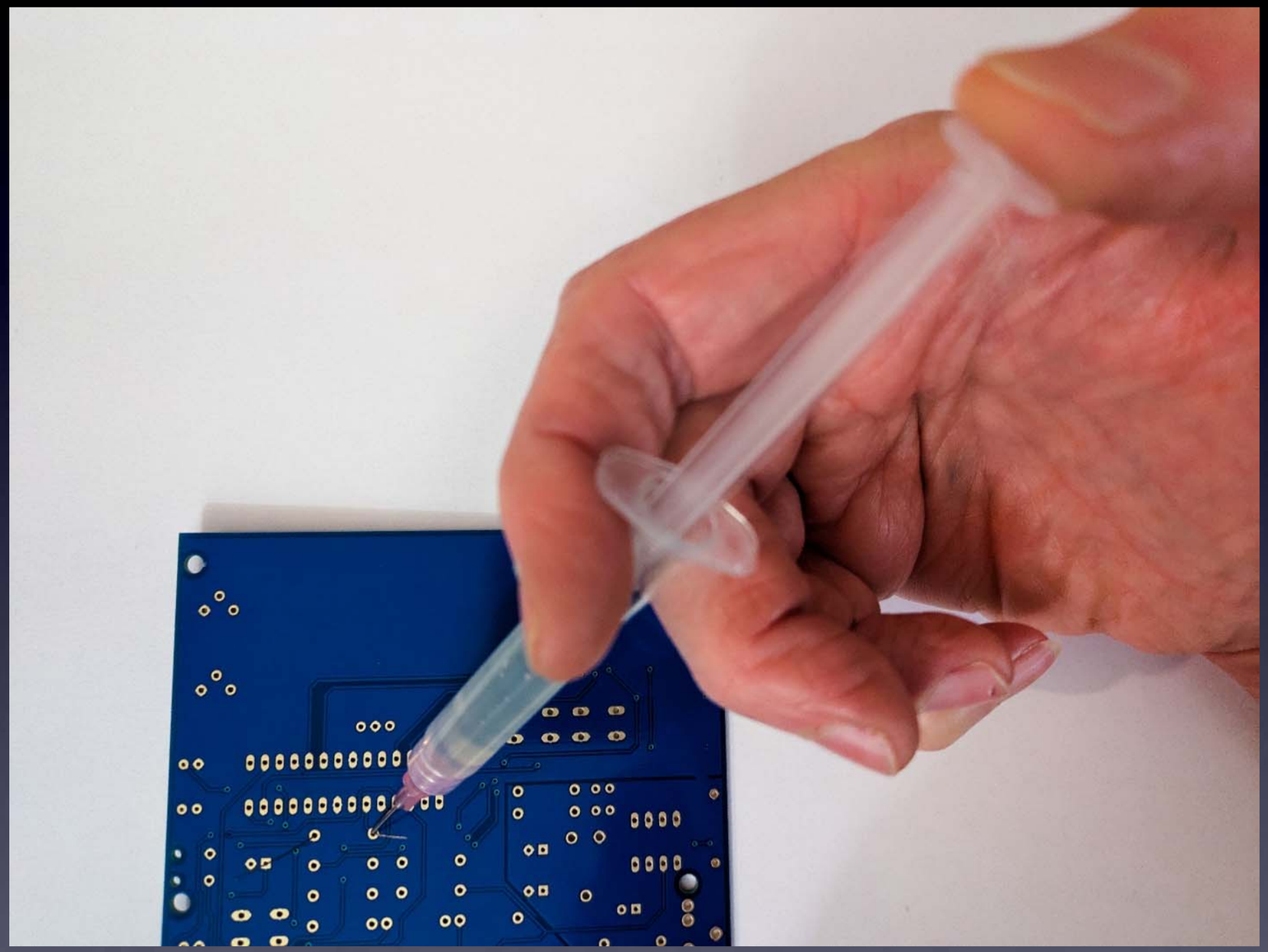


For this part, there are two leads

Here you can see two good solder connections

BUT – if you are using *Lead-Free* solder:

First add flux !

