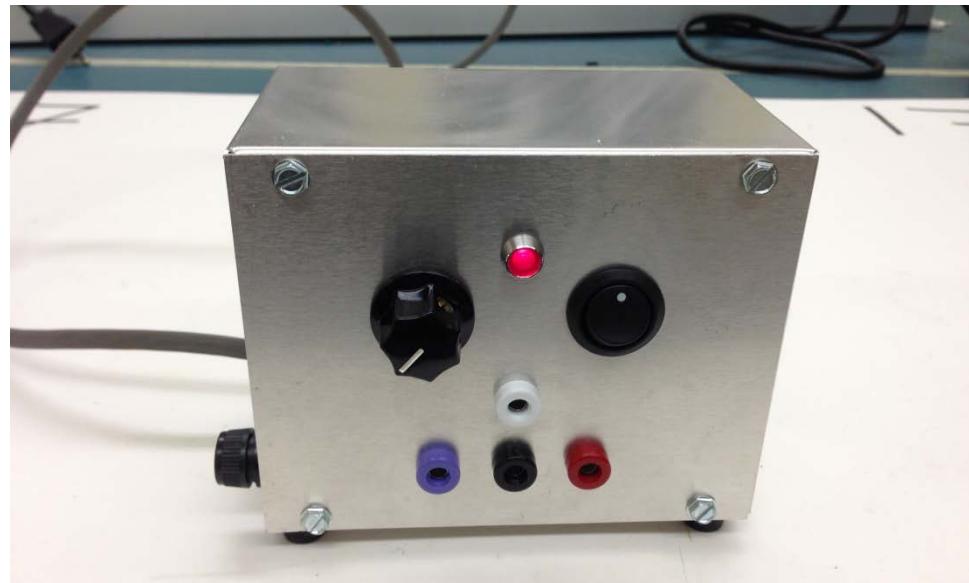




**BCIT**  
**School of Energy**

Electronics Fabrication  
DC Power Supply



Chassis Assembly Guidelines  
Prepared by: M. LeNoble

# Shop Safety

*When working in the shop...*

- Safety glasses must be worn at all times. (No exceptions)
- Closed toed shoes are to be worn.
- Wear close fitting clothing that cannot interfere with work.
- Tie back long hair so that it cannot interfere with work.



# Chassis Assembly

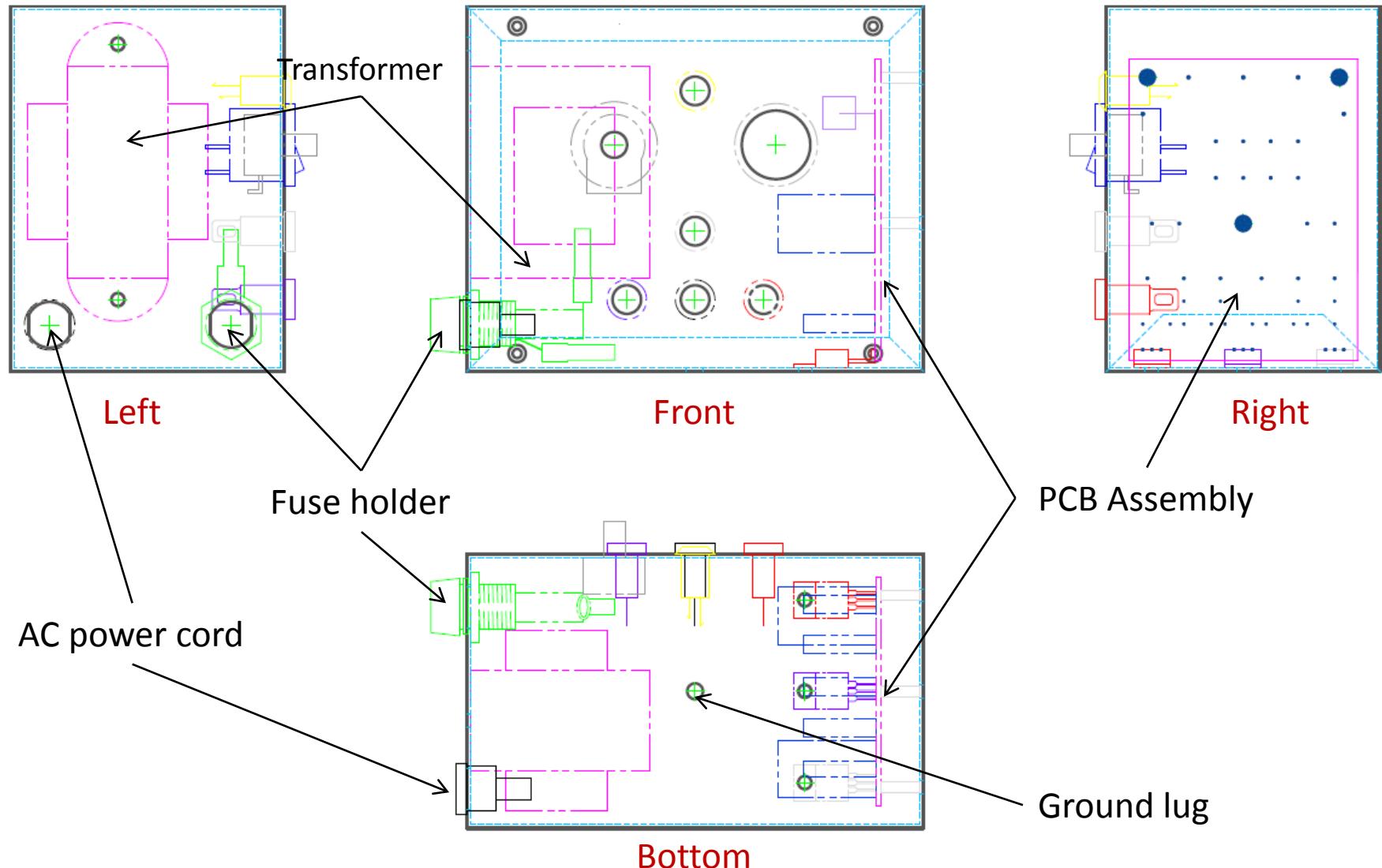
- Phase 2 of the DC Power Supply manufacture consists of the steps to install the tested PCB assembly, transformer, fuse holder and AC power cord (and AC power wires) in the chassis.
- The following tools are required for this phase of work:

Student Supplied	Shop Supplied
Safety glasses*	Screw drivers
Precision side cutters	Nut drivers
Needle-nose pliers	Adjustable wrench
Wire strippers	Strain relief pliers
	Crimping tool
	Pb-free solder station
	Work mat (non-ESD)
	SAC Pb-free flux core solder
	De-soldering kit
	Hot air gun

\* Must be worn at all times when working in the shop.

*Reference the Plan View and Interconnect drawings for correct placement of parts in chassis.*

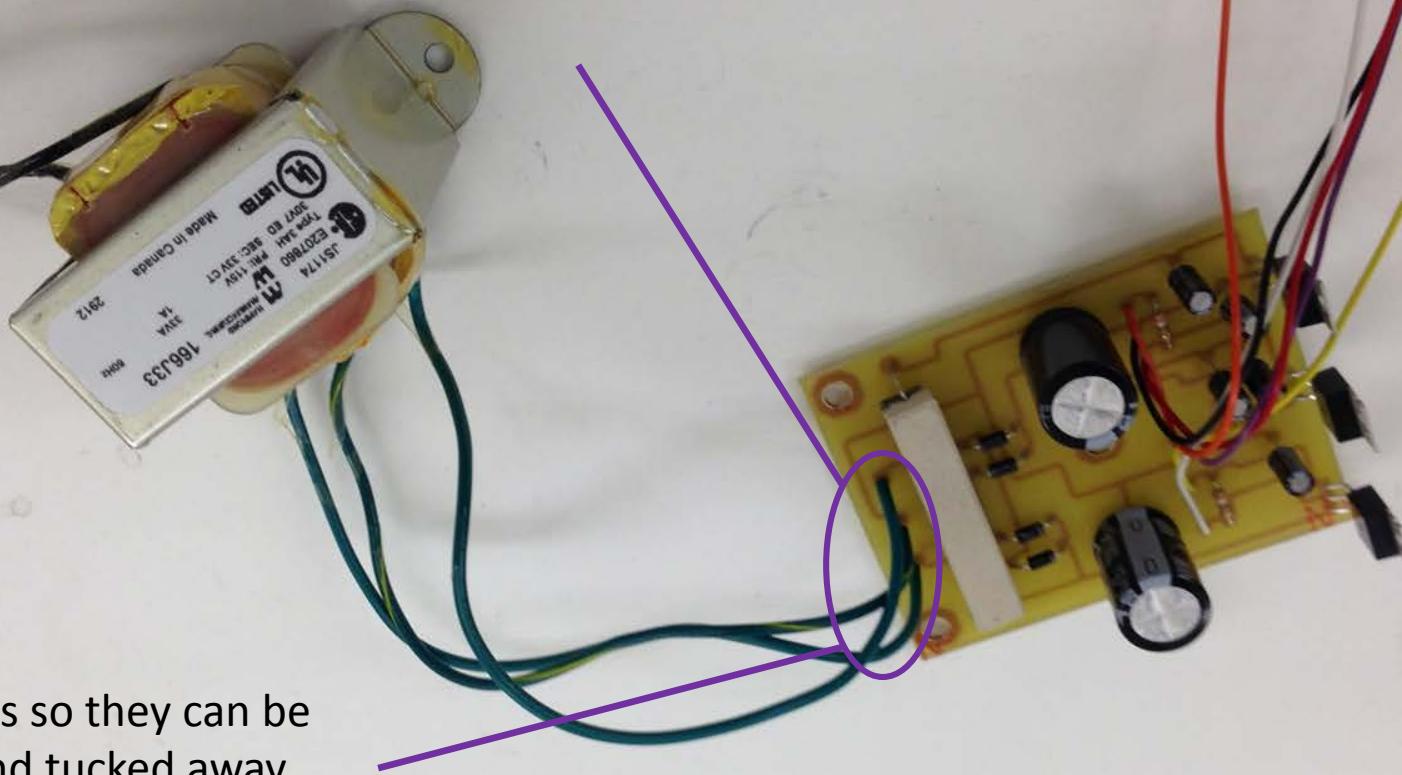
# Chassis Assembly



Refer to the above drawing to determine the correct location of each component during assembly.

