

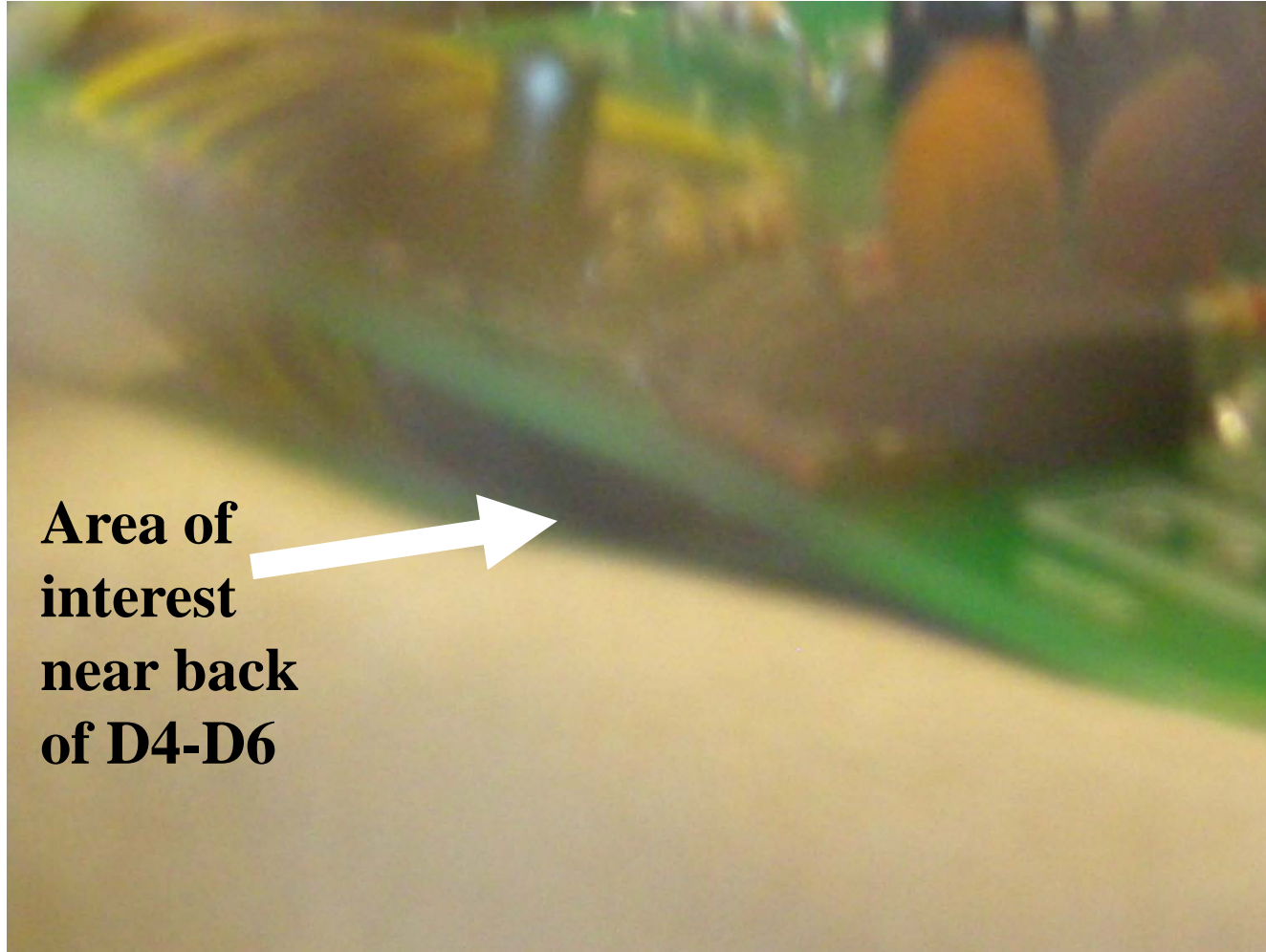
Coronal Discharge

Coronal Discharge: An Overview

- Coronal discharge occurs in low pressure environments with high voltages present.**
- The air around a high potential (high voltage) will become a conductor and emit a bluish glow (plasma).**
- This plasma will cause adverse effects for the component as well as neighboring parts.**
- The plasma is a bluish-purple and is visible under normal lighting. (see images)**