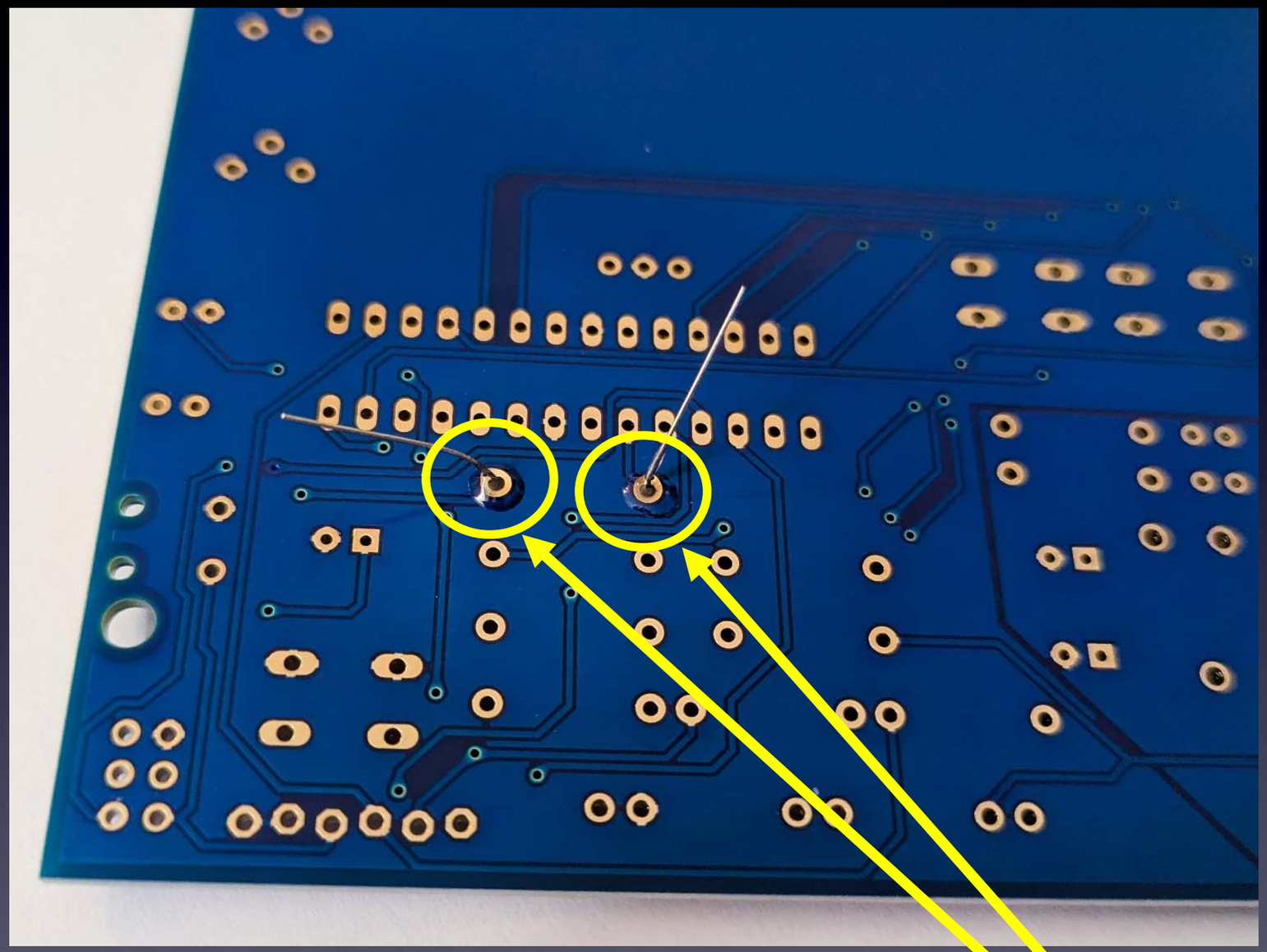


For *Lead-Free* solder, add flux to each pad before soldering !