Solder the 3 transformer secondary winding output wires to the PCB.

*(Refer to the Component Locator and Interconnect drawings)*



Trim the wires so they can be neatly tied and tucked away inside the chassis.



Securely fasten the fuse holder body; rubber washer (on the inside); and nut to the chassis using the appropriate double-D hole. Ensure the quick connect center-post is oriented towards the top side of the chassis. Store the fuse holder in your parts kit.



Use pliers or a wrench to tighten the plastic nut.  
Take care not to overtighten to avoid damage.

# Chassis Assembly

- PCB installation steps:
  - 1) PCB mounting
  - 2) Regulator mounting.
- Obtain the following mechanical hardware:

## PCB Mounting

1. #6-32 x 1" round slotted machine screw (Qty. 3)
2. #6 x 3/8" x 1/4" spacer (Qty. 3)
3. #6 flat washer (Qty. 6)
4. #6 lock washer (Qty. 3)
5. #6 nut (Qty. 3)

## Regulator Mounting

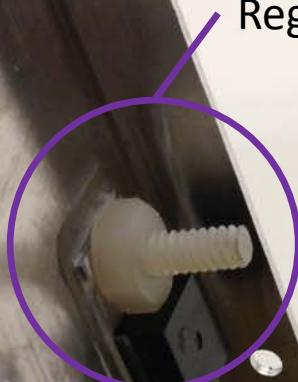
1. #6-32 x 1/2" nylon slotted screw (Qty. 3)
2. #6-32 nylon hex nut (Qty. 3)
3. Mica insulator (Qty. 3)

- Masking tape and non-conductive thermal paste will be provided in the lab.

*The following slides illustrate the installation procedure.*

PCBA assembled into chassis

Regulator secured using nylon fastening hardware (3x).

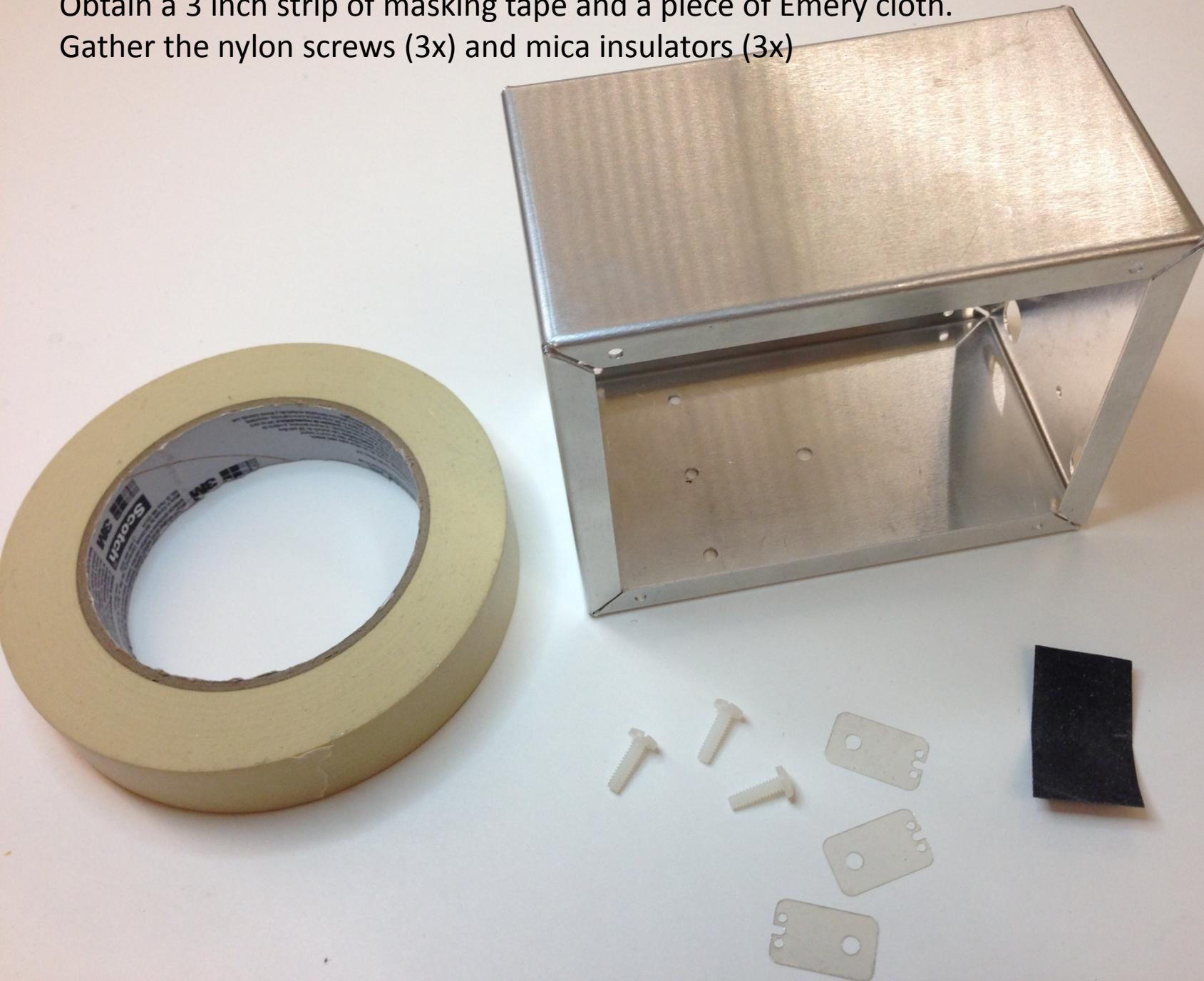


PCB mounted on spacers (3x) using metal fastening hardware (3x).



The transformer remains outside of the chassis during this assembly step

Obtain a 3 inch strip of masking tape and a piece of Emery cloth.  
Gather the nylon screws (3x) and mica insulators (3x)





Gently roughen the area where the regulators are to be installed in the chassis using emery cloth. This will increase the surface area for heat transfer.

Roughen the area between the chassis right side and the regulator mounting holes.



Insert the nylon screws into their respective holes along the chassis bottom.



Secure the nylon screws in place with masking tape.