Coronal Discharge: An Example

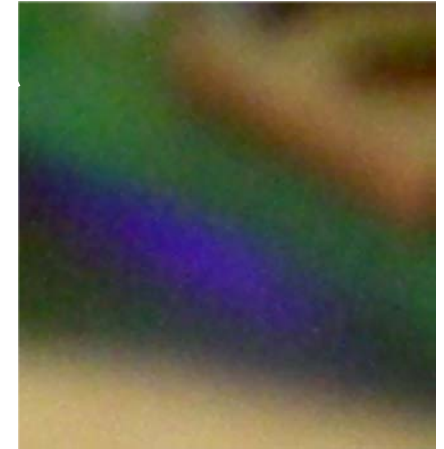
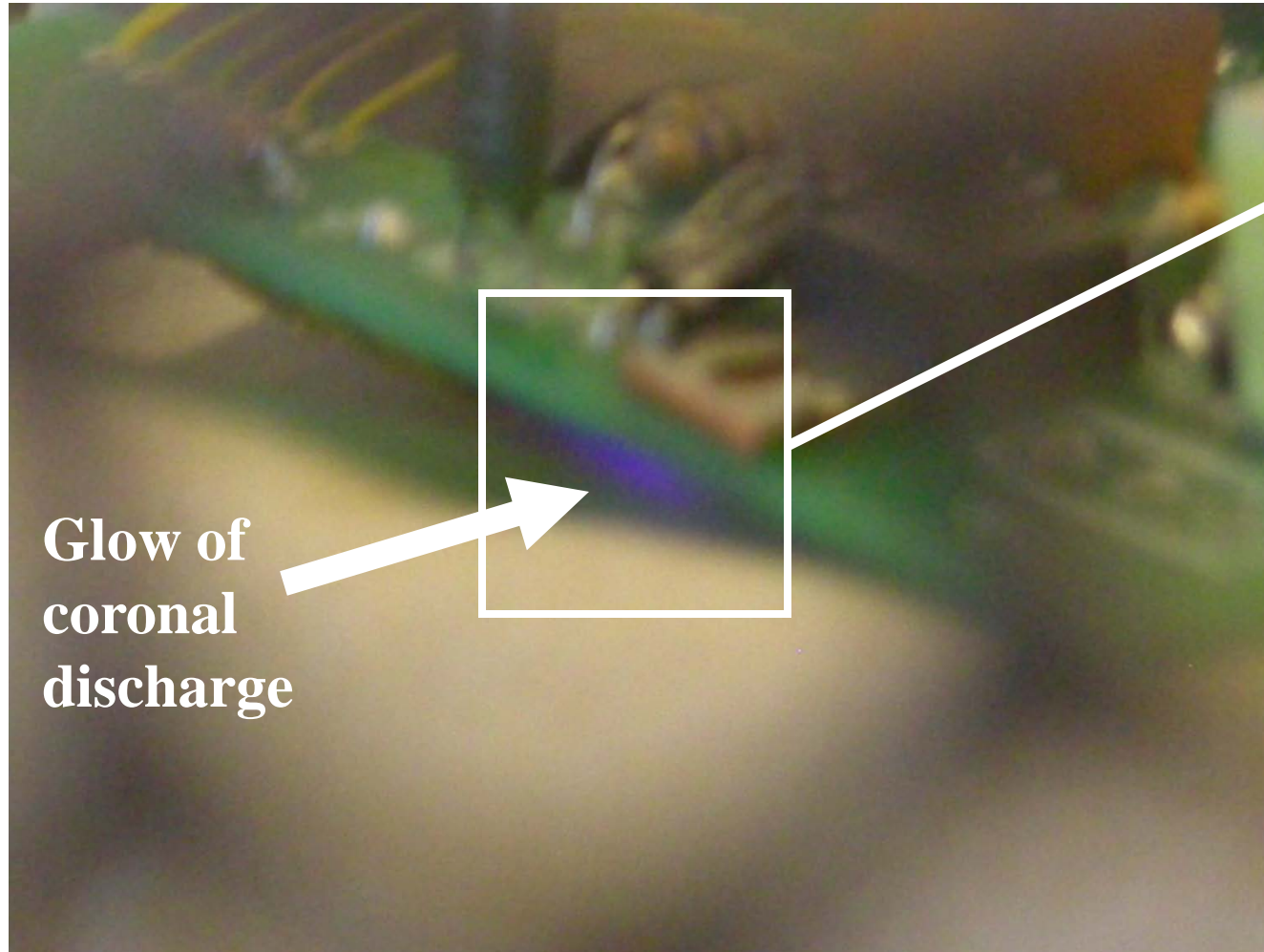
RockOn! Geiger counter seen through a vacuum chamber.



