

# **Gold, Copper and Nickel Electroplating Hood Manual**

# Electroplating Quick Reference

- The plating solutions used are expensive and are shared by all users. Please do your best to avoid contaminating or wasting the solutions.
- DO NOT DRAIN THE TANK; this is a staff role to maintain the solution.

## Setup:

1. Sign in on CORAL & the chemical hood. Chemical buddy requirements exist for all after hours work.
2. PLEASE try to use clean dry gloves when touching the hood controls, do not splatter wet chemicals all over controls. Keep it clean.
3. Use of heavy green gloves, a face shield and apron is required for all wet work within the hood. Remove your green gloves to touch anything on the power supply control panel.
4. Start solution circulation pump running.
5. Enable heating of solution. Set temperature on controller for desired process if need be, this value should be already set and correct, verify.
6. Allow solution to come to temperature and stabilize. Keep the lid on the solution as much as possible during your work to reduce evaporation.
7. Verify that the power supply is in *STANDBY* mode.
8. Verify that the proper anode is in the tank, held in place by the grooves on the sides in the front end of the tank.
9. Define your plating recipe in the power supply controller (see power supply documentation section of this manual).
10. Reset the totalizer (charge meter) on power supply to zero.

## Plating:

11. Preclean your wafer if required, metal adhesion may suffer if wafer is contaminated. Photoresist and other polymers are allowed in the bath if oven cured as a selective masking agent.
12. Select the appropriate fixture for your part; DO NOT move fixtures between different metal plating stations and contaminate other processes. If you cannot find the fixture you desire ask Staff for assistance.

- a. Whole wafers may be selectively plated on one side in the AMMT fixture; an O-ring seal precludes plating solution contact on the back of the wafer. See AMMT wafer holder work instructions in this manual for proper usage. Place your wafer in the PEEK wafer holder and carefully tighten evenly, be sure O-ring seals are in the right locations.
  - b. Whole wafers or pieces may be plated with the open frame and alligator clip fixture – all exposed surfaces will be plated!! Be gentle with the clips as they are coated to prevent plating on them, do not scratch them.
  - c. A single alligator clip fixture is also available for small pieces.
13. Insert wafer holder, frame fixture or clipped part into the tank, the part can be placed as desired with reference to the solution flow (front to back)/anode grid. There are locating holes down both sides of the tank to help control fixture placement.
  14. Connect wafer holder or frame to circuit. The cathode line is the black wire running from the right front corner of the tool around the inside wall terminating at the rear of the plating tank. Connect your fixture to this terminal connector.
  15. Verify and finish setup of your plating process parameters on the Dynatronix power supply. Please refer to the power supply manual section of this work instruction on how to operate the power supply.
  16. Once the plating program is setup in the supply, take power supply out of standby mode and place into *OPERATE*.
  17. Initiate your plating process. Adjust the voltage/current to the appropriate amount as necessary to maintain your process. Put the lid on the tank if plating for more than a few minutes, the cathode wire may exit in the center rear of the tank cover where the immersion heater is located, with the wire running up and over the heater.
  18. Once your target deposition has been attained, or automated plating program completes, place the power supply in *STANDBY* again.
  19. Turn off the tank heater.
  20. Turn off the recirculation pump.

#### **Part Retrieval and Clean up:**

21. Lift off tank cover and place safely to the left side of the tank or to the rear.
22. Disconnect the wafer holder or piece frame holder from the circuit.
23. Quickly and CLEANLY move the sample to the Quick Dump Rinser (QDR) and start the QDR cycle, your wafer or piece will now be rinsed with DIH<sub>2</sub>O, when