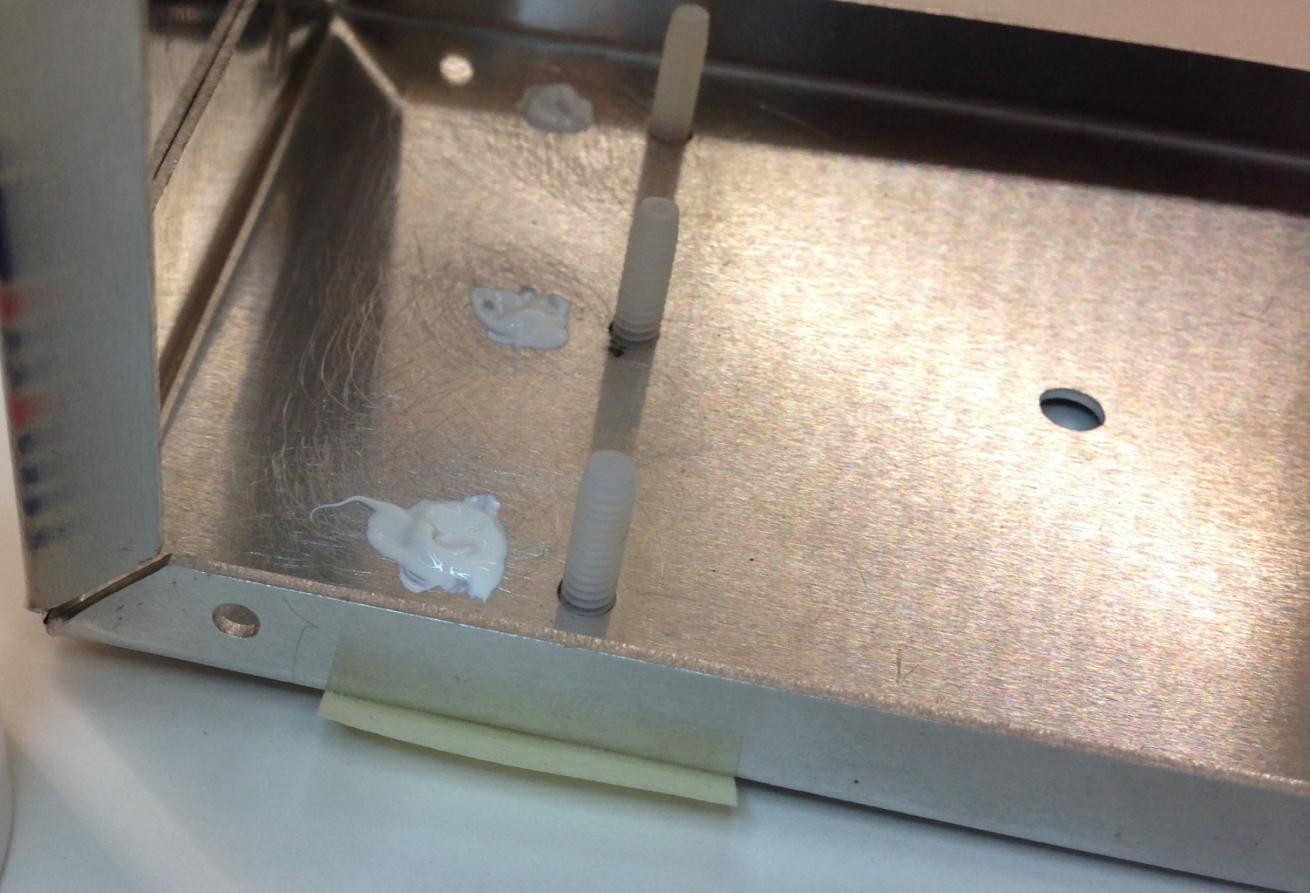


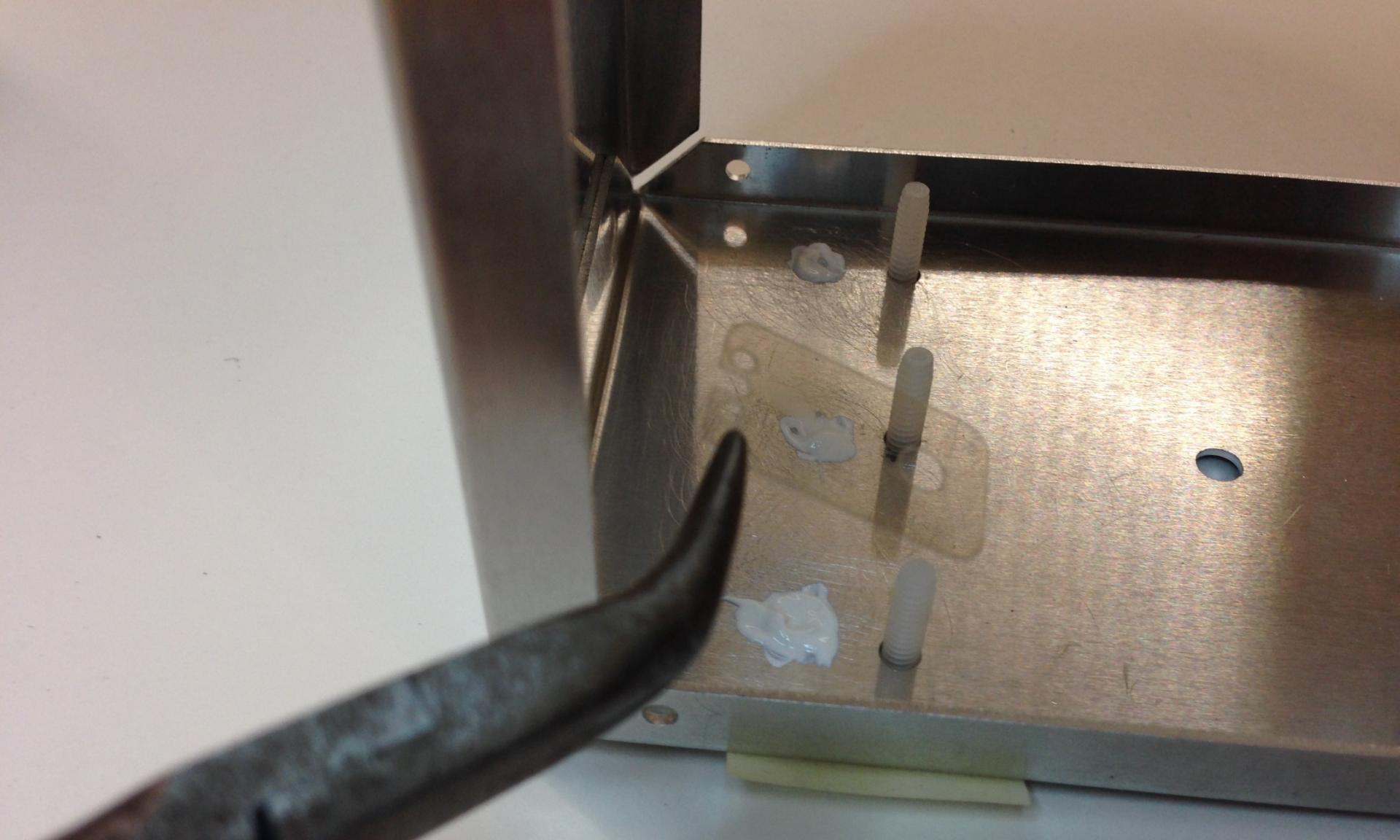
Proceed to the thermal paste work area.

*Use caution when working with this material.*



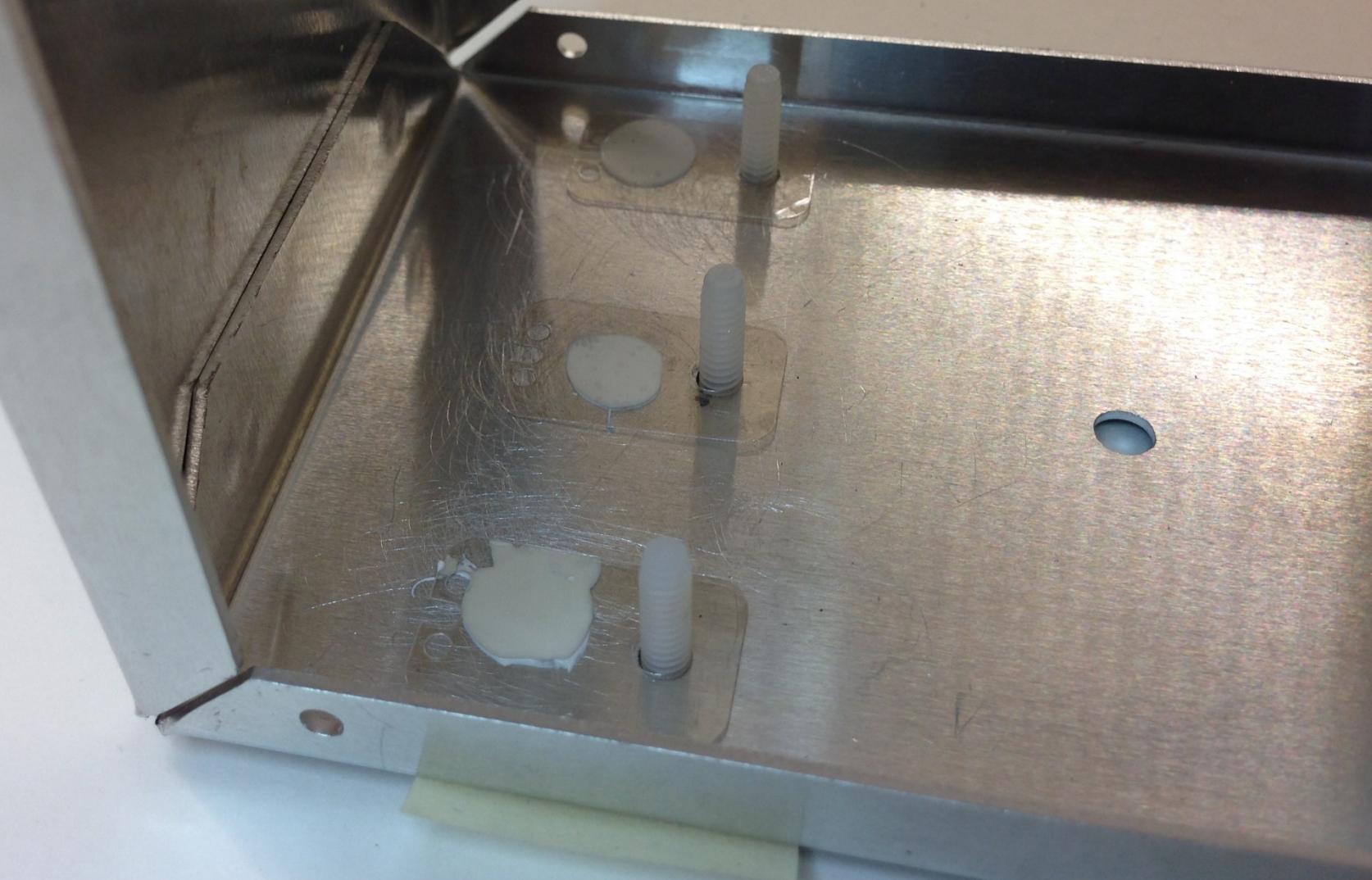
Apply a nominal 5mm diameter thermal paste 'dot' on the chassis bottom in the heatsink zone for each regulator. Centre the dot along a perpendicular from the right side of the chassis to the screw approximately 5 – 7 mm from the screw.

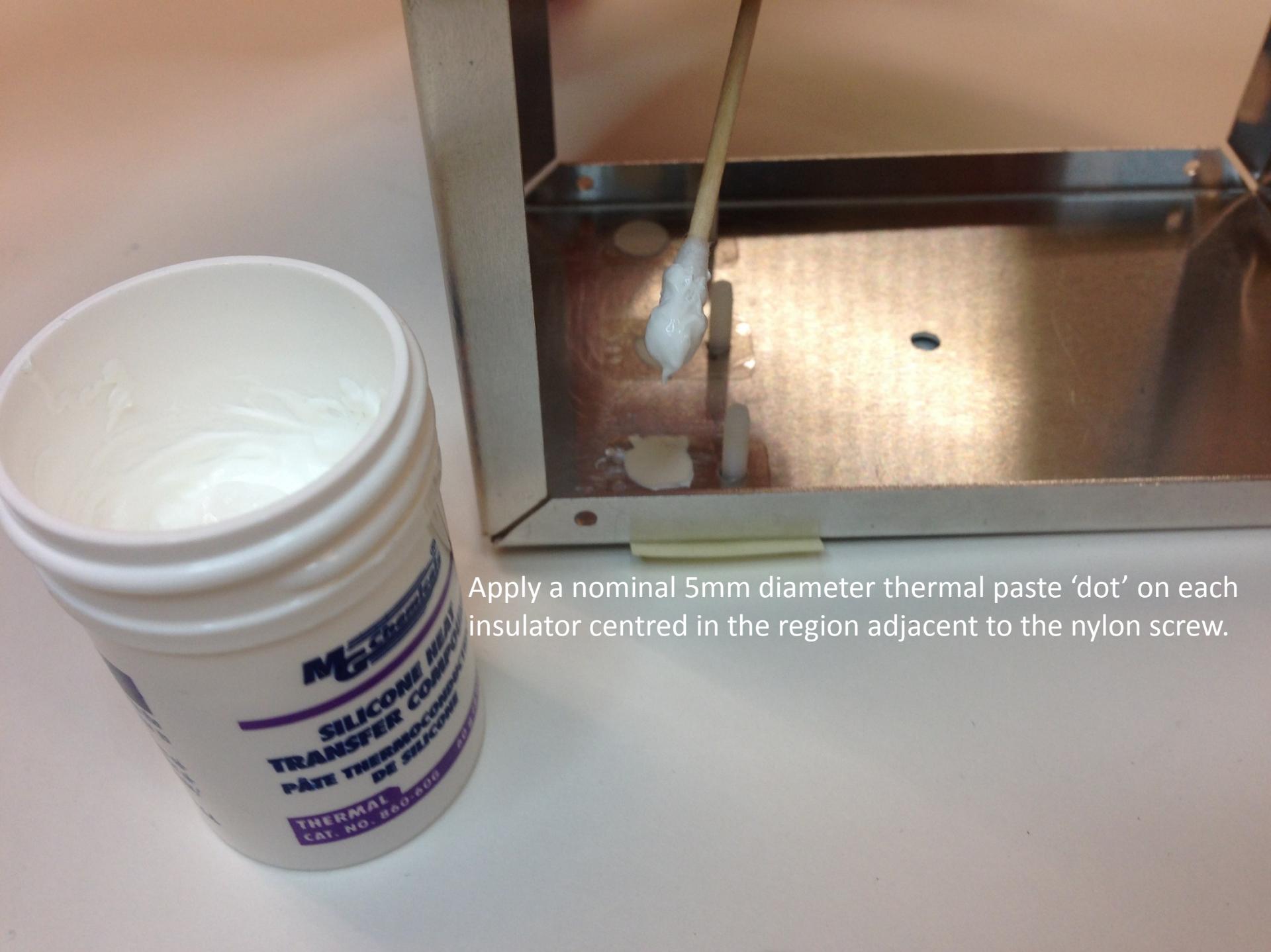




Install the mica insulators on the nylon screws and seat the insulators on to the thermal paste dots. Apply a gentle pressure on each insulator to ensure correct seating.