Area of
interest
near back
of D4-D6

Coronal Discharge: An Example

Geiger counter seen through a vacuum chamber



Close-up

Coronal Discharge: The solution

- Coronal discharge is detrimental to parts.**
- Dangerous to other payloads on the rocket.**
- To mitigate these risks, we will add conformal coating to the board to prevent coronal discharge.**
- **Note: We will be in a pressurized environment on this flight so this is not necessary, but is a good practice especially with space applications.**

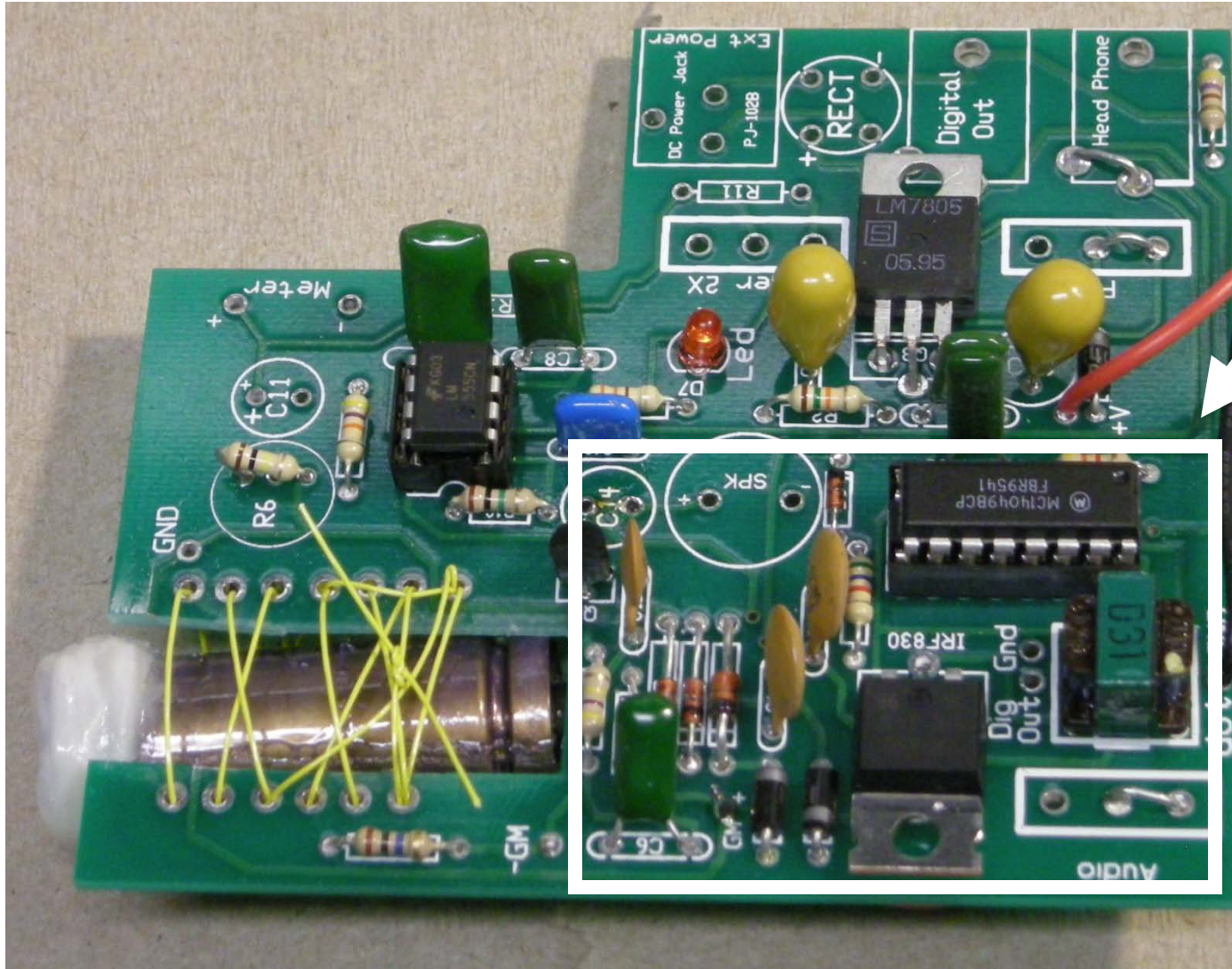
Conformal Coating

Step 1: Board Prep

- Take the board to a well ventilated area (we will be outside).
- Put on safety glasses and rubber gloves.
- Place the board face up on the prepared protected surface.
- Shake the bottle lightly and open it.
- **MAKE SURE** there is no power on the board.