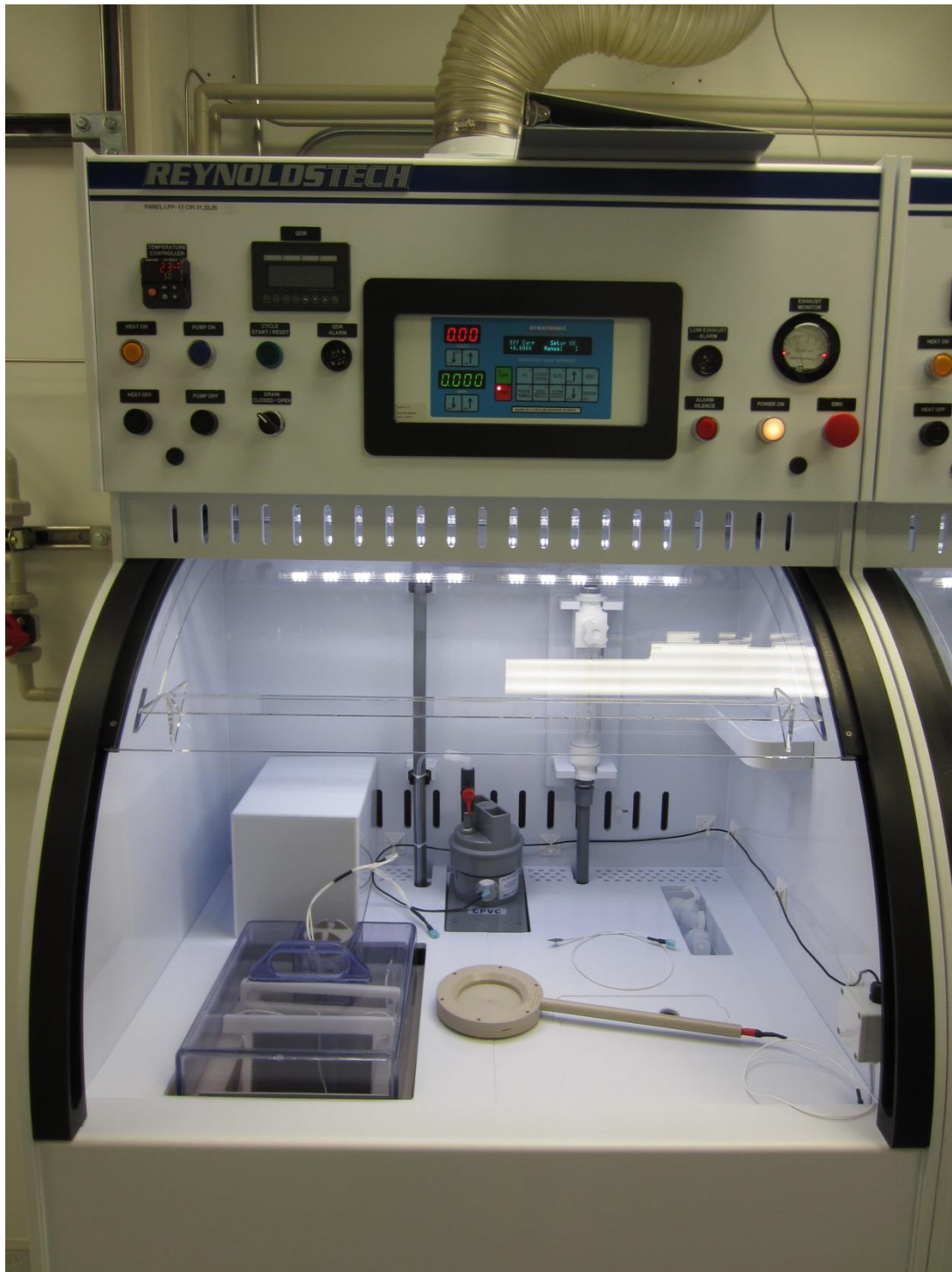
the alarm sounds the cycle is complete and you may press the reset button. Some part fixtures or piece(s) may not fit nicely into the QDR, use best judgment to clean your part; some fluoroware is available for this purpose. There are PTFE spray DIH<sub>2</sub>O and N<sub>2</sub> guns in the right rear of the hood for parts, fixture and hood deck cleaning and drying. Do not get water in the plating tank!!! Keep cover on the tank!!!