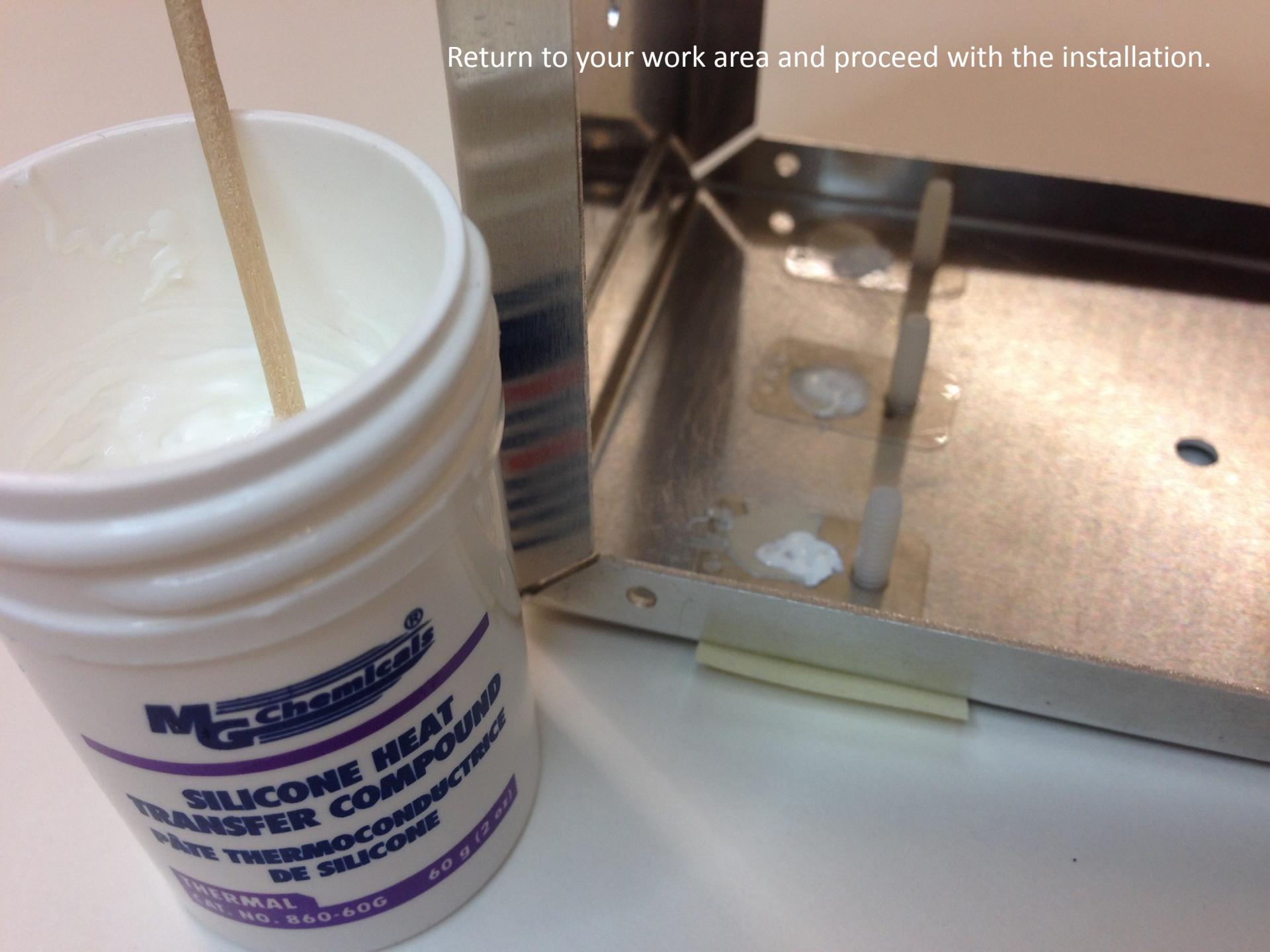
Verify the insulators are correctly oriented.

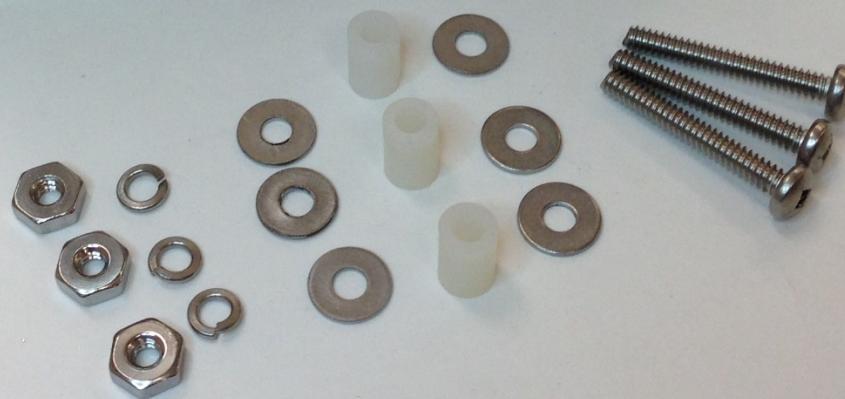




Apply a nominal 5mm diameter thermal paste 'dot' on each insulator centred in the region adjacent to the nylon screw.

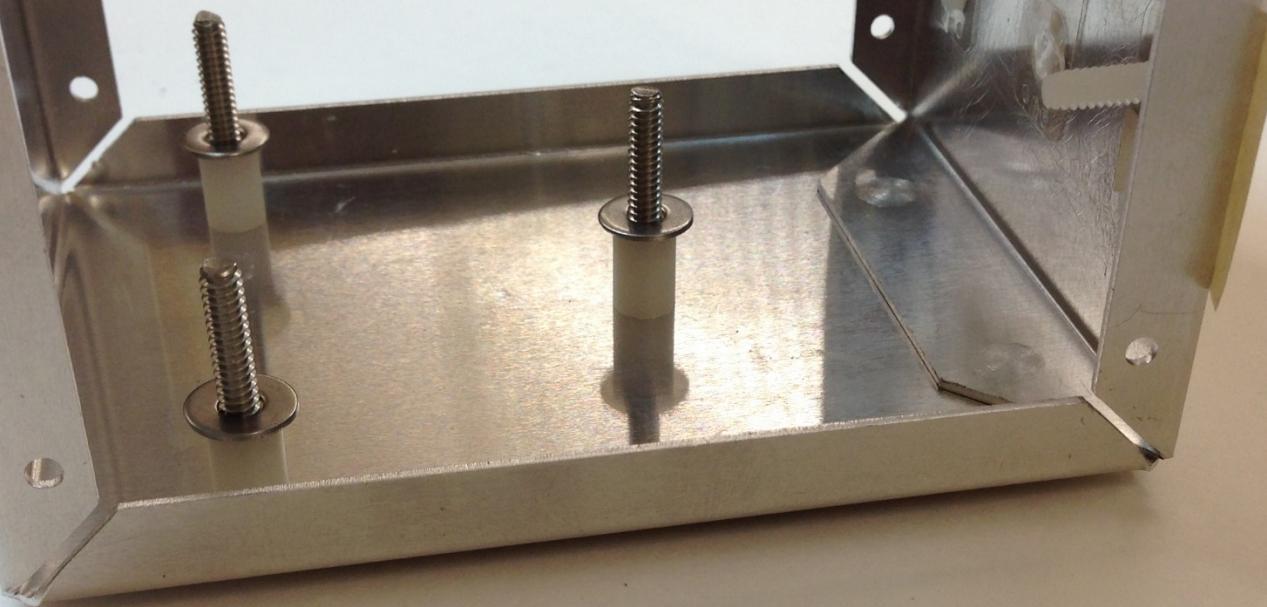
Return to your work area and proceed with the installation.