Step 1: Board Prep



HV Section

Step 2: Begin Coating

- Dip the brush in and begin application coating the entire top side of the board with an even layer.
- Re-dipping the brush every 2-3 strokes is recommended.
- The board should look glossy under lighting where coating has been applied.
- If any safety concerns occur consult the MSDS provided.



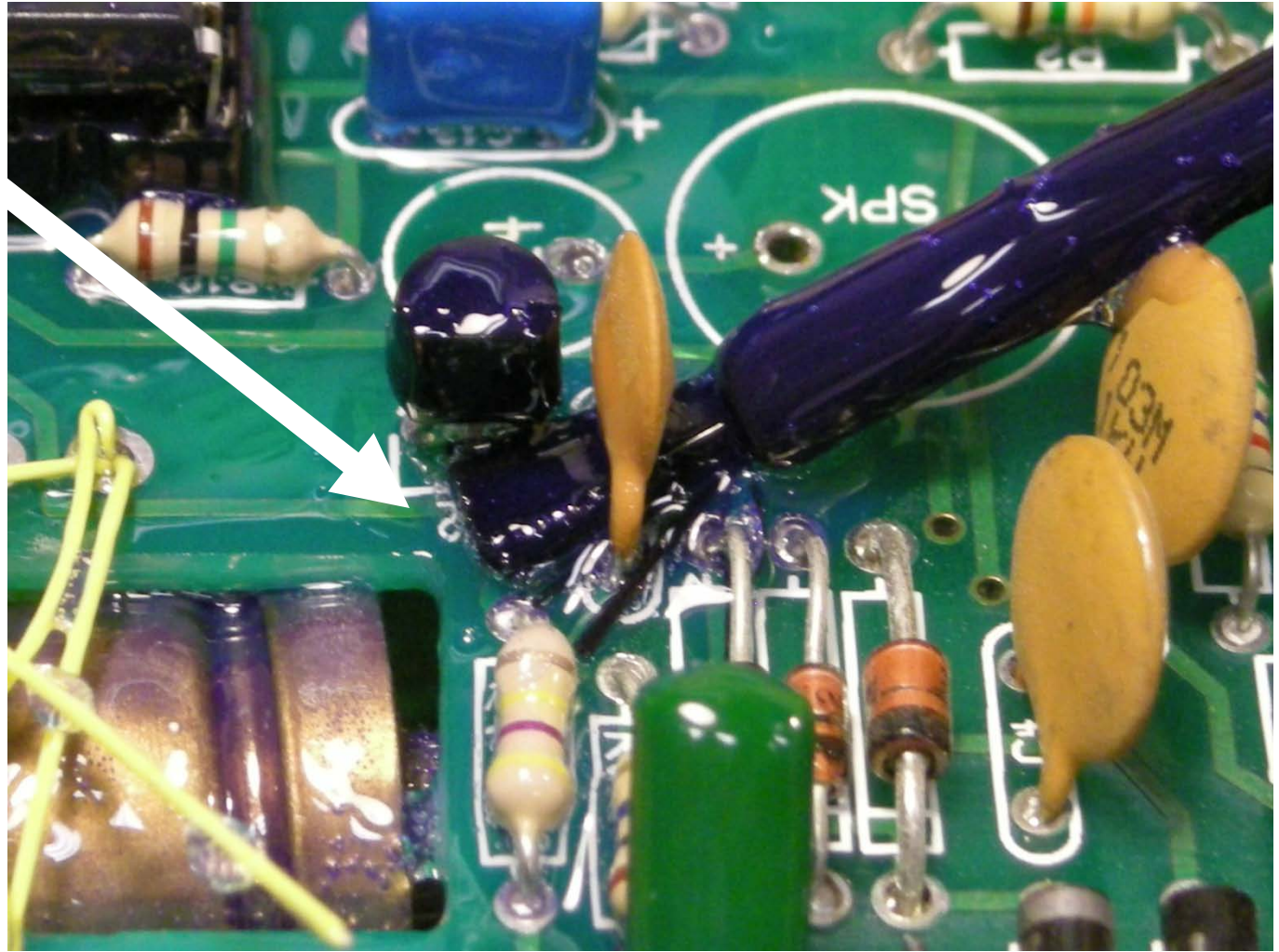
Step 3: Detail Coating (chips in sockets)

- Coat the chips as well as long as they are secured in their sockets.