24. If using the wafer holder remove your wafer and place the holder in the QDR to soak in the DIH<sub>2</sub>O, rinse clean and leave unassembled to dry on a beta wipe.
25. The QDR will stay filled upon completion of the recipe, once done rinsing parts and fixtures press F1 on the QDR controller to drain the QDR dump tank.
26. Wipe down all spills and drips in the hood that have occurred during your work. Thoroughly rinse in water.
27. DO NOT DRAIN THE PLATING SOLUTION TANK!!! DO NOT MAKE ANY AMMENDMENTS TO THE BATH SOLUTION!!! These are staff responsibilities.
28. Fill out log sheets, recording charges from meter, and notes about your plating.
29. Log out of the hood in Coral. Be sure to enter in your material charge and comments as needed.

## Electroplating Solution Quick Reference Data Fields

Temperature	
Current Density	
Deposition Rate	
Uniformity	
Surface Roughness	
Film Stress	

**Example of CNF Electroplating Station/Hood:**



**Typical Status of Hood Power/Exhaust:**

(This picture is of top right side of hood)

- Power ON button light should be illuminated.
- Mini-photohelic gauge should be reading around 0.5" W.C.
- NOTE location of EMO button!!!



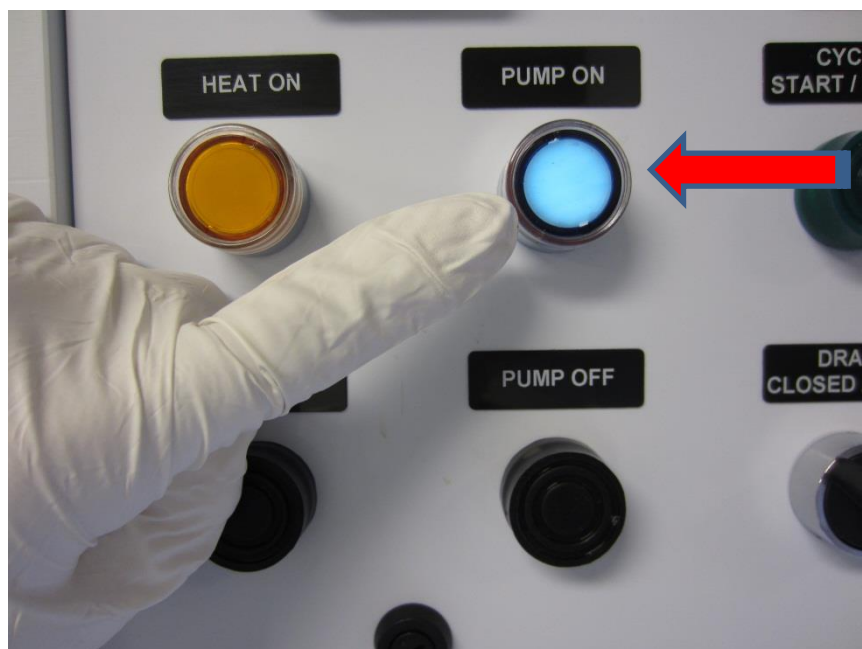
### Plating Bath Setup:

1. Sign in on CORAL & the electroplating station/hood clipboard sign in sheet. CNF "Chemical buddy" requirements exist for all after hours work.
2. PLEASE try to use clean dry gloves when touching the hood controls, do not splatter wet chemicals all over controls. Keep it clean.
3. Use of heavy green gloves, a face shield and apron is required for all wet work within the hood. Remove your green gloves to touch anything on the power supply control panel
4. Primary Electroplate Bath Controls:
  - All bath controls visible here are shown in the IDLE or OFF state!!! The tool should look like this when you are about to start and when you are done and about to leave.





5. Start solution circulation pump running.



6. Start the immersion heater:

- Set temperature on controller for desired process if need be, this value should be already set and correct, verify.