For this part there are two pads

If you are using *Lead-Free* solder:

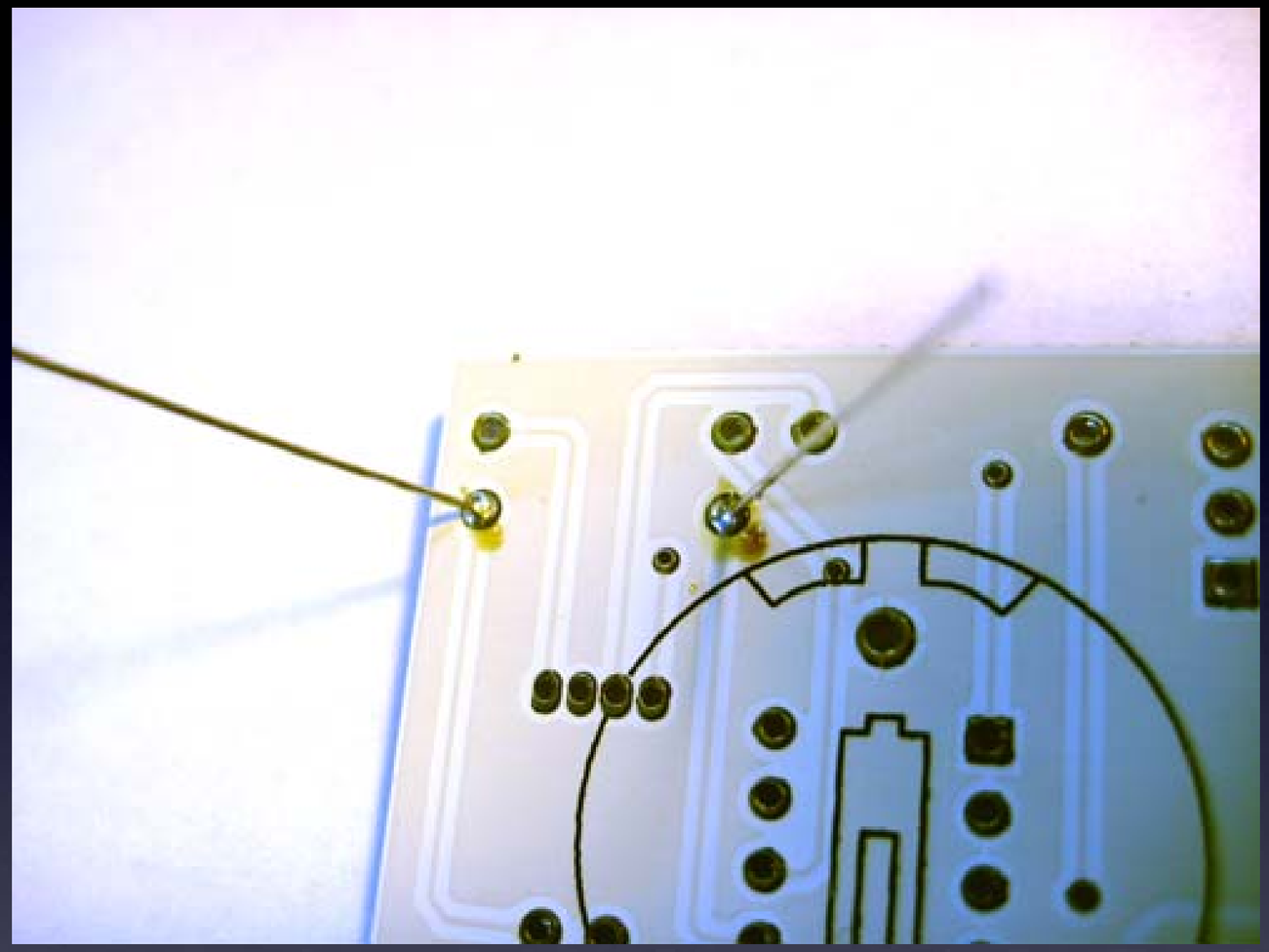
Add flux to the pads before soldering



Here you can see flux over each of the two pads.