Step 3: Detail Coating (underneath components)

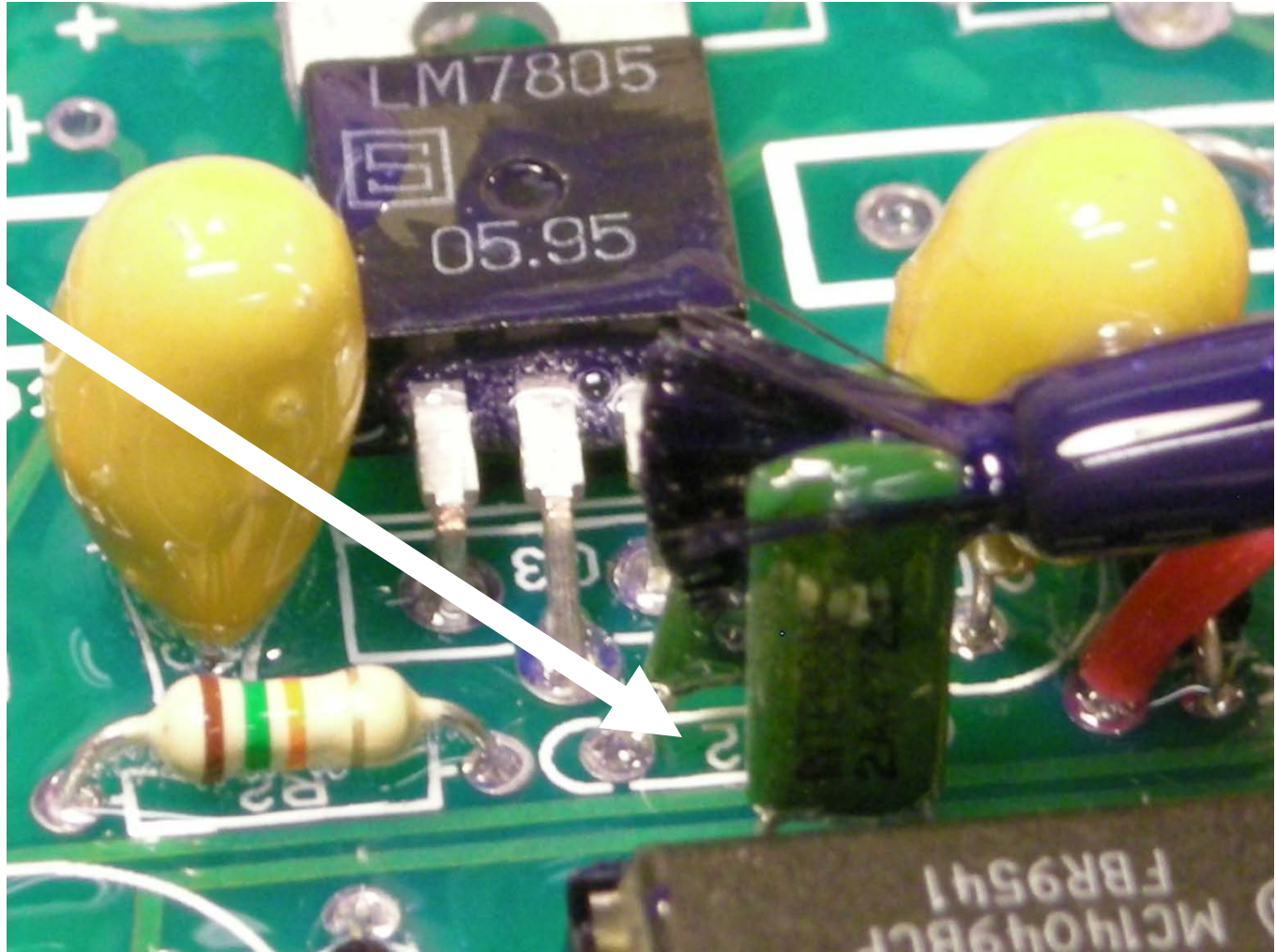
Apply underneath closely oriented parts like diodes, capacitors, and resistors in this manner.