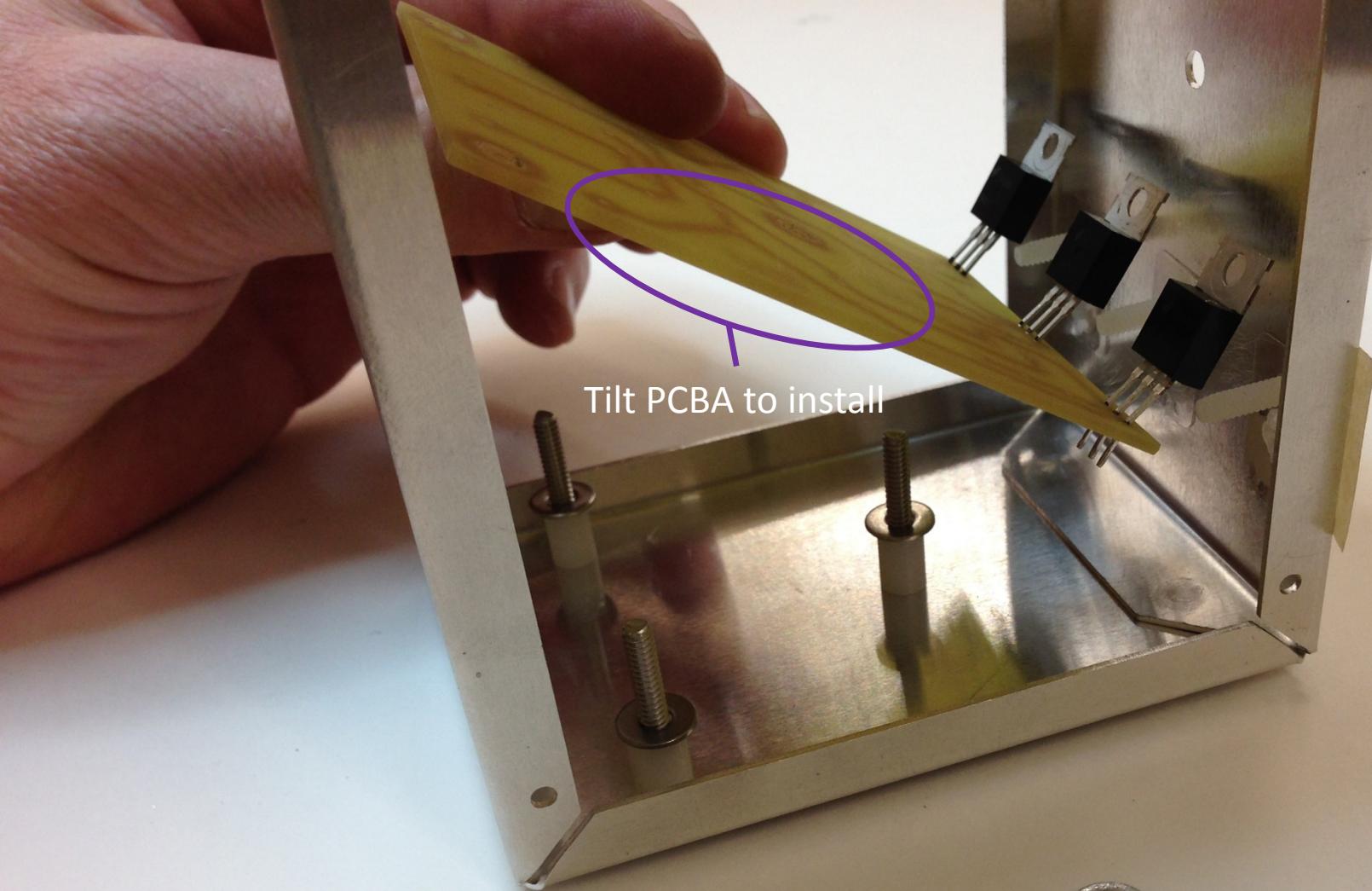




Gather the PCBA mounting hardware (3x).

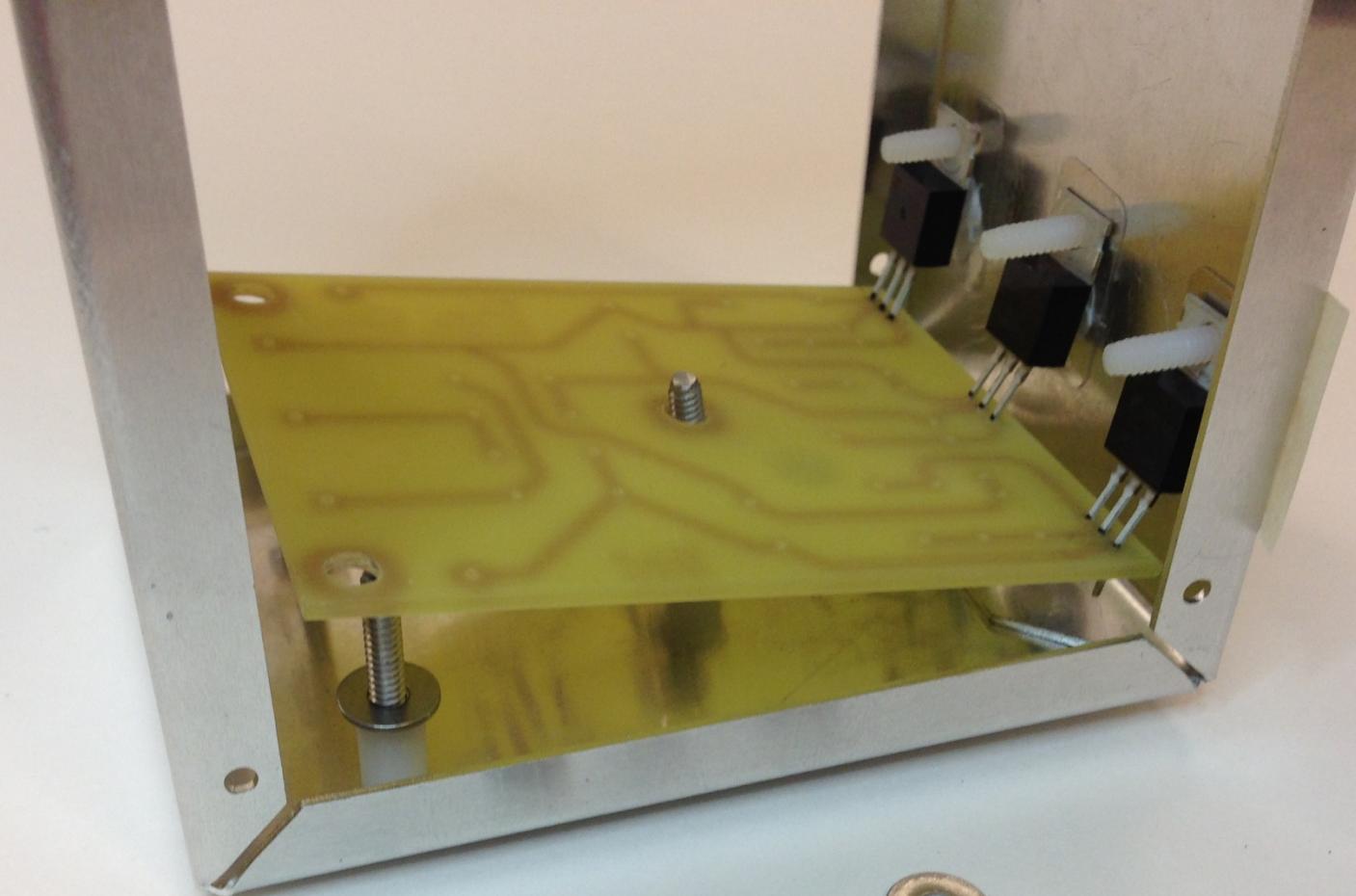
Insert the screws through their respective holes on the right side of the chassis. Install a spacer and flat washer on each screw.





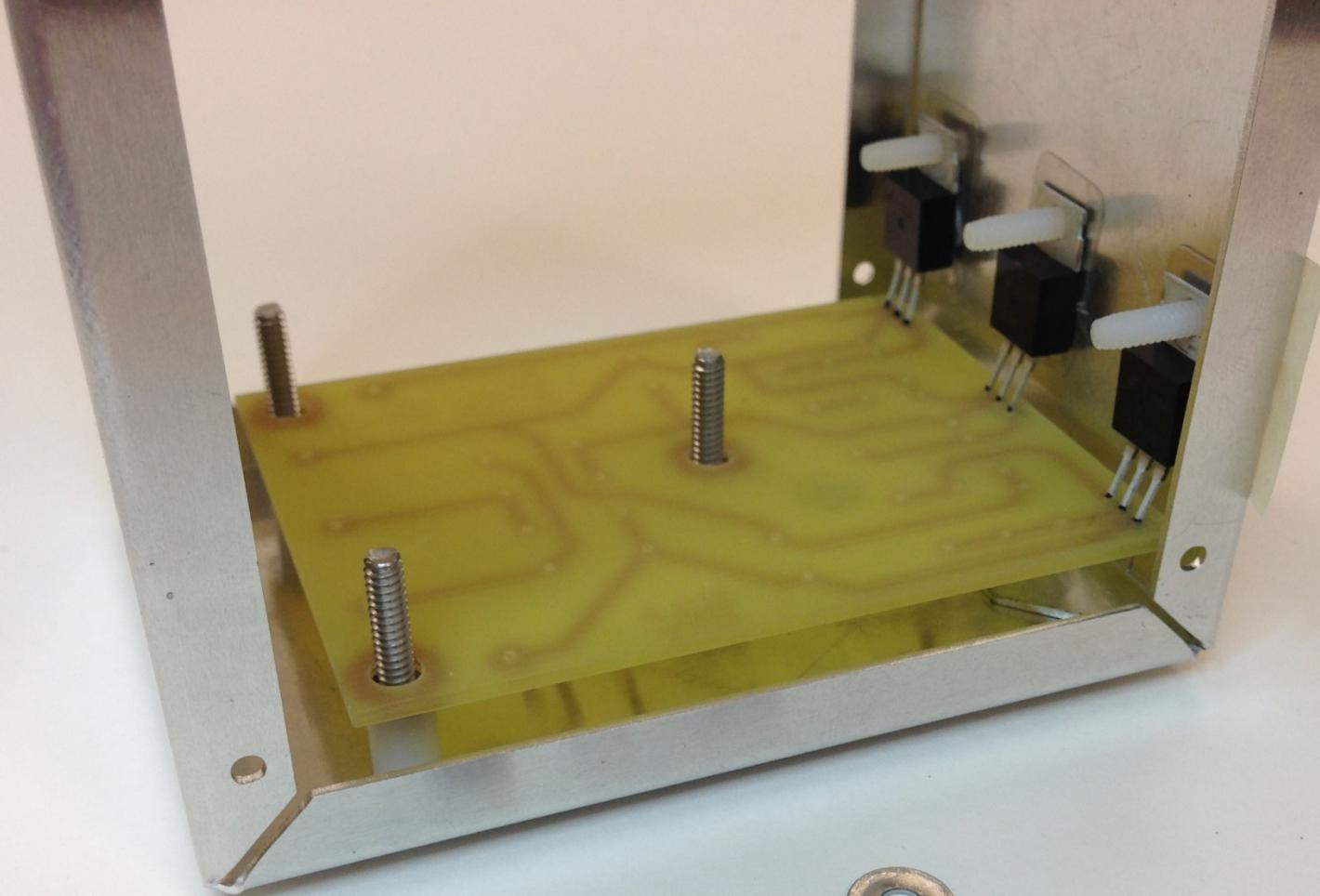
Assemble the PCBA into the chassis, initially insert the regulator tabs on to their respective nylon screws. Tilt the PCBA while doing this.