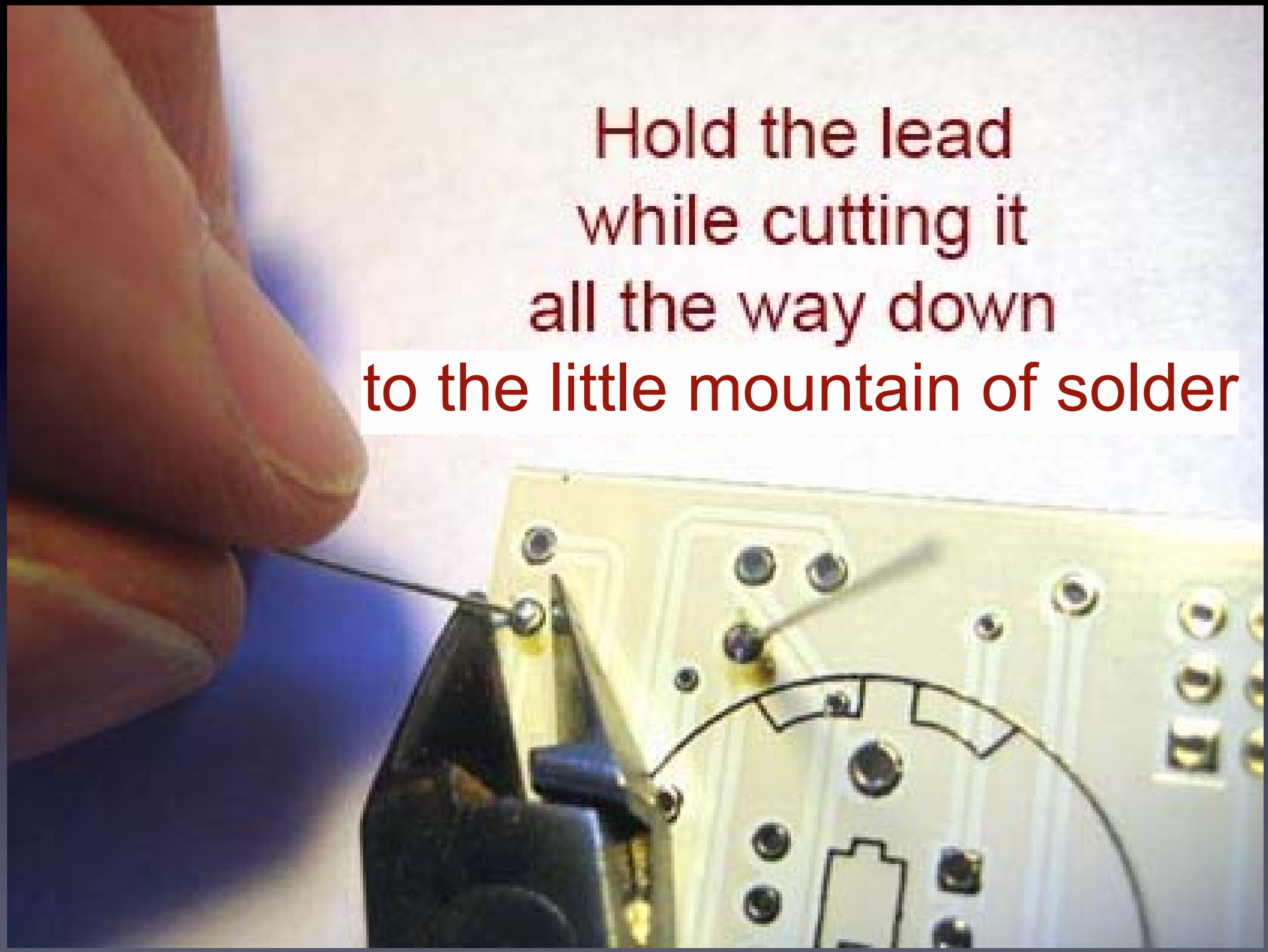
Now these leads are ready to solder with your *Lead-Free* solder.