Step 4: Detail Coating (between components)

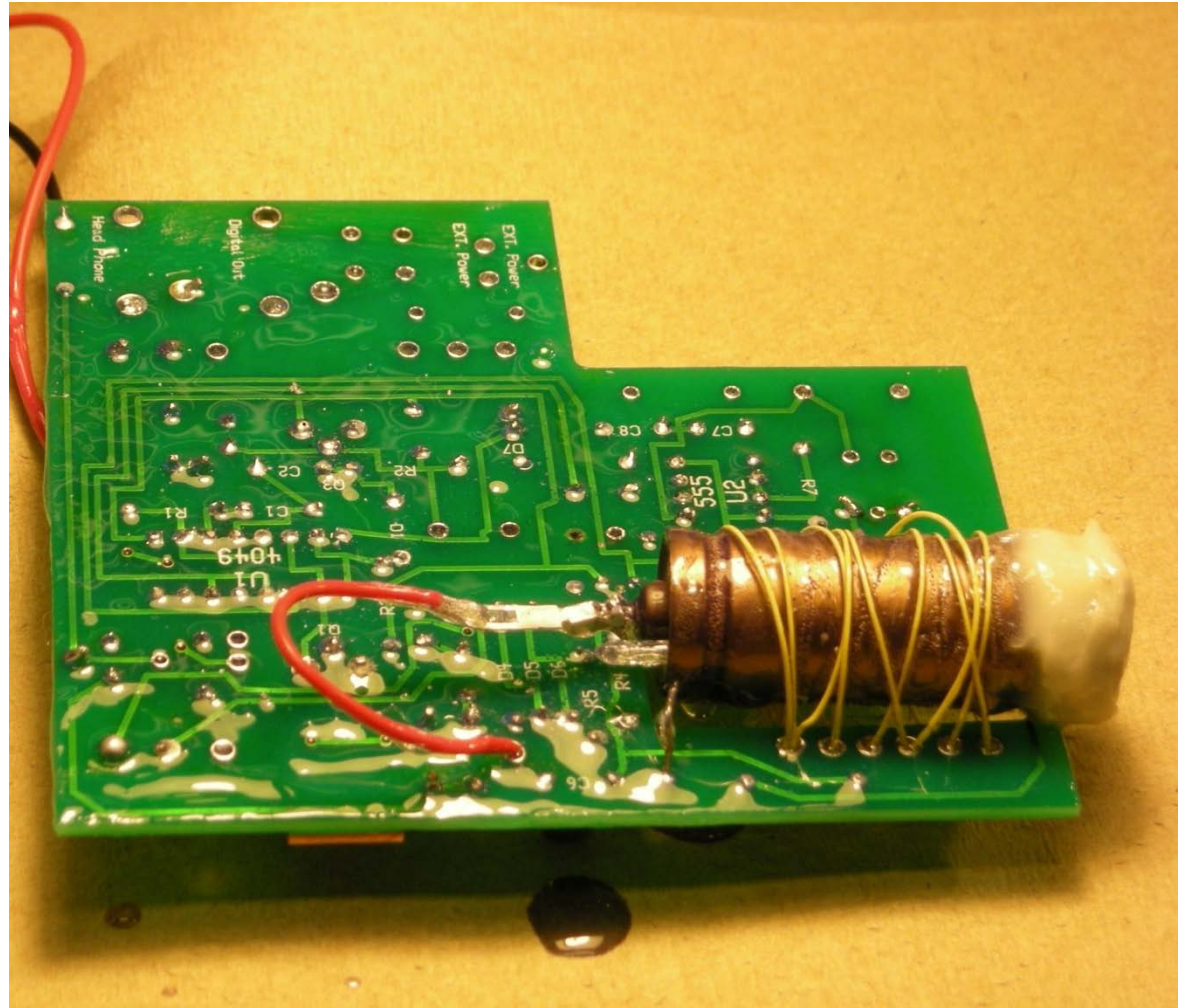
Apply
between
closely
oriented
parts

Use
smooth
strokes
(about 3
per dip)



Step 5: Backside Coating

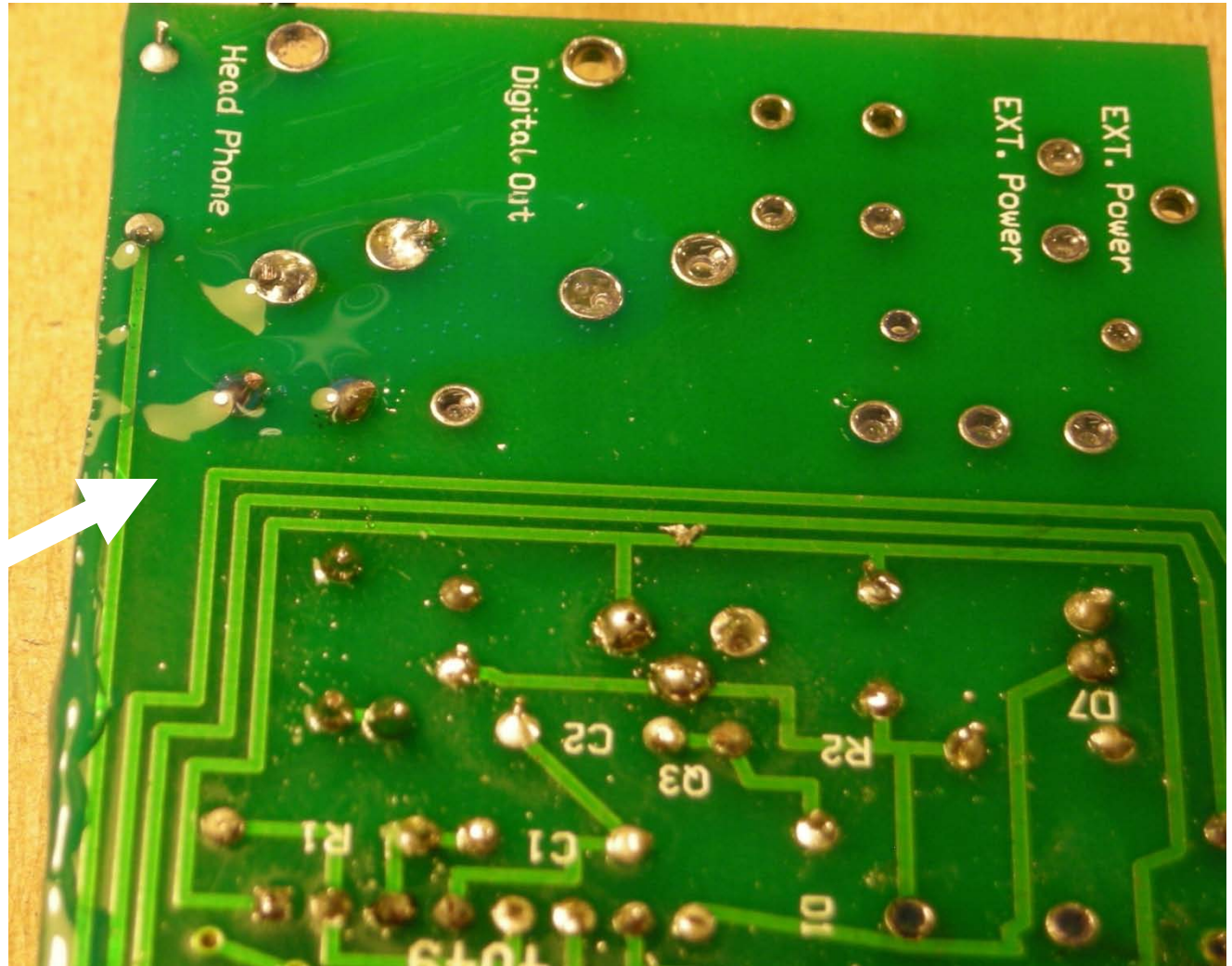
- Flip the board over using minimal contact with the currently curing coating.
- Coat the entire backside as desired using the same 3 stroke per dip rule.



Step 5: Backside Coating

Apply across the whole board, make sure the whole PCB is coated thoroughly.

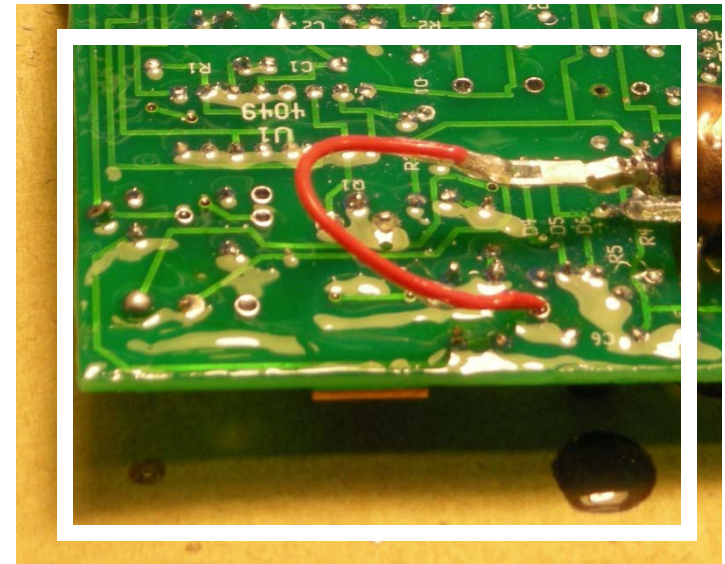
Note glossy look of coated board.