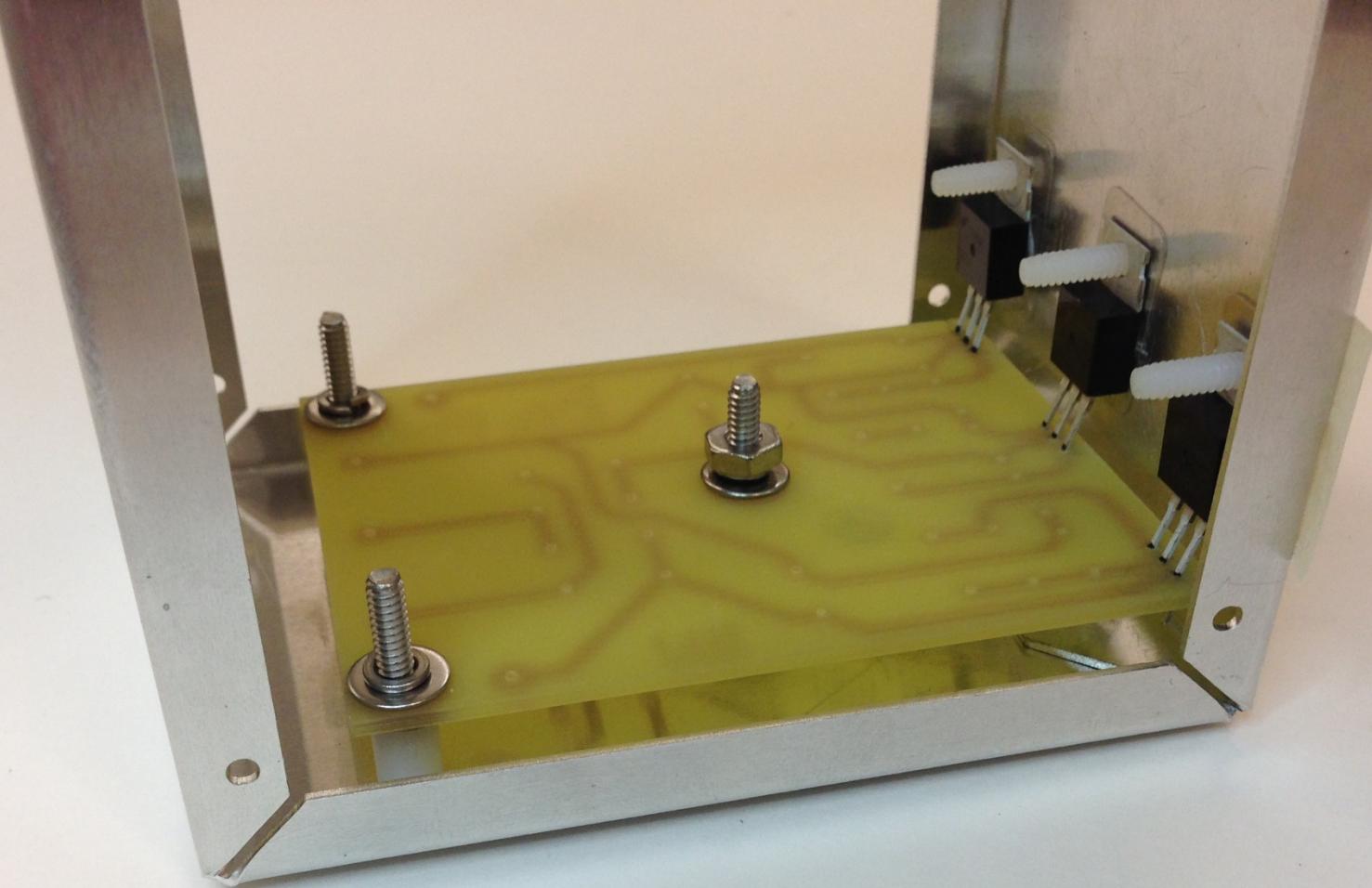
Install the PCBA on to its respective screws by gently tilting the PCBA downward. Continue this until the PCBA is seated on the 3 washers.





Ensure the PCBA is seated on all 3 washers and the regulators on their nylon screws. Take care not to rotate the mica insulators under the regulator heatsink tabs.



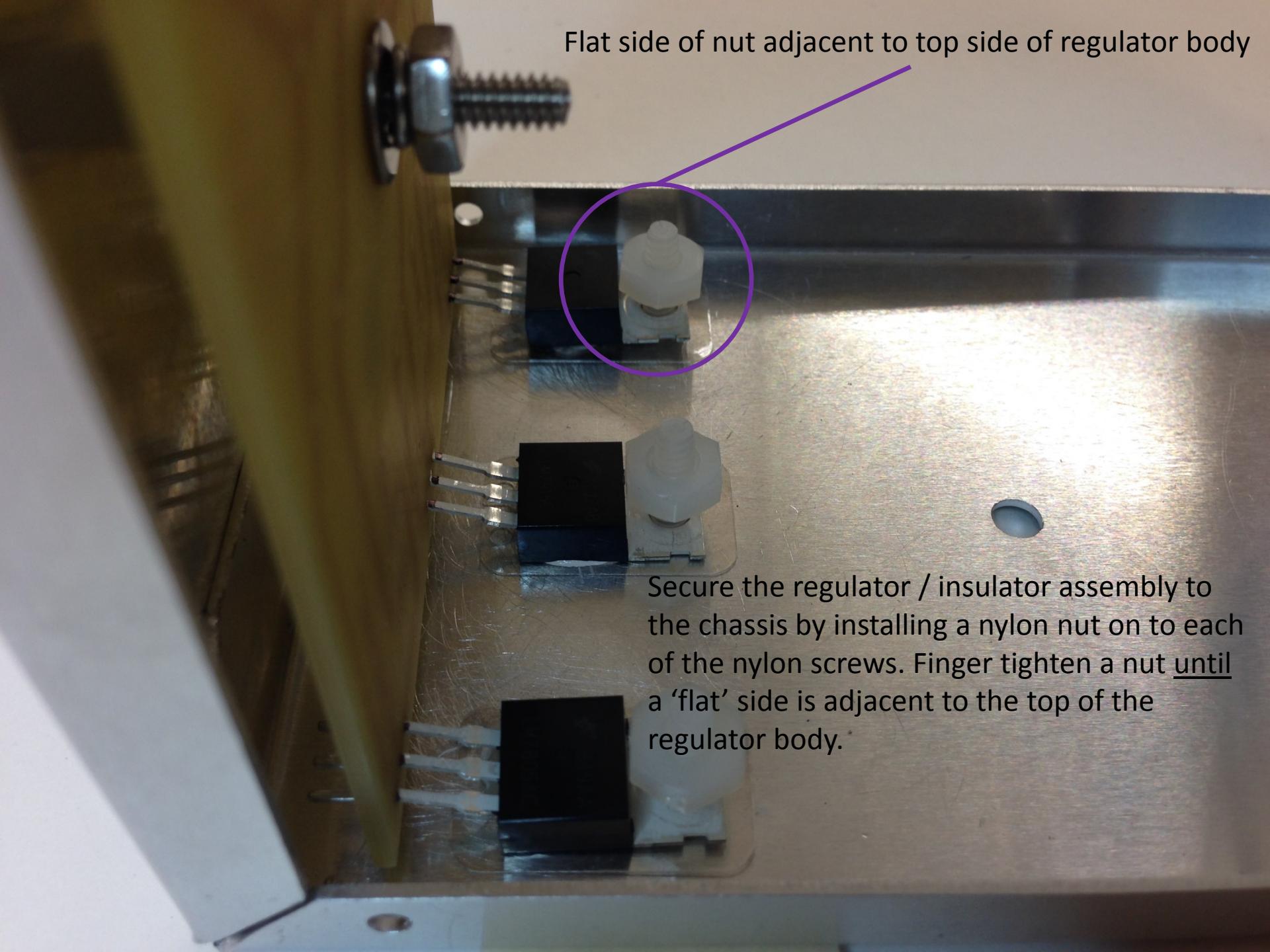


Install a flat washer onto each PCBA mounting screw followed by a lock (split) washer and secure using the nuts.





Use a nut driver or screw driver to tighten the PCBA fastening hardware.



Flat side of nut adjacent to top side of regulator body

Secure the regulator / insulator assembly to the chassis by installing a nylon nut on to each of the nylon screws. Finger tighten a nut until a 'flat' side is adjacent to the top of the regulator body.

