Jana Elst

Welcome to [DIS]CONNECT

An ***installation*** that uses ***obsolete tech*** to break the smartphone bubble
and ***encourages meaningful micro-interactions*** between
two people who have never met before.

an installation

Tactile world

2019 - 2023

Industrial Design Engineering

Digital world

2023 - now

Digital Design & Development

obsolete tech

look and feel 🥰

the world <3 smartphones

the world <3 social-media

the world <3 anti social-media

people have stopped talking...

We are built for social moments!

concept

a telephone exchange

a telephone exchange

+ some extra sparks


ROOM 1
ROOM 2

Welcome to disconnect.

Please select a topic by dialing zero, followed by any number.

ROOM 2

RINGGGGG

RINGGGGG

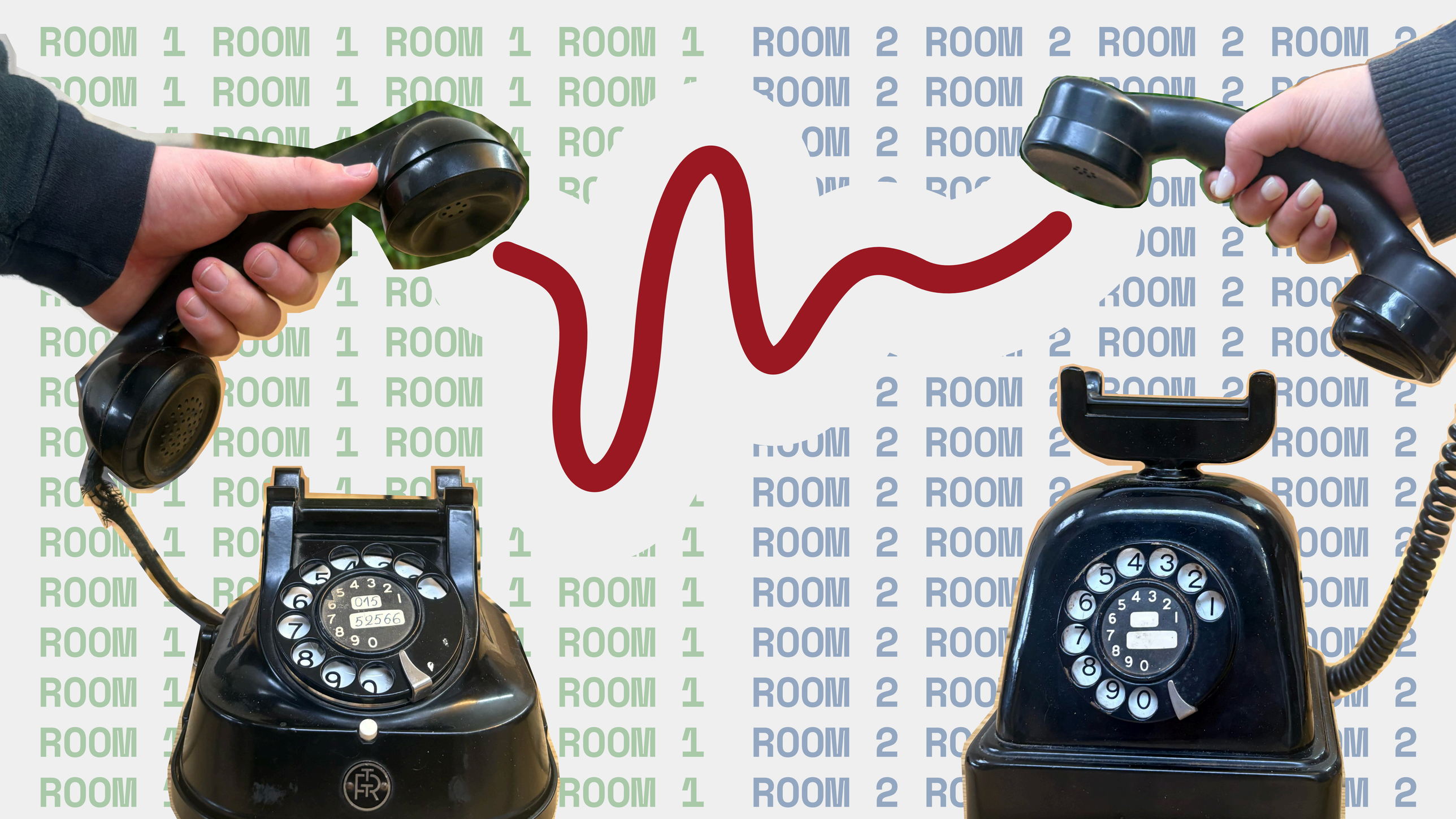
RINGGGGG

RINGGGGG

RINGGGGG

RINGGGGG

RINGGGGG


ROOM 1
ROOM 2

voicemail

listen to a message and record one yourself

passion project ***development***

electronics

development

electronics | development

[1] Which phones do I have?

[2] How do they work?

[3] Play & record sound

[4] A big circuit

[5] Soldering

[6] Housing

[1] Which phones do I have?

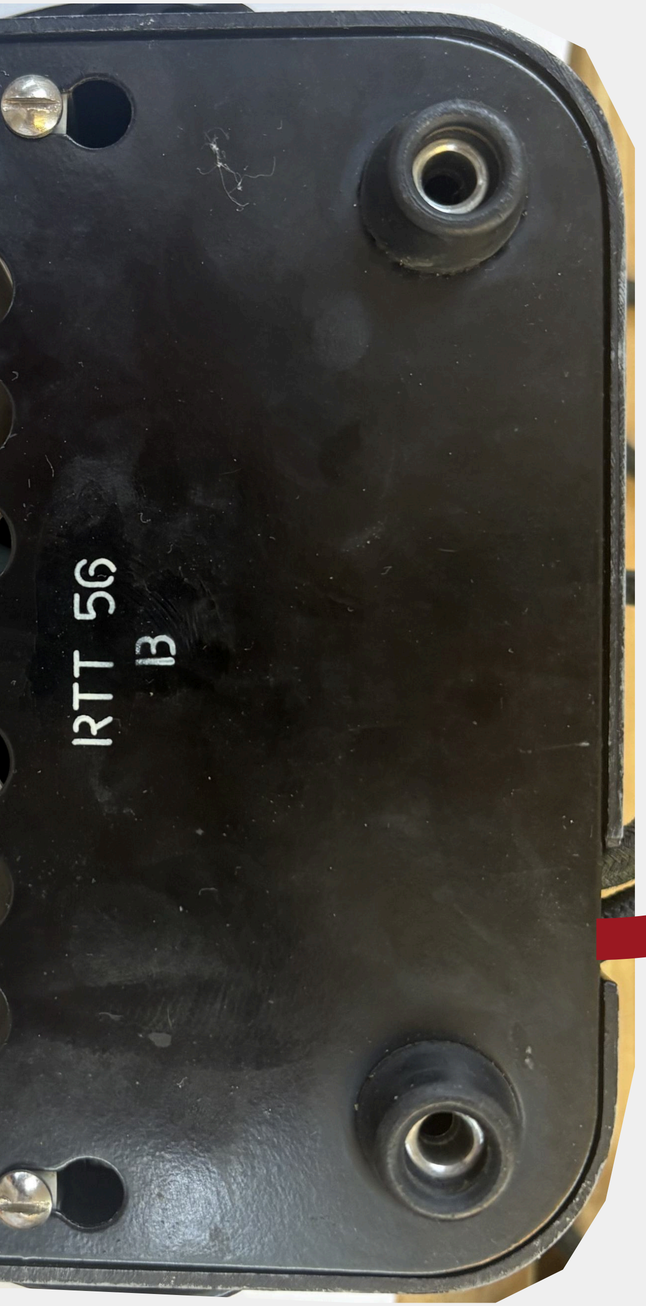
RTT 56B

year: 1964

ATEA TYPE 400

year: 1959

They are working the same!



sending & receiving

electrical signals

[A] On/off hook switch

[B] Calling

[C] Ring the bell

[D] Dial a number

[2] Do my phones still work?

+ how do they work?