Step 6: Touch-ups

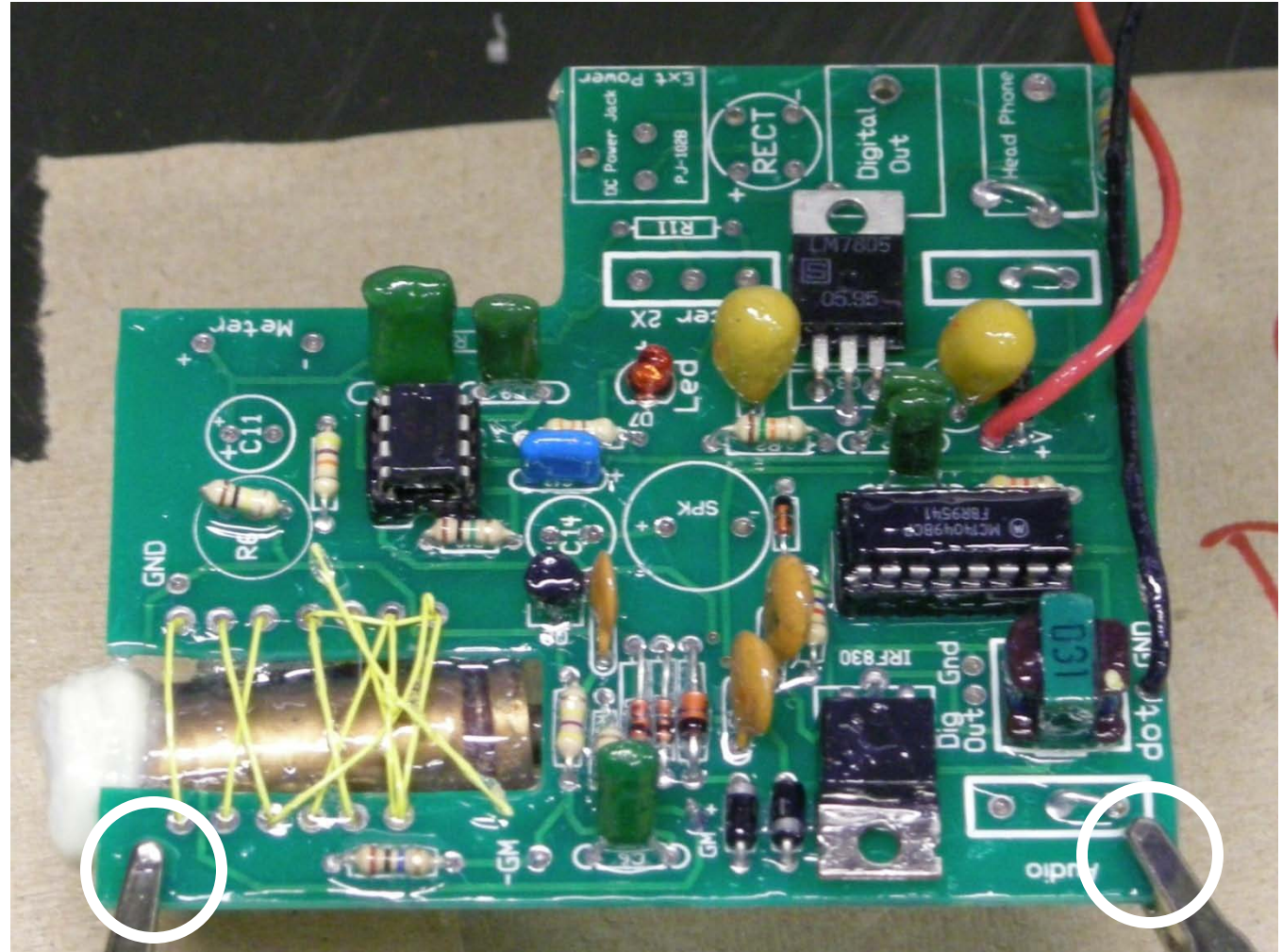
- **Visually inspect the board to ensure it is coated thoroughly.**
- **Make any touch-ups as necessary, ensuring there are no bubbles underneath parts.**
- **You may add additional coating to the HV section if you desire, but one coat is enough to do the job.**

HV Section



Step 7: Drying and Clamping

- Flip the board over and attach to helping hands where shown.
- This area is not HV and won't affect the cure if clamped here



Step 7: Drying and Clamping

- Allow the board to cure in a controlled environment for 24 hrs to achieve a full cure.**
- Tack free cure is about 10 min. The coating wont stick to your hand as readily after this stage.**
- Handling cure is about 4-6 hrs depending on the humidity.**
- Cure time can be decreased by using a convection heater at low heat (100 F) and low humidity.**