Tighten using a screw driver



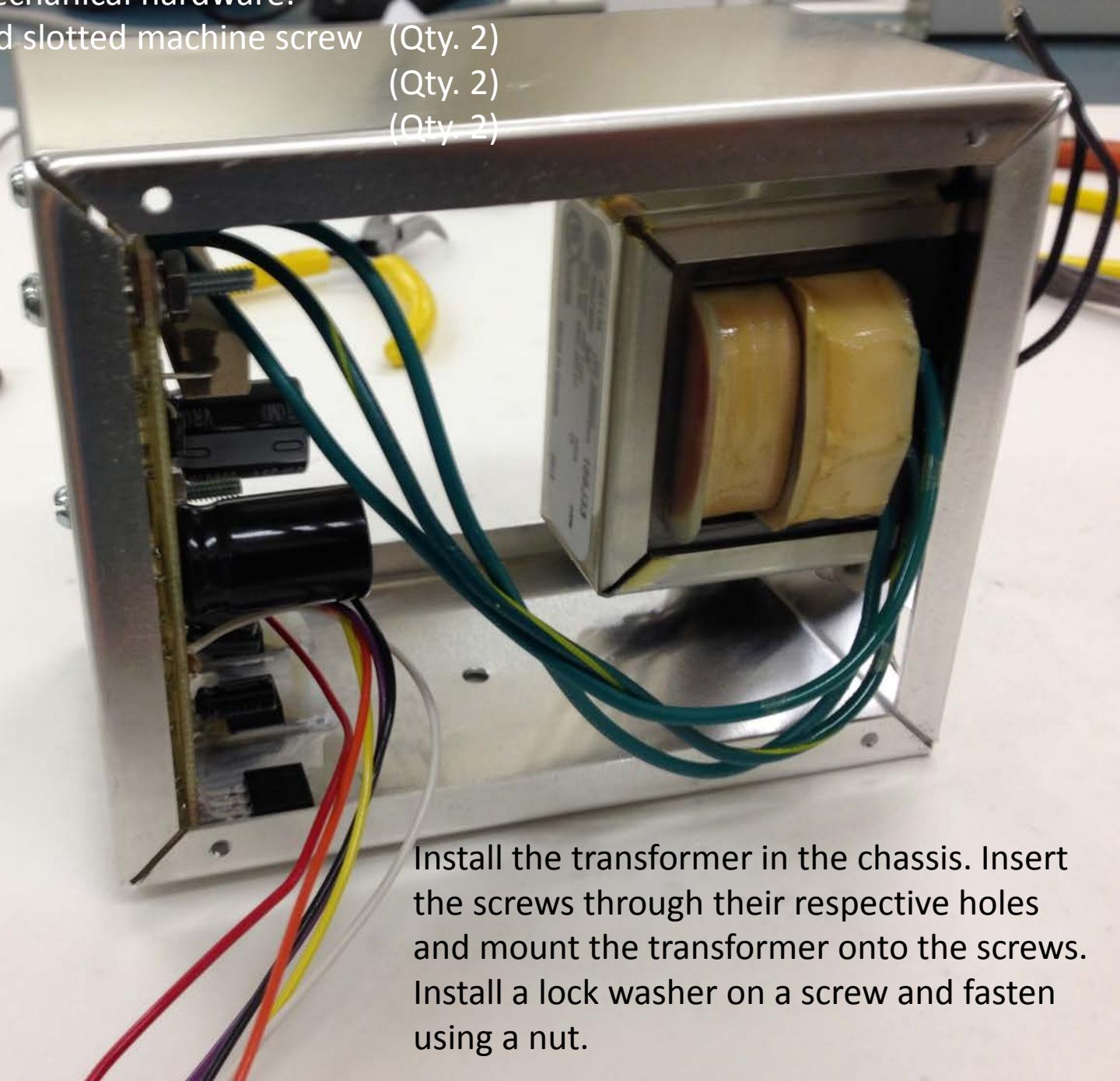
Verify all fasteners are secure and the mica insulators are positioned squarely under each of the voltage regulator tabs.

*This completes the PCBA assembly to the chassis*

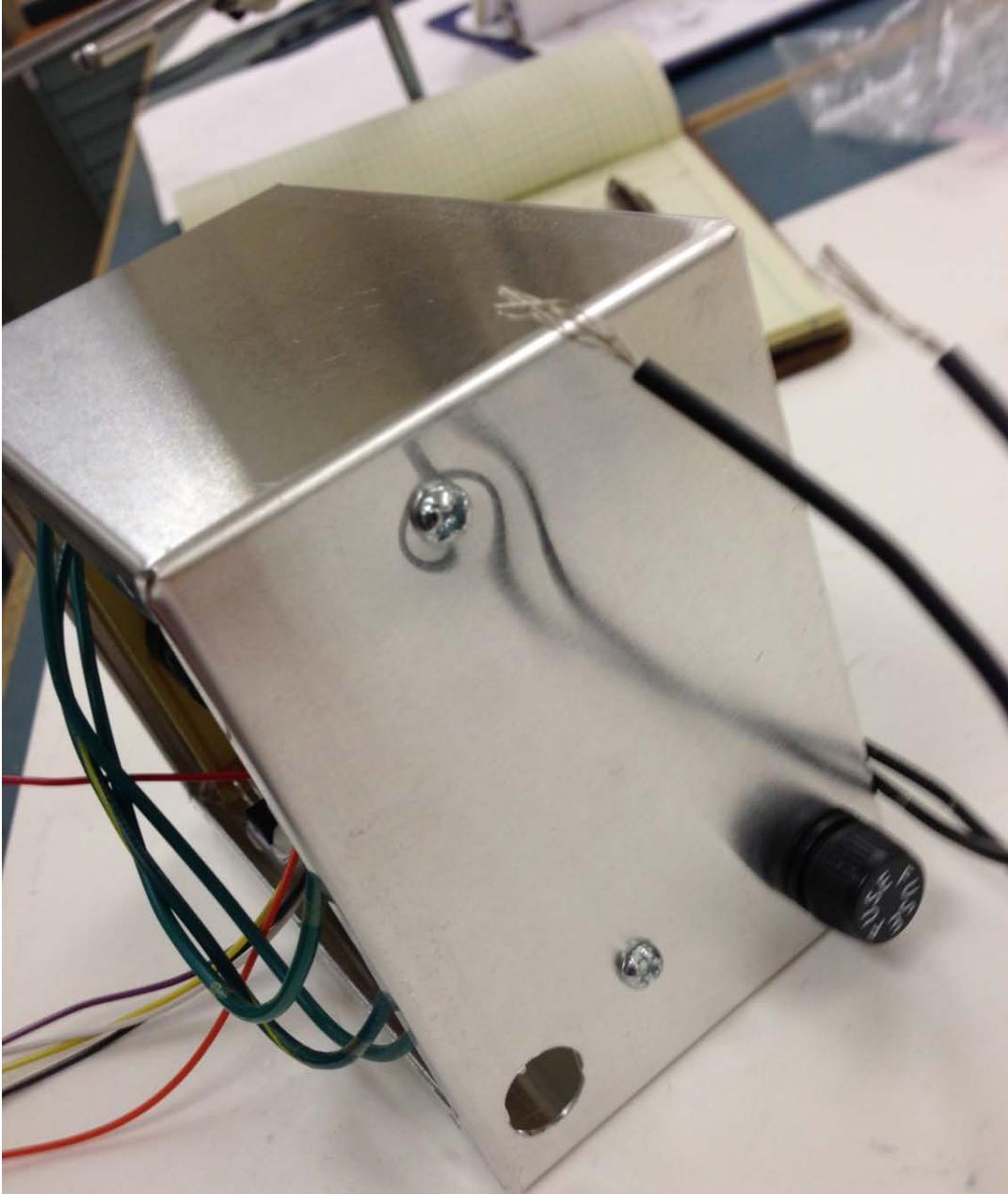


Obtain the following mechanical hardware:

1. 6-32 x  $\frac{1}{2}$ " round slotted machine screw (Qty. 2)
2. #6 lock washer (Qty. 2)
3. #6 nut (Qty. 2)



Install the transformer in the chassis. Insert the screws through their respective holes and mount the transformer onto the screws. Install a lock washer on a screw and fasten using a nut.



Ensure transformer fasteners are secure.  
Tighten a nut using a nut driver or pliers.



Remove about 6" of the AC power cord grey outer insulation without nicking the inside wires. Pass the exposed wires and approximately 1" of insulated cable through the AC power cord double-D hole in the chassis. Clamp the strain relief onto the cord outside of the chassis with the crimped side oriented to the top of the chassis. Use the strain relief pliers to crimp the cable (takes some force) and to insert the strain relief into the hole. A correctly installed AC power cord should be secured to the chassis by the strain relief.

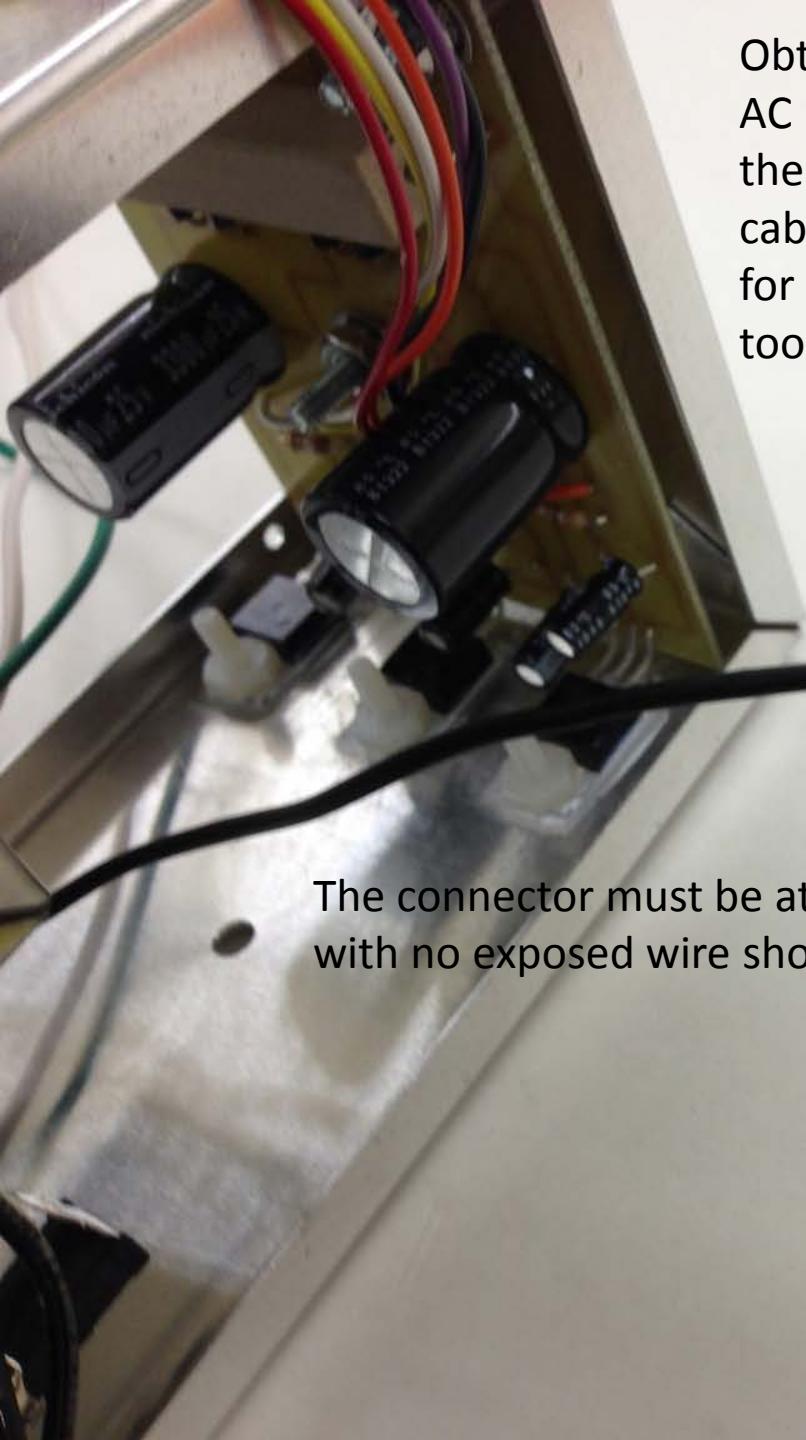
# Chassis Assembly

- AC power cord wiring steps:
- Obtain the following items:
  1. #22-18 Quick Connect (Qty. 1)
  2. #22-18 ring terminal (Qty. 1)
  3. 8-32 x  $\frac{1}{2}$ " round slotted machine screw (Qty. 1)
  4. #8 external star washer (Qty. 1)
  5. #8 lock washer (Qty. 1)
  6. 8-32 hex nut (Qty. 1)
  7. Heat shrink tube (about 3 cm) (Qty. 1)
- Cut the AC power cord wire lengths so the wires can be bundled and tucked away neatly inside the cabinet. **The green wire must be longer than the black and white wires.**

## Neutral Wire Spliced Connection

- Cut a transformer primary wire to length. Strip about 1cm of insulation from this wire and the white (neutral) AC power cord wire. Slide the heat shrink tube over one of the wires.
- Twist the exposed neutral wire together with the primary wire and solder the resulting joint.
- Slide the heat shrink tube over the exposed solder joint and shrink using the hot air gun.