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:

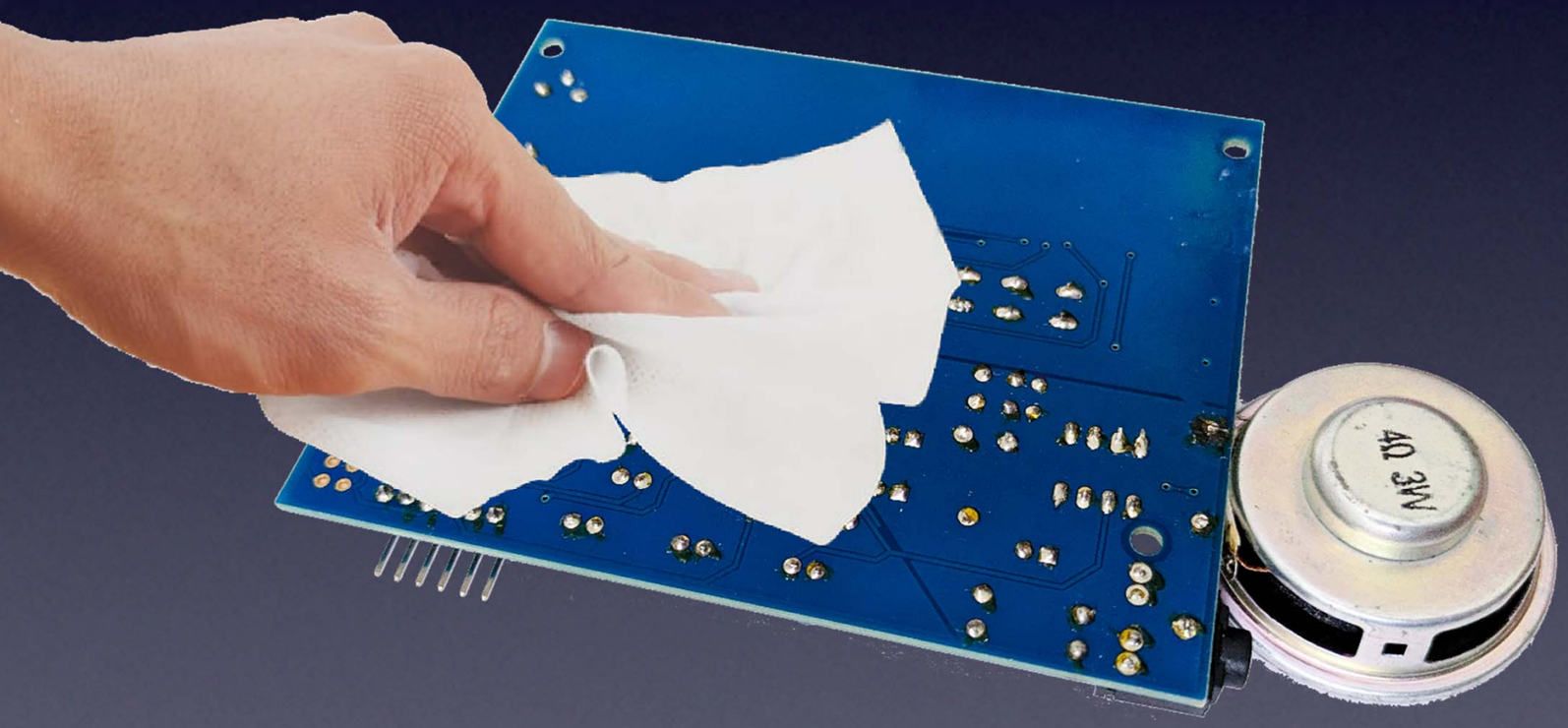
- Each connection is a small mountain (not flat)
- You cannot see any pad (they're totally covered with solder)
- You cannot see the holes (they're totally covered with solder)
- No connections to other pads

One part at a time

Till all the parts are soldered

If you used *Lead-Free* solder
and
***flux paste* in a syringe**

<u>The bottom of the PCB will be sticky from the flux</u>



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.)

White LED
I
CAN
SOLDER
Blinky LED
push button switch
slide switch

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