[A] on/off hook switch

on hook

open switch

↓

open circuit

↓

resistance = ∞ Ω

off hook

closed switch

↓

closed circuit

↓

resistance = internal resistance = ±200 Ω

X incorrect values

RTT 56B

on hook: ∞ Ω

off hook: ∞ Ω, 3K Ω, 250, ... Ω

ATEA TYPE 400

on hook: ∞ Ω

off hook: 250 Ω

√ correct values

√ correct values

RTT 56B

on hook: ∞ Ω

off hook: 150 Ω

ATEA TYPE 400

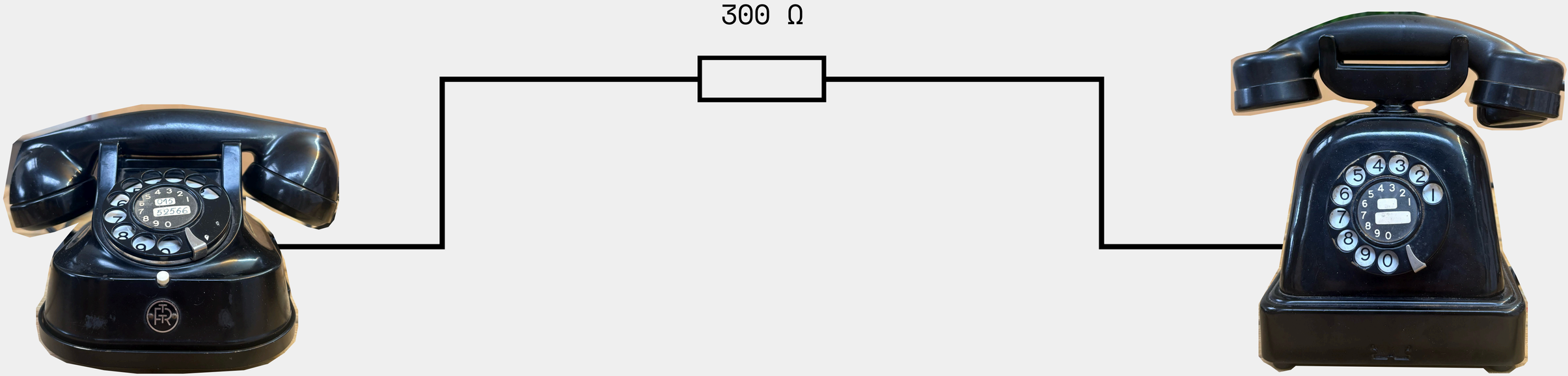
on hook: ∞ Ω

off hook: 250 Ω

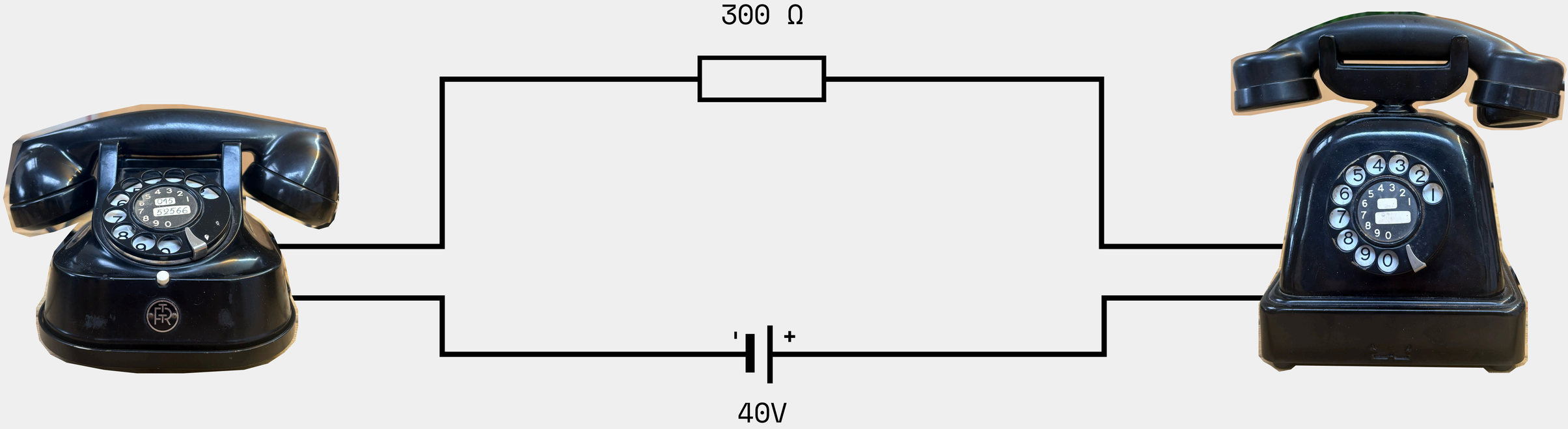
√ correct values

[B] calling

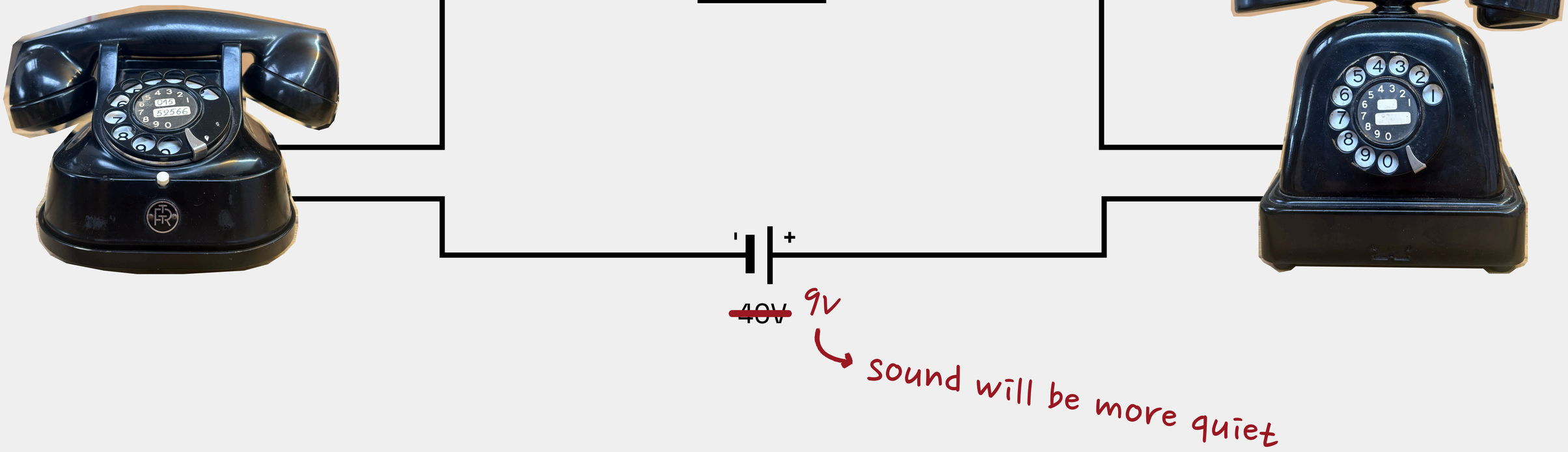
[B] calling



[B] calling



[B] calling



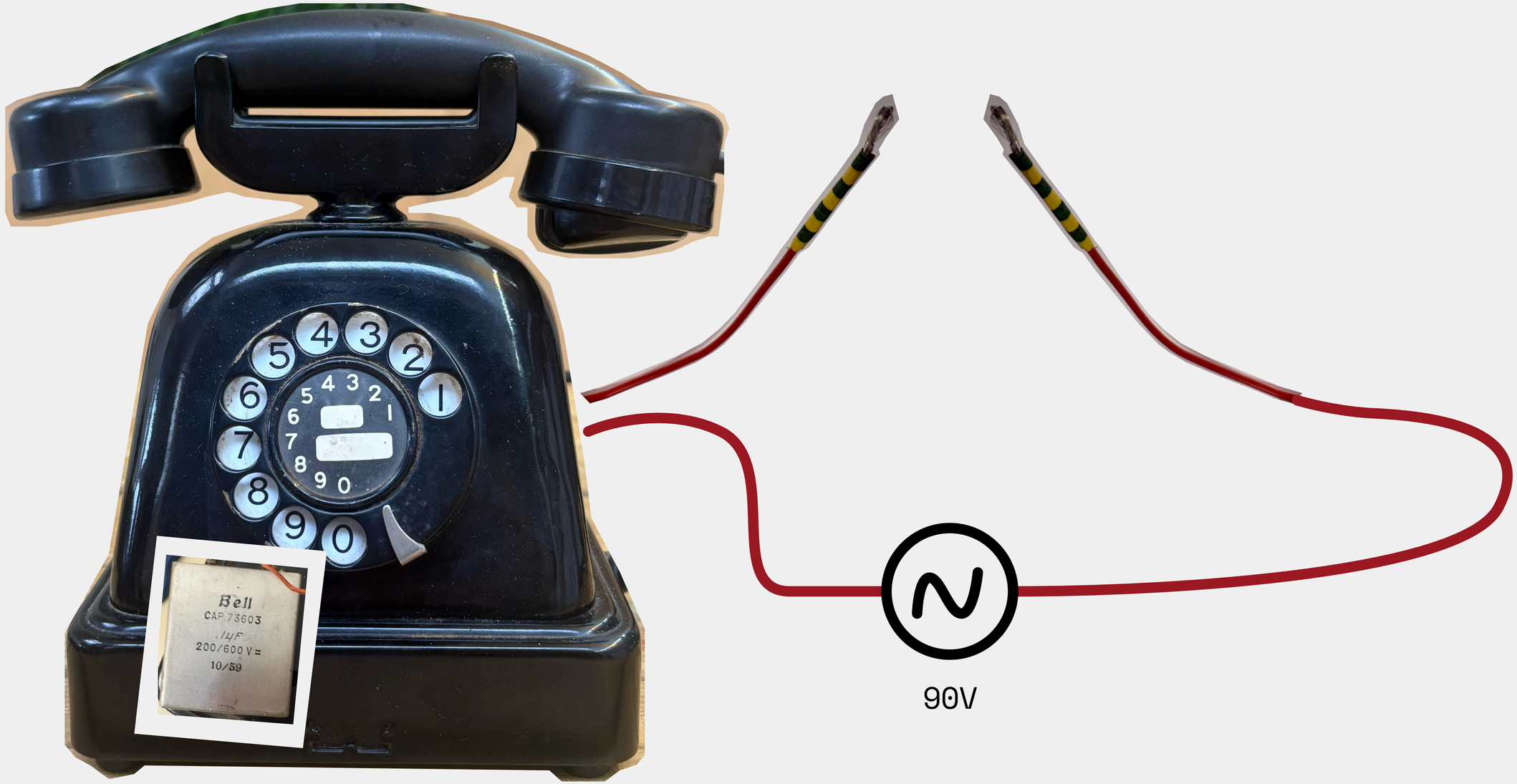
[B] calling

[B] calling

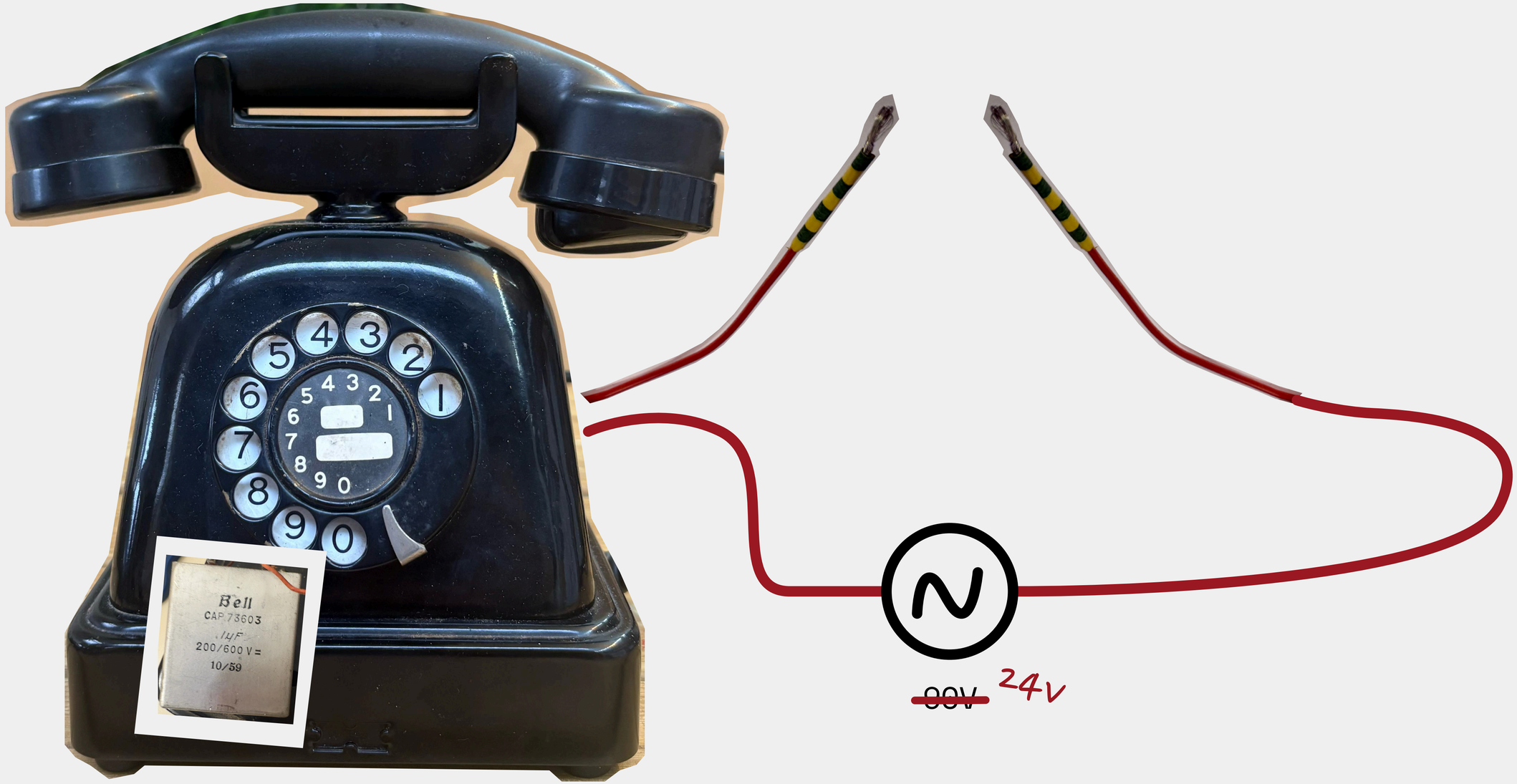
Let’s shake it!

[B] calling

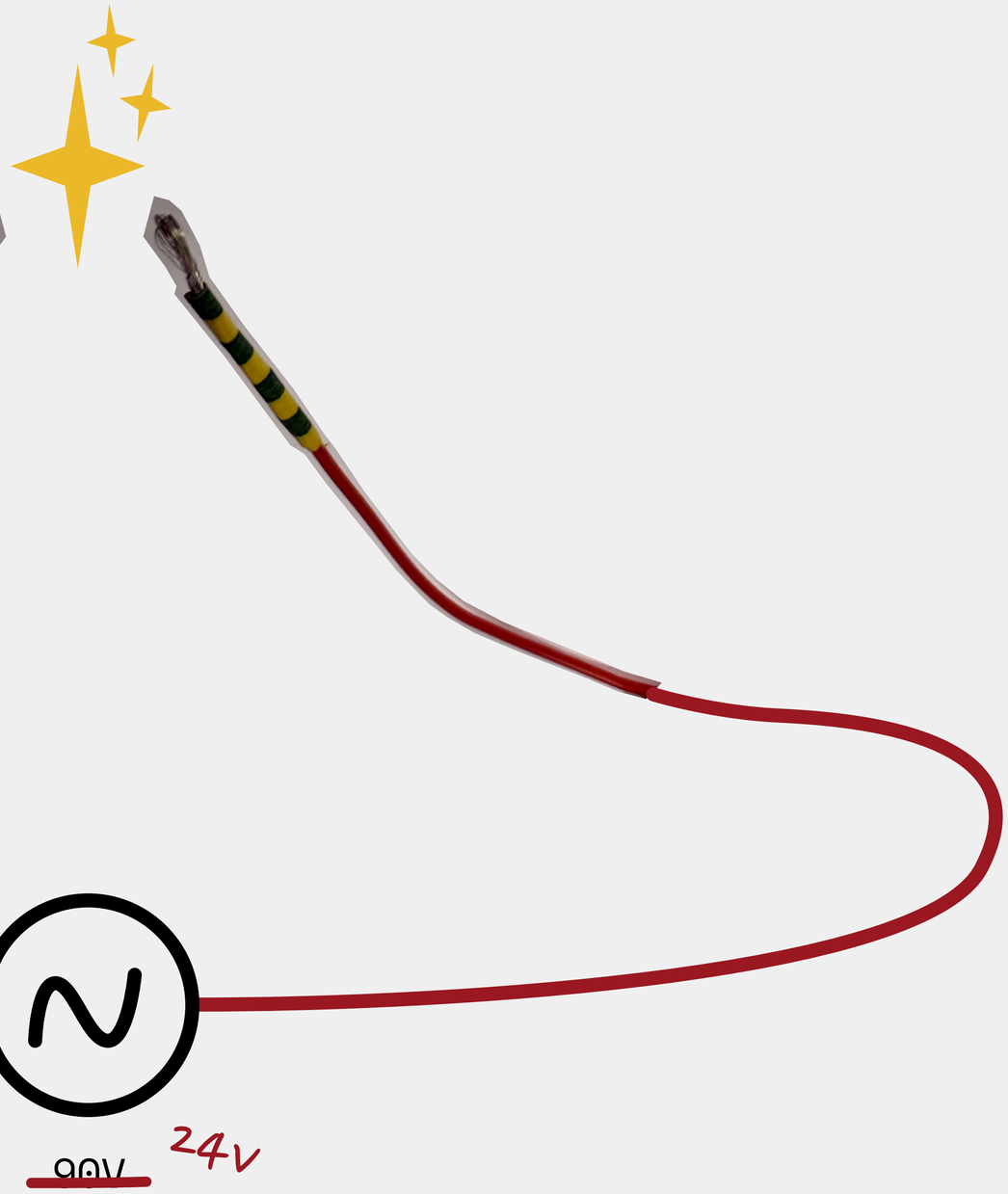
[C] ringing



[C] ringing



[C] ringing



[C] ringing

[C] ringing

RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG
RIIIINGGGGGGGGGGGG

90V 24V

[D] dialing

9V

[D] dialing

9V

[D] dialing

5 4 3 2 1

[D] dialing

9V

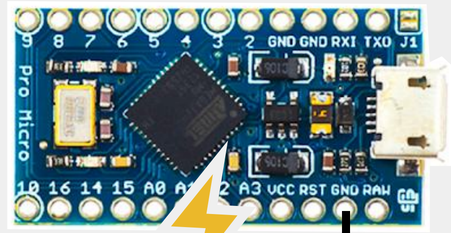
+

-

9V

!

max 5V



[D] dialing

9V

voltage divider

10K Ω

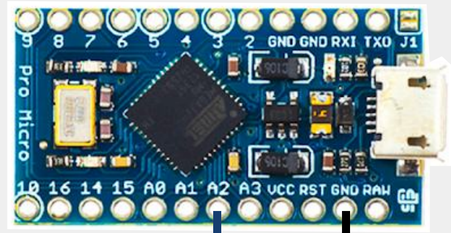
4,5V

9V

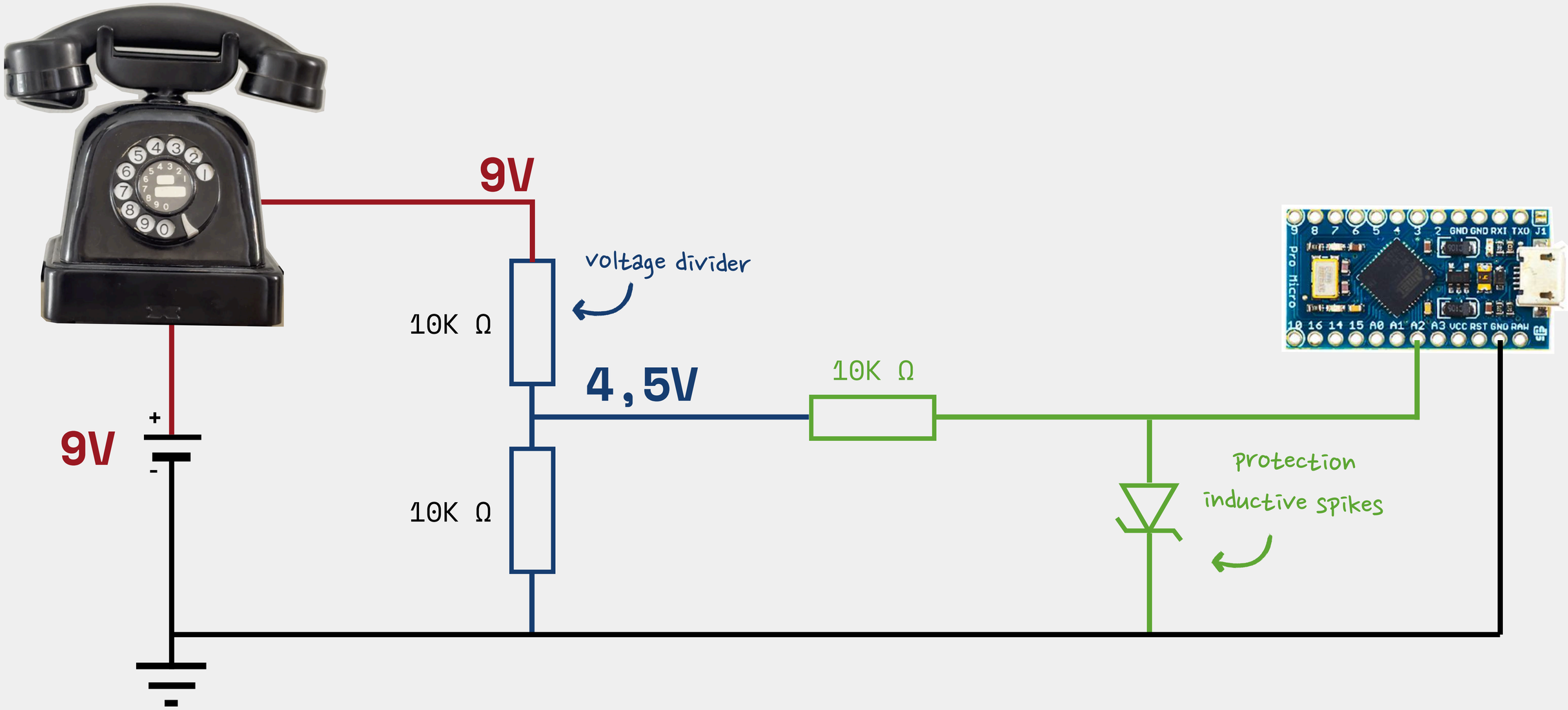
+

-

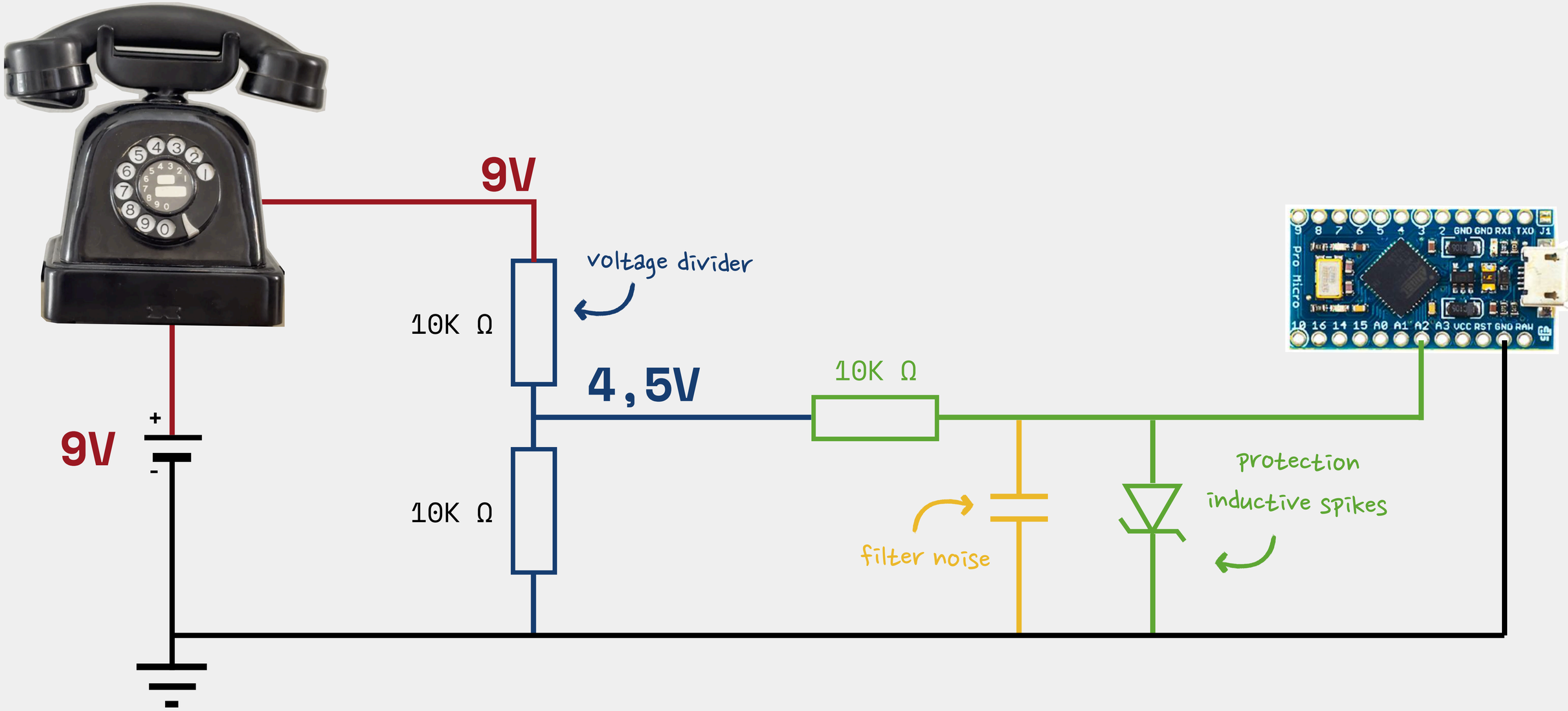
10K Ω



[D] dialing

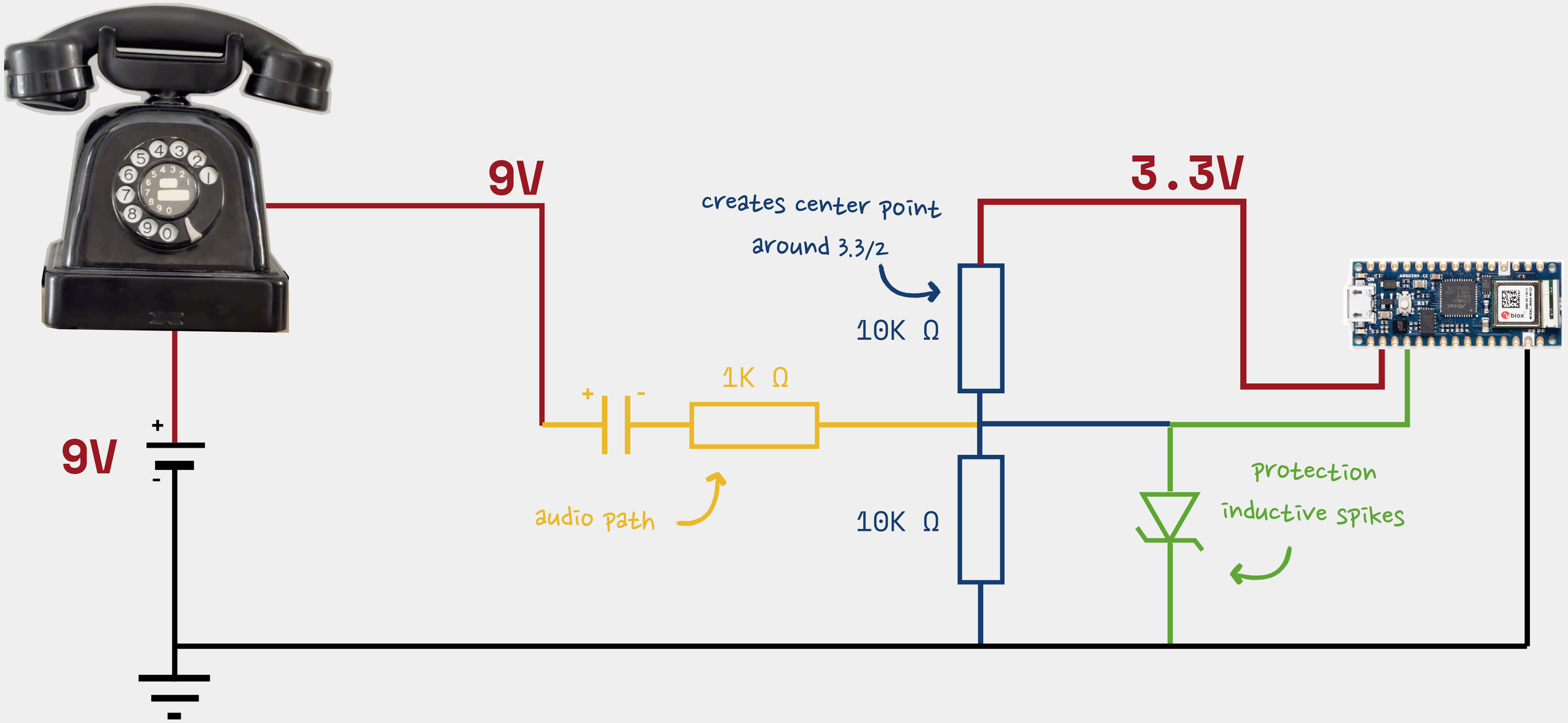

9V
voltage divider
10K Ω
4,5V
10K Ω
10K Ω
9V
+
-
protection
inductive spikes
Pro Micro
9 8 7 6 5 4 3 2 GND GND RXI TXO J1
10 16 14 15 A0 A1 A2 A3 VCC RST GND RAW

[D] dialing


9V
voltage divider
10K Ω
4,5V
10K Ω
10K Ω
9V
+
-
filter noise
protection
inductive spikes
Pro Micro
GND GND RXI TXO J1
10 16 14 15 A0 A1 A2 A3 VCC RST GND RAW

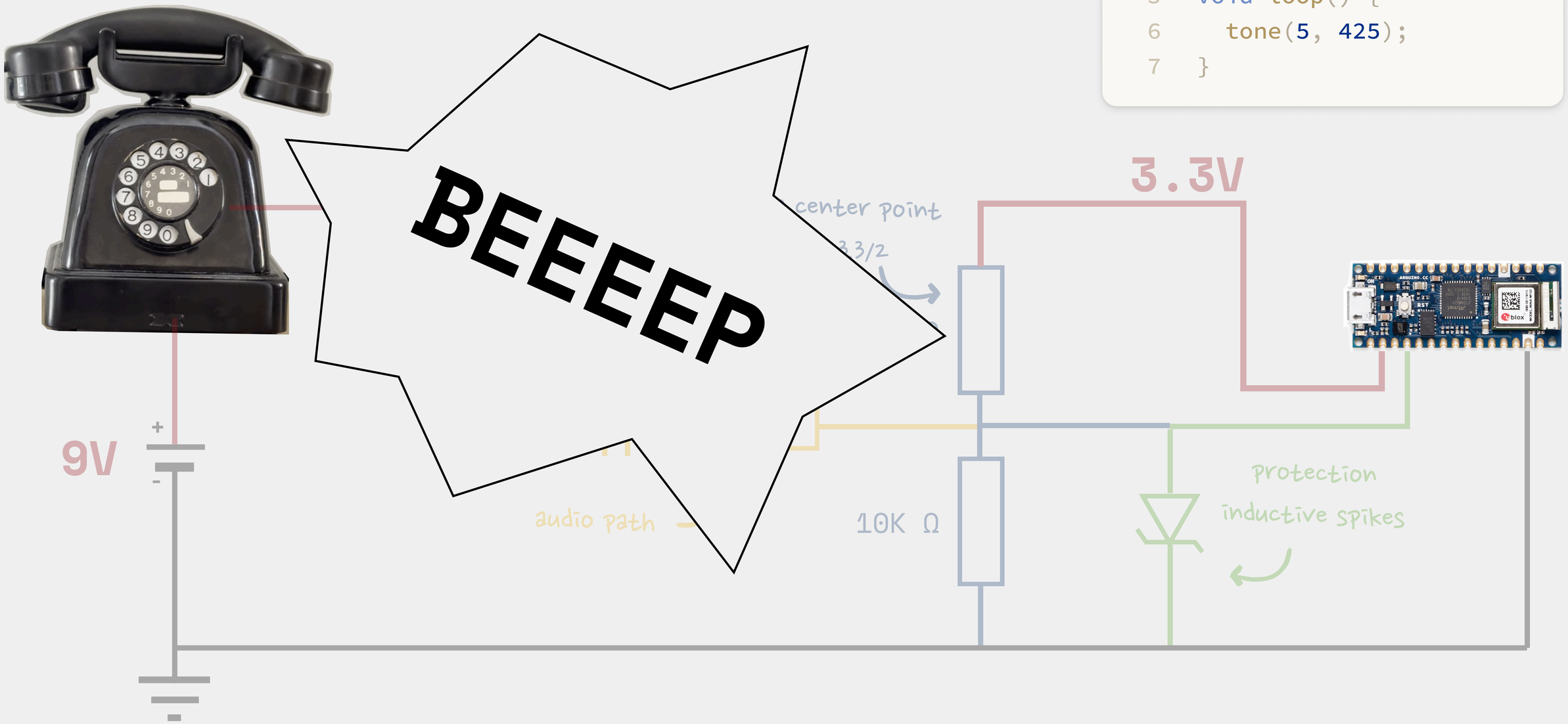
[3] Play & record sound

[A] play sound


9V
3.3V
creates center point
around 3.3/2
10K Ω
1K Ω
9V
audio path
10K Ω
protection
inductive spikes

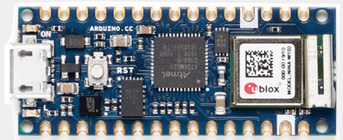
[A] play sound

```
1  void setup() {
2    pinMode(5, OUTPUT);
3  }
4
5  void loop() {
6    tone(5, 425);
7  }
```



[A] play sound

music
8000HZ mono



3.3V

center point
3.3/2

9V

audio path

10K Ω

protection
inductive spikes

[A] play sound

arduino

can preform 1 task at a time

raspberry pi

can preform multiple tasks at the time

[A] play sound

arduino

can preform 1 task at a time

raspberry pi

can preform multiple tasks at the time

How can I play sound?

[A] play sound

arduino

can preform 1 task at a time

—

sends analog signals

raspberry pi

can preform multiple tasks at the time

—

sends digital signals

↓

need to convert them to analog signals

How can I play sound?

[A] play sound

arduino

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—

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raspberry pi

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—

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↓

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How can I play sound?

[A] play sound

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—

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raspberry pi

can preform multiple tasks at the time

—

sends digital signals

↓

need to convert them to analog signals

How can I play sound?

[A] play sound

arduino

can preform 1 task at a time

—

sends analog signals

raspberry pi

can preform multiple tasks at the time

—

sends digital signals

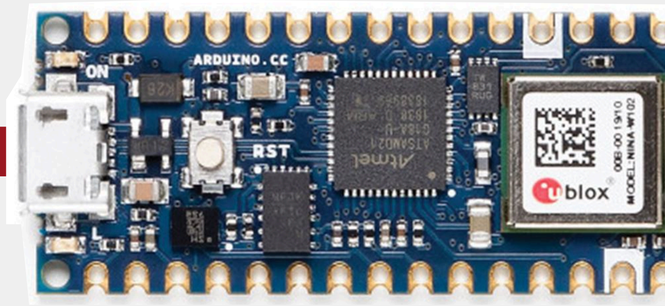
↓

need to convert them to analog signals

How can I play sound?

[A] play sound

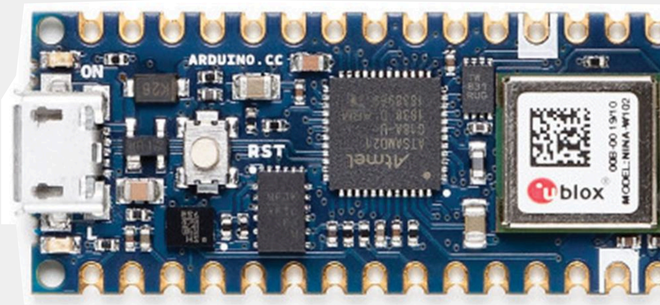
let them communicate!



[A] play sound

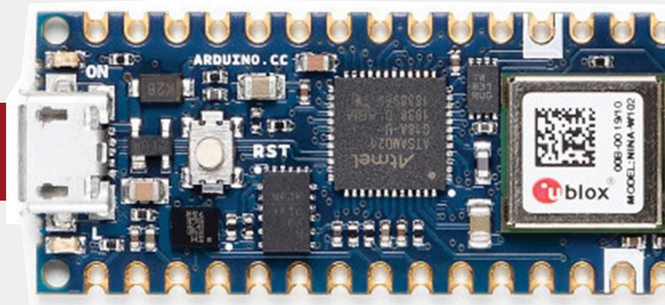
byte by byte

blocked my audio stream

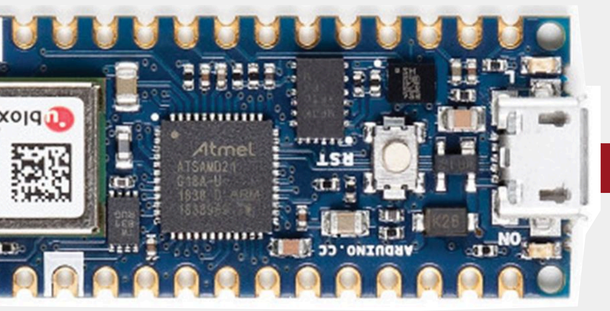


[A] play sound

small packages (chuncks)



[B] recording

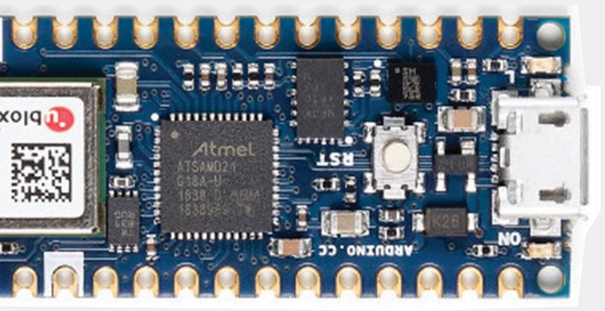


analog to digital

[B] recording

got a 1 sec high pitched tone

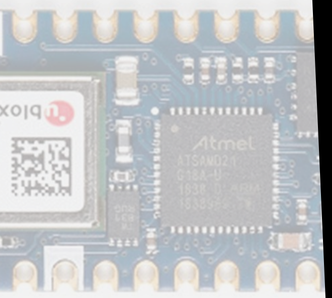
byte by byte



[B] recording


small packages (chuncks)
noise + a voice in the background
DEVINE

[B] recording

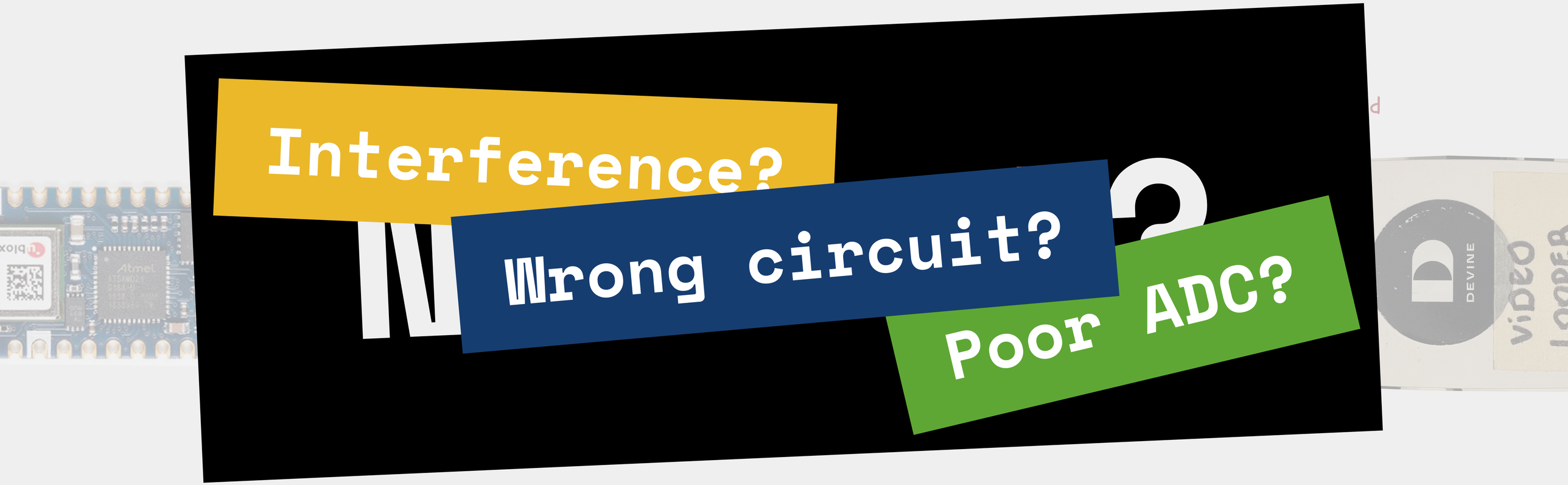


Noise!?

[B] recording

[B] recording

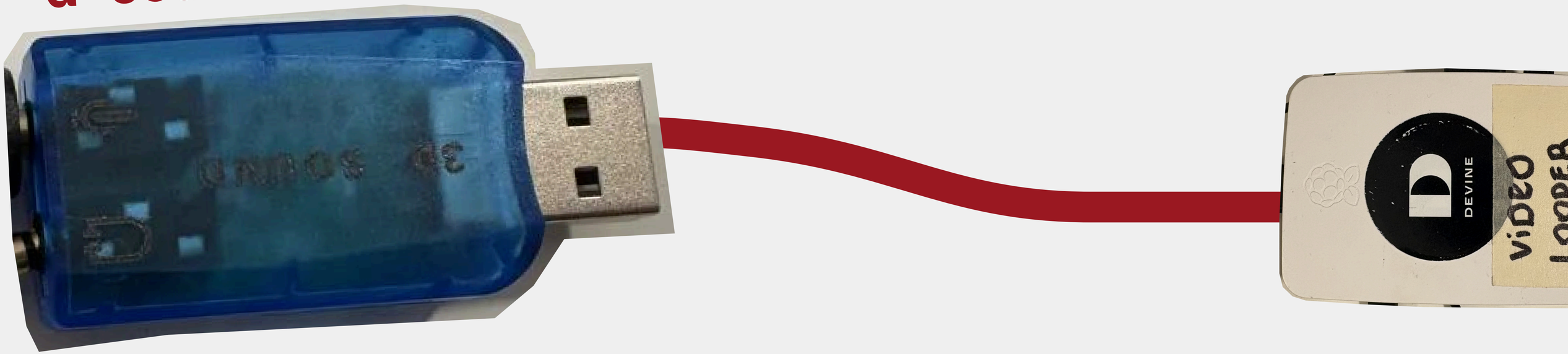
[B] recording



[B] recording

don't support bad audio quality

a soundcard



[4] A big circuit

each phone hear the same

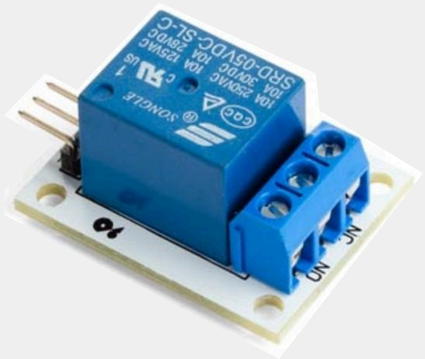
intercom

separate circuit

each phone can hear a different sound

each phone hear the same

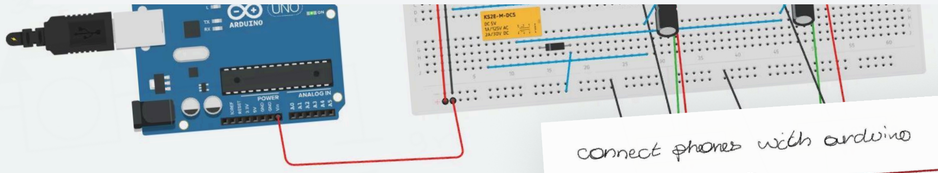
intercom

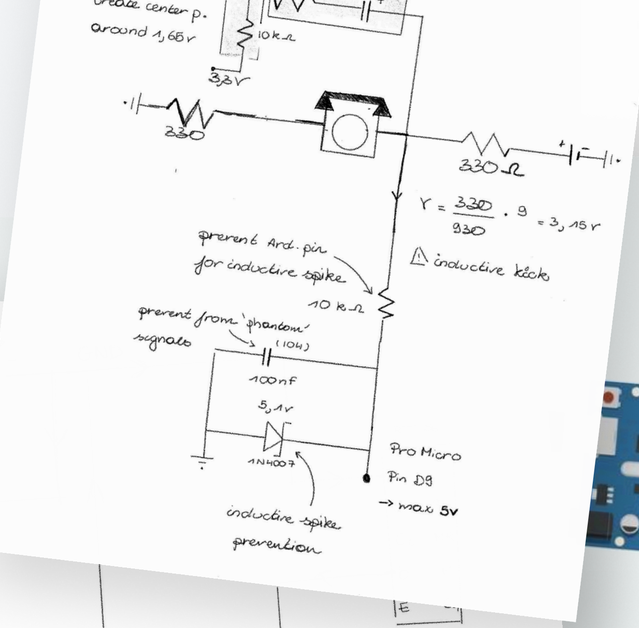


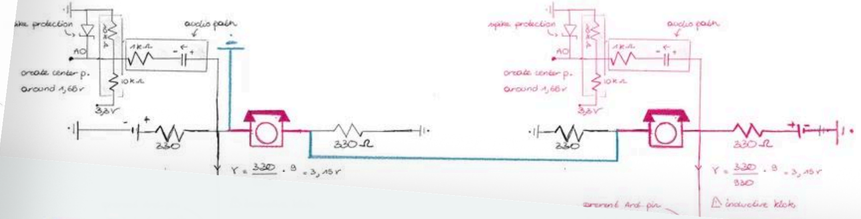
separate circuit

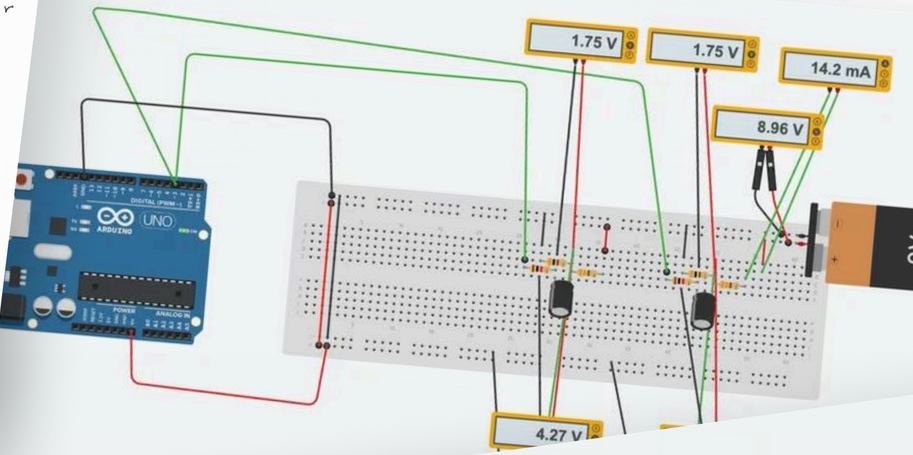
each phone can hear a different sound

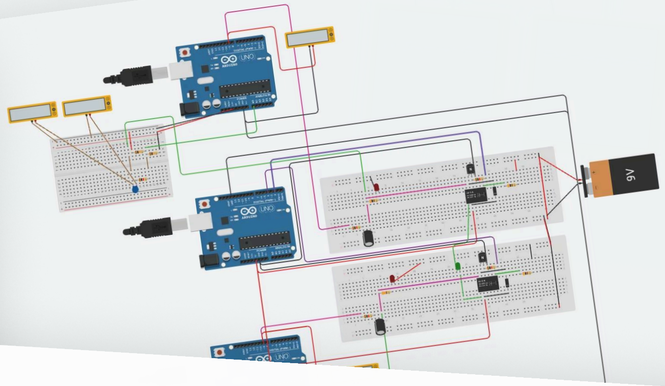
Connect everything

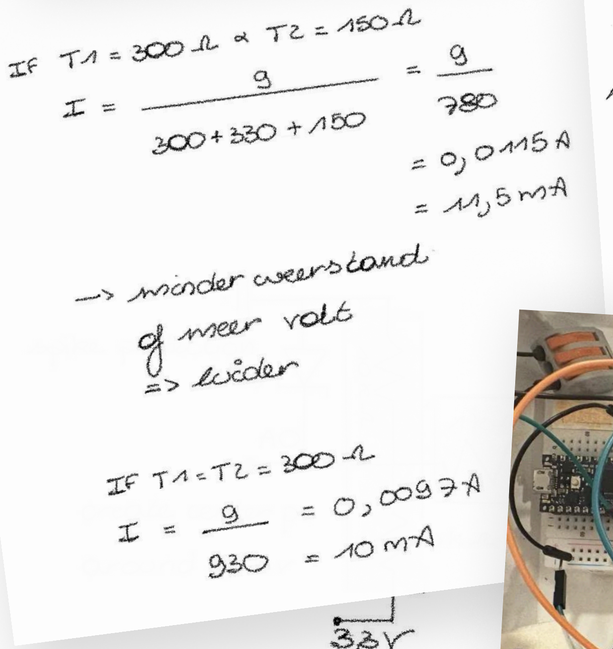


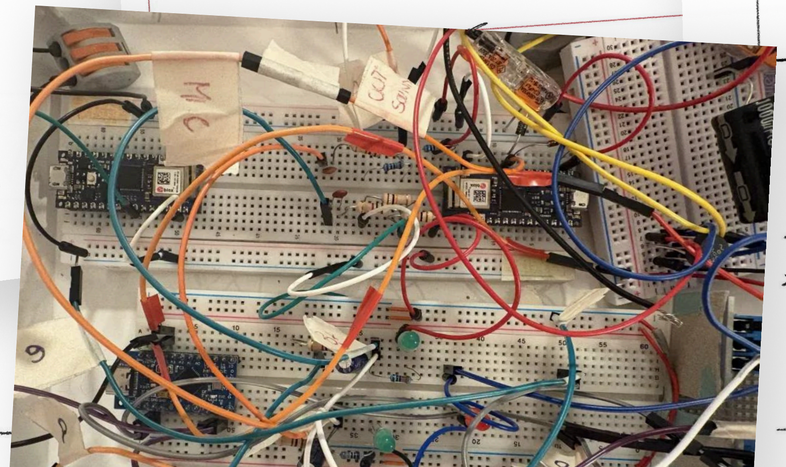


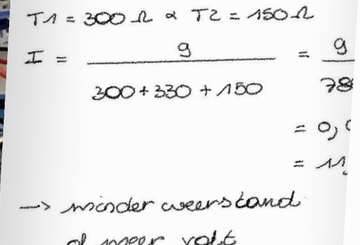


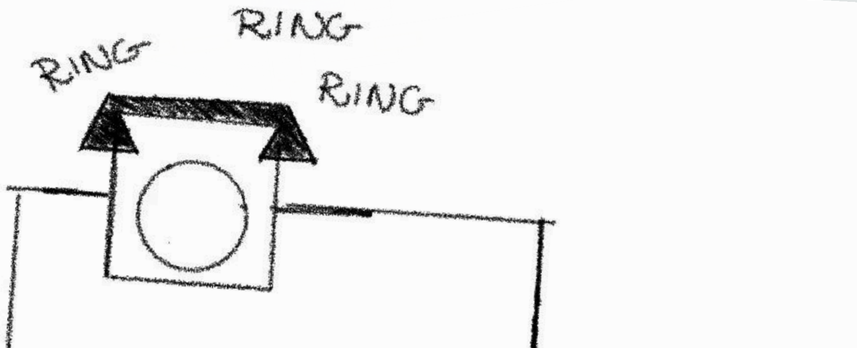






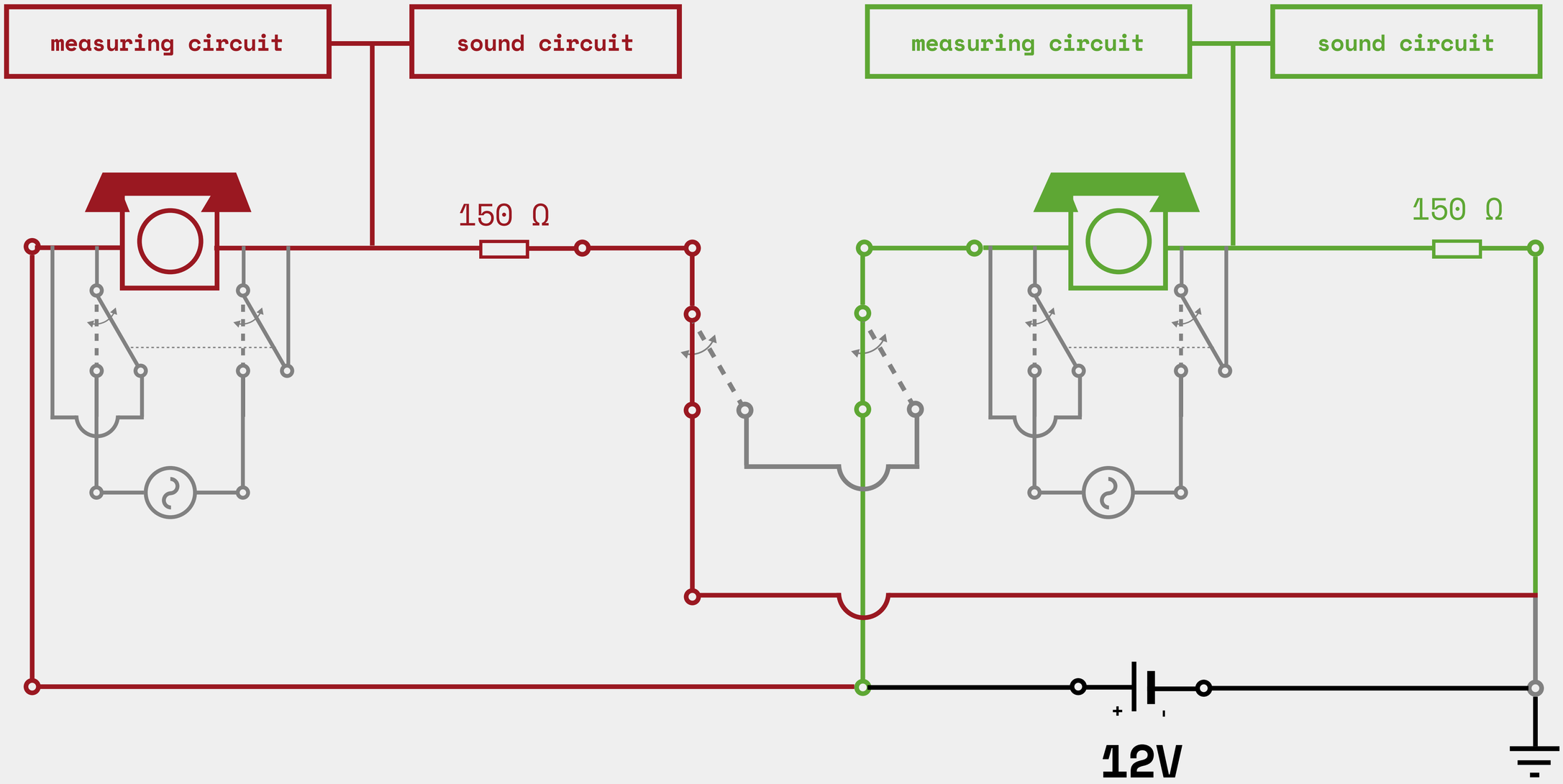






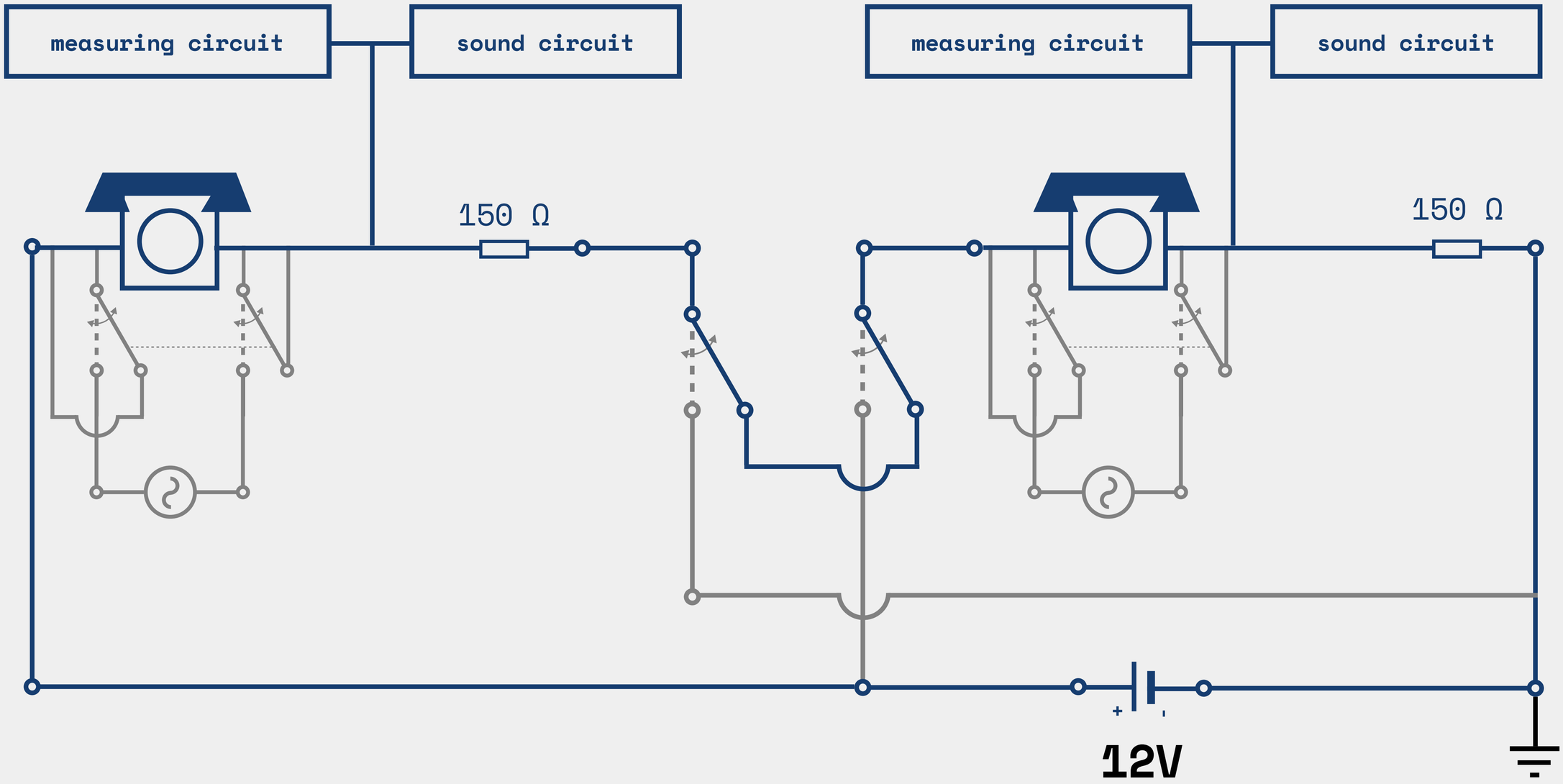
The final circuit

Normally closed

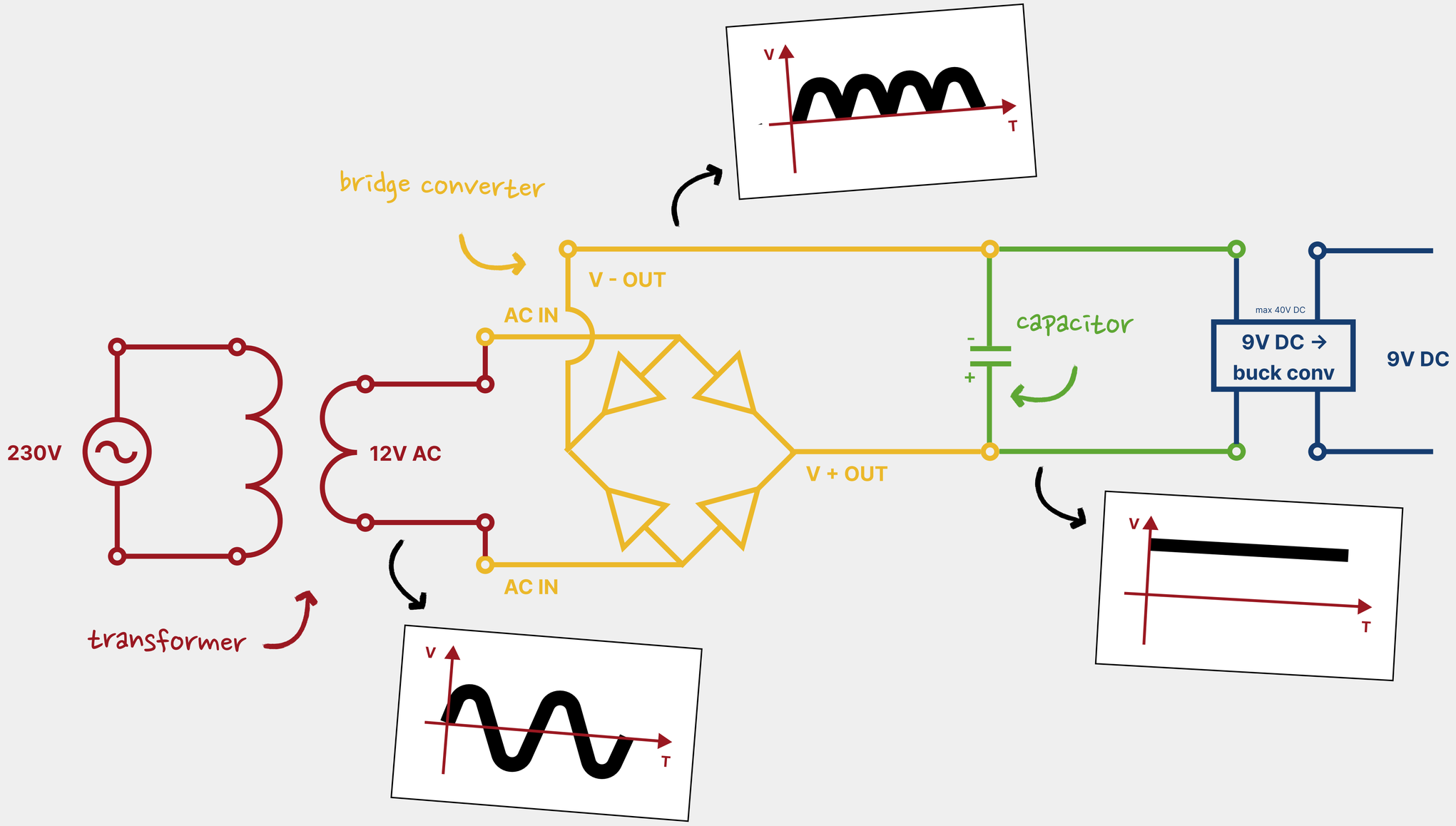


The final circuit

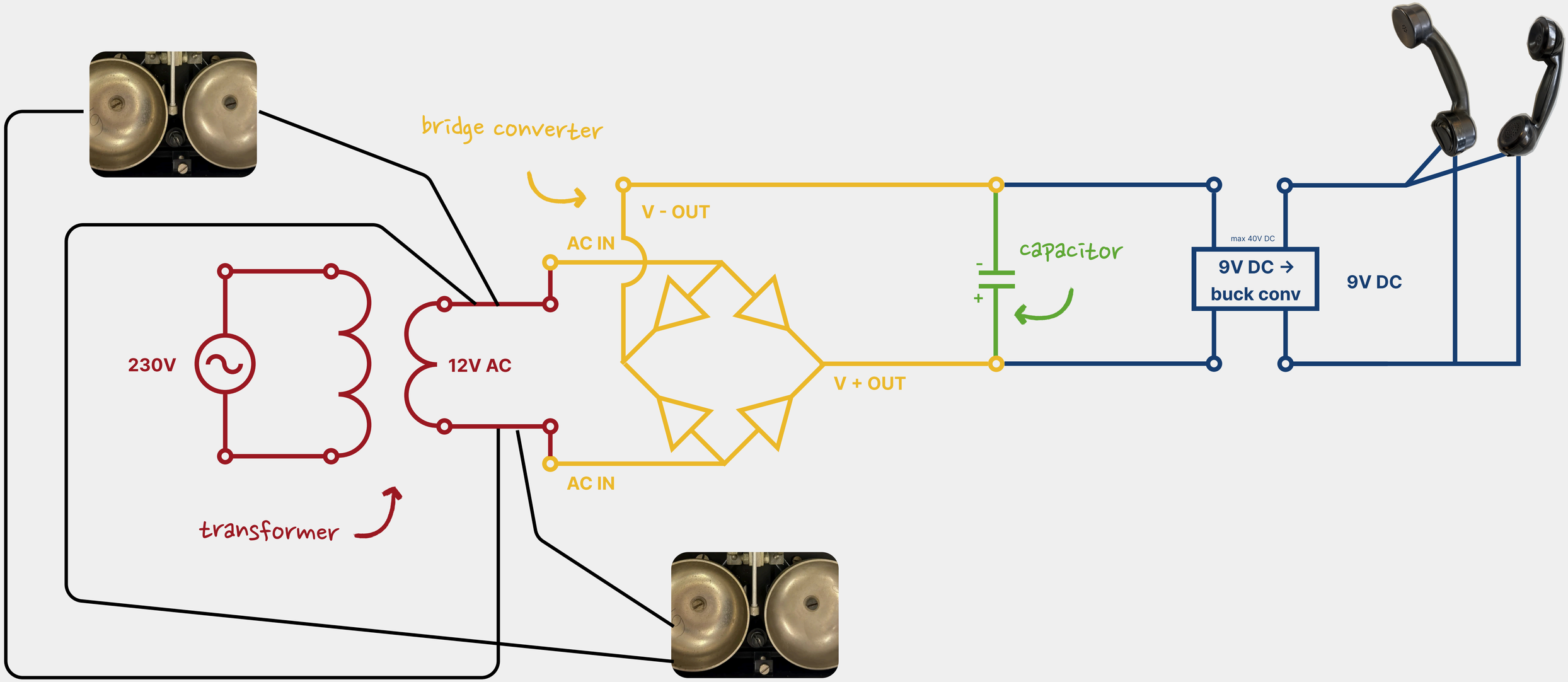
Normally open



Power supply



Power supply



... and my transformer broke

I was asking for too much current

1 X 12V DC adpater

former broke

I was asking for too much current

1 X 12V DC adpater

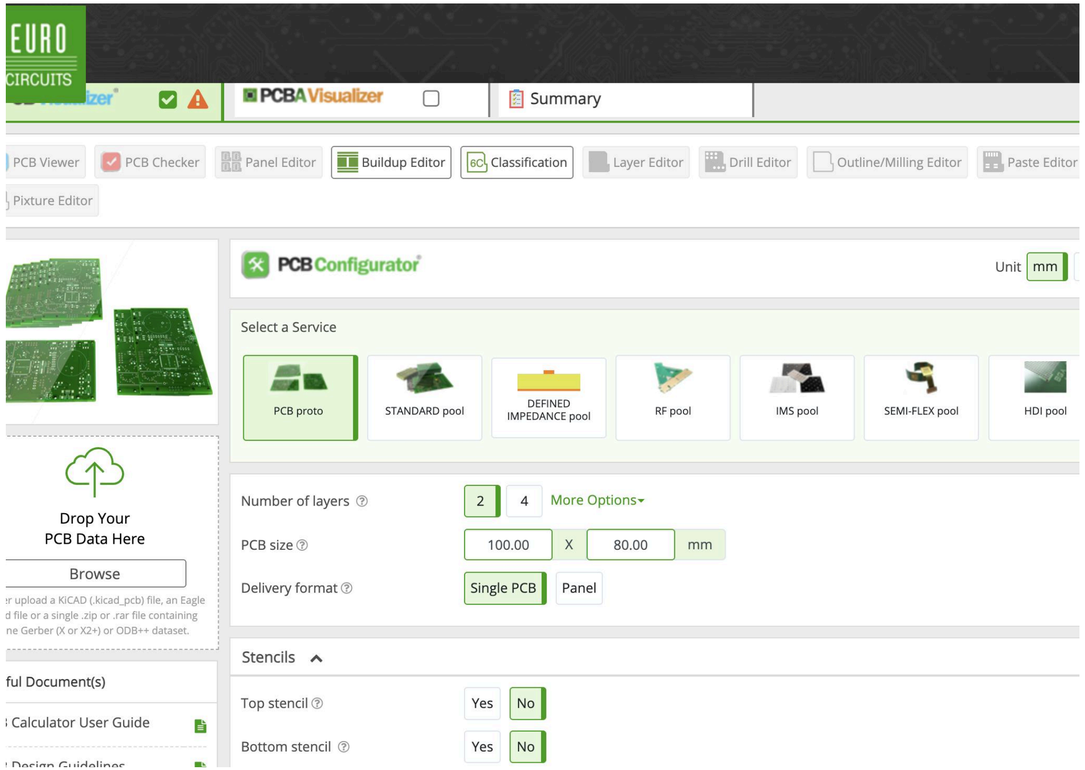
2 x 12V AC transformer

[5] soldering

X

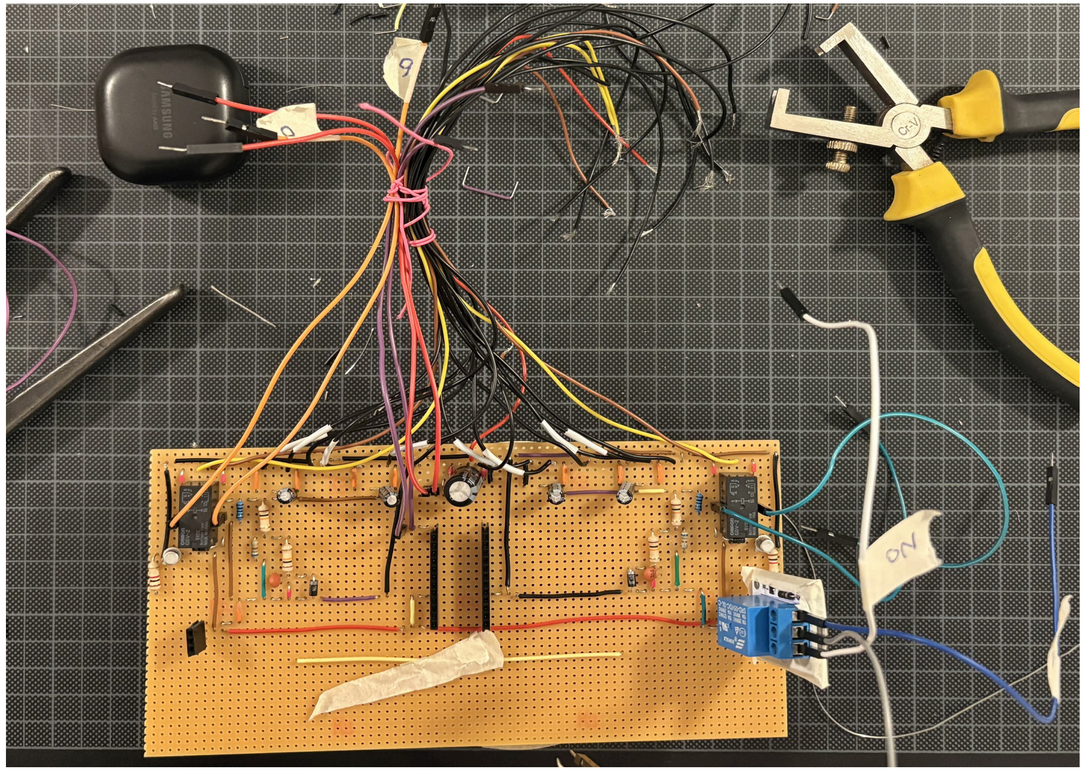
A PCB?

too complex
too little time



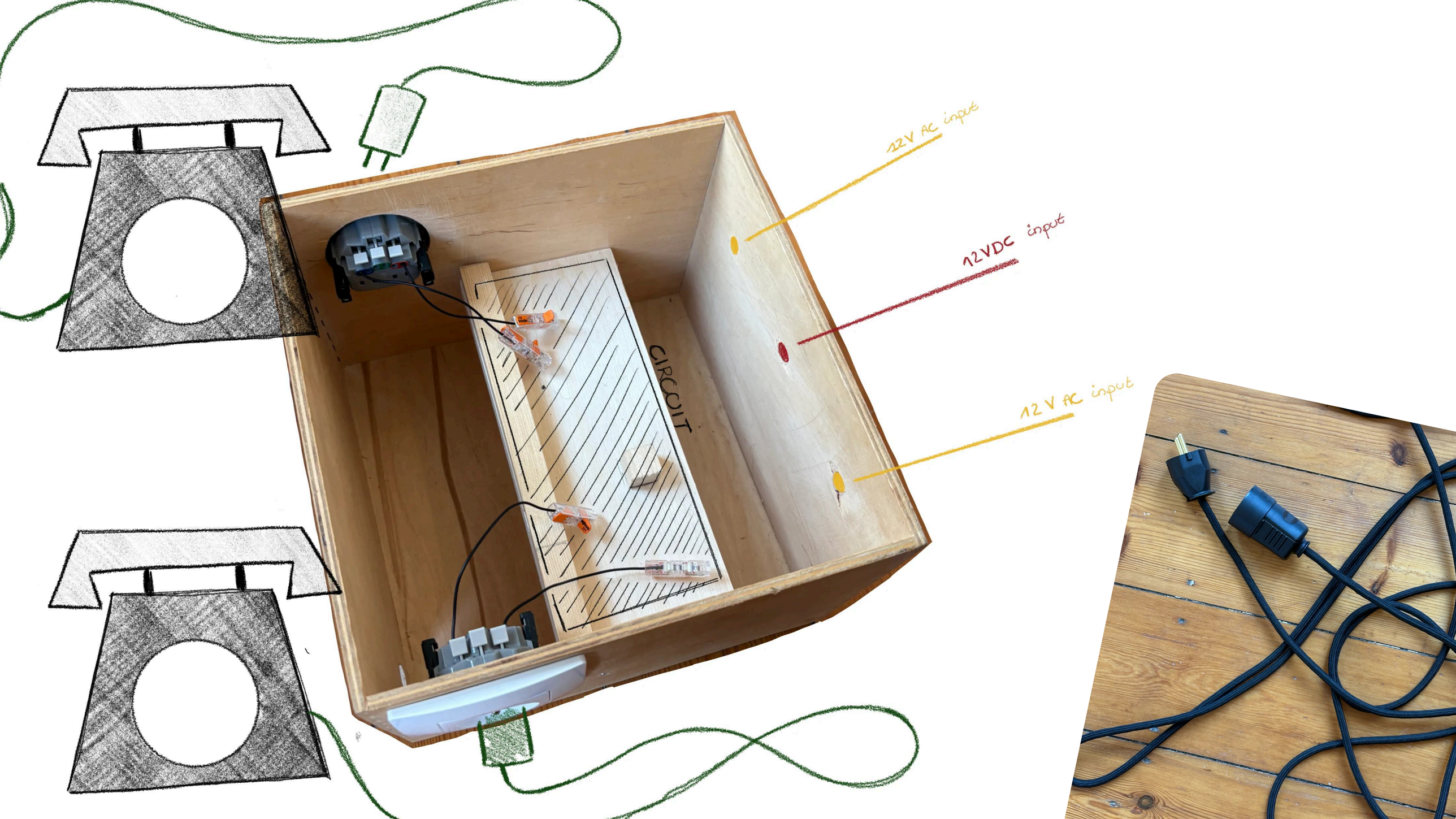
√

Solder it myself?



A corrupt adapter blew the fuse in my room ...

[6] housing


12V AC input
12VDC input
12V AC input
CIRCUIT

electronics

development

[1] Arduino

[2] Python script V1

[3] Python script V2

[4] Python script V3

[5] A big bug

[6] Add extra feedback sounds

[1] arduino

communication protocol

phone name _ action

[2] python script V1

Multi-threading

Plays sound connected to a number

Handshake process

[3] python script V2

telephone states + system states

[1] ONHOOK

[2] OFFHOOK

[3] DIALING

[4] ....

[1] IDLE

[2] CONVERSATION

[3] VOICEMAIL

[4] INTRO_START

[5] PRE_CONVERSATION

[6] CONVERSATION_END

[7] VOICEMAIL_INTERUPTION

[8] ...

[4] python script V3

```python
class State(ABC):
    def __init__(self, context):
        self.context = context

    def on_enter(self):
        """Run setup tasks (start timers, play audio)"""
        pass

    def on_exit(self):
        """Run cleanup tasks (stop timers, stop audio)"""
        pass

    # Events return the NEXT State, or None to stay.
    def on_offhook(self, phone): return None
    def on_onhook(self, phone): return None
    def on_dial(self, phone, number): return None
    def on_timeout(self, timer_name): return None
```

It worked!

It worked!

... In the terminal

[5] a big bug

During the intercom circuit, the Arduino can detect:

- [X] both phones are off hook
- [X] one of both phones is on hook.

[5] a big bug

NEW!

The arduino sends only serial communication to the Pi if the phones are disconnected

Let’s test it!

Thank you <3

e-mail

jana.elst@gmail.com

website

www.janaelst.be

blog

www.janaelst.be/passionProject