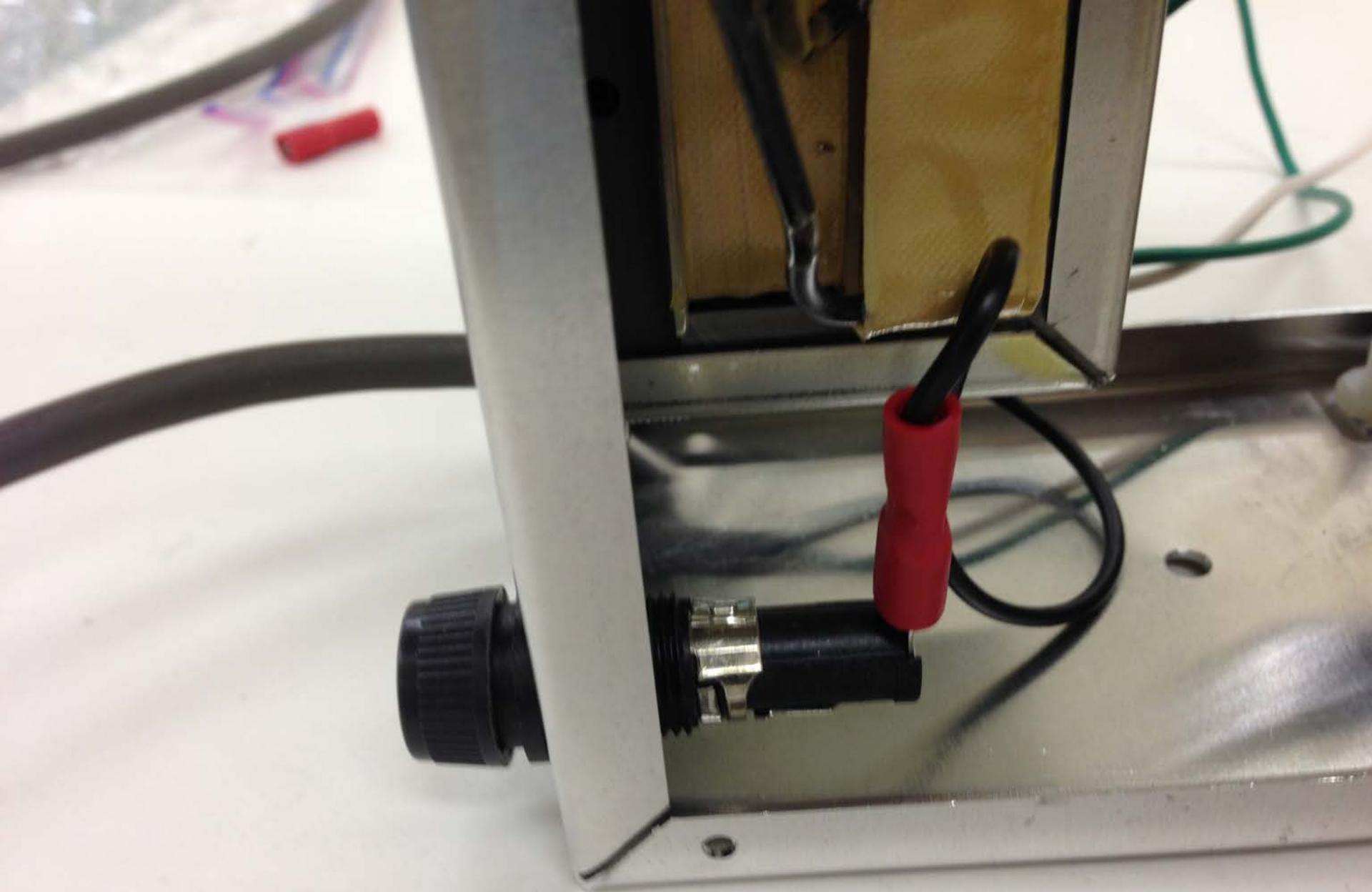




Obtain a #22-18 Quick Connect connector. Trim the black AC power cord wire to a suitable length for attaching to the fuse holder center post (consider length needed for cable routing). Strip the insulation to the correct length for the connector. Use the 22-18 position on the crimp tool to secure the connector to the wire.

The connector must be attached with no exposed wire showing.

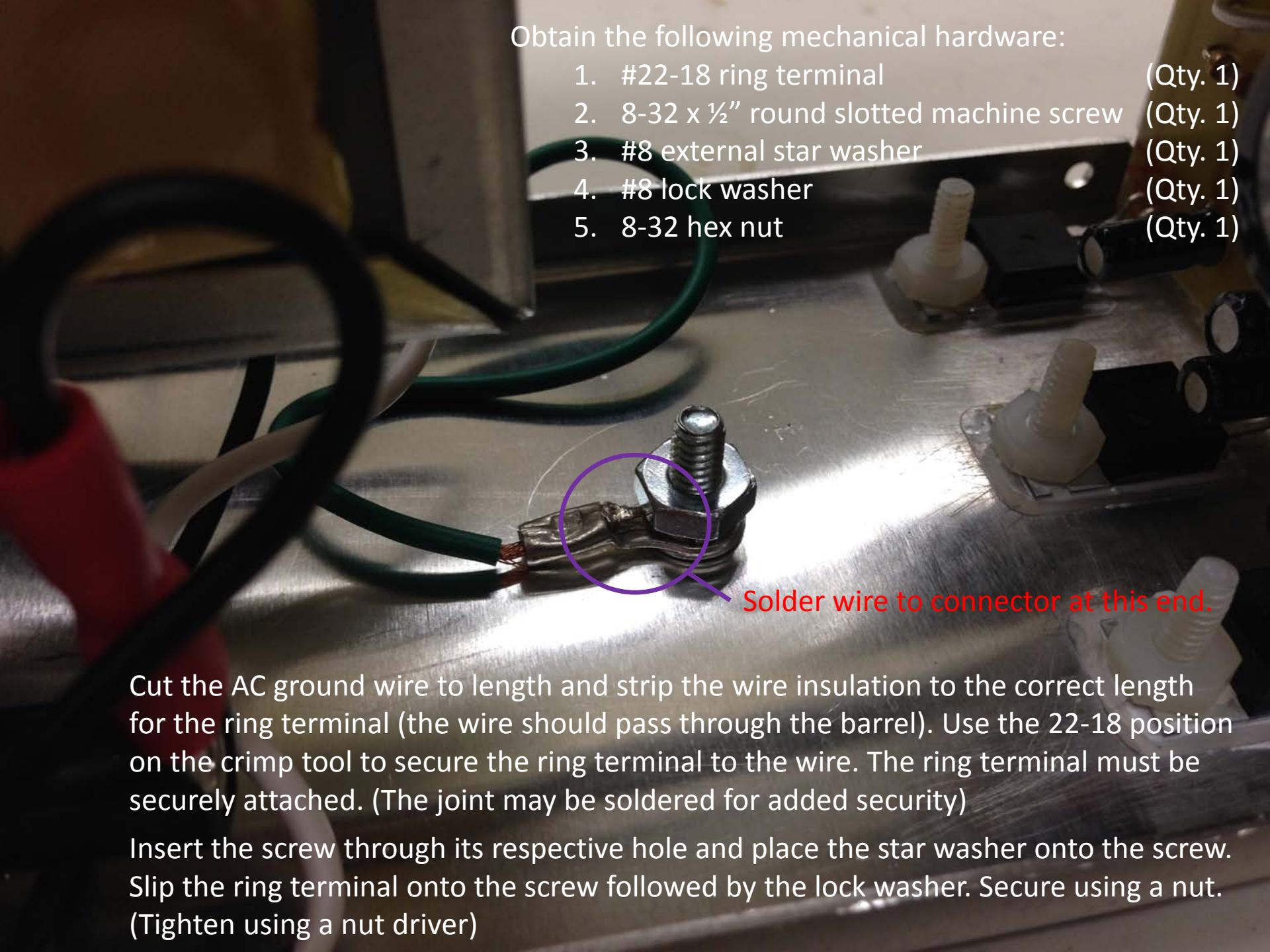




Securely attach the Quick Connector to the fuse holder center-post. Confirm the post is inserted correctly into the connector slot and not off to one side of the connector.

Obtain the following mechanical hardware:

1. #22-18 ring terminal (Qty. 1)
2. 8-32 x  $\frac{1}{2}$ " round slotted machine screw (Qty. 1)
3. #8 external star washer (Qty. 1)
4. #8 lock washer (Qty. 1)
5. 8-32 hex nut (Qty. 1)



Solder wire to connector at this end.

Cut the AC ground wire to length and strip the wire insulation to the correct length for the ring terminal (the wire should pass through the barrel). Use the 22-18 position on the crimp tool to secure the ring terminal to the wire. The ring terminal must be securely attached. (The joint may be soldered for added security)

Insert the screw through its respective hole and place the star washer onto the screw. Slip the ring terminal onto the screw followed by the lock washer. Secure using a nut. (Tighten using a nut driver)

# Chassis Assembly

*The chassis is ready for final assembly in Phase 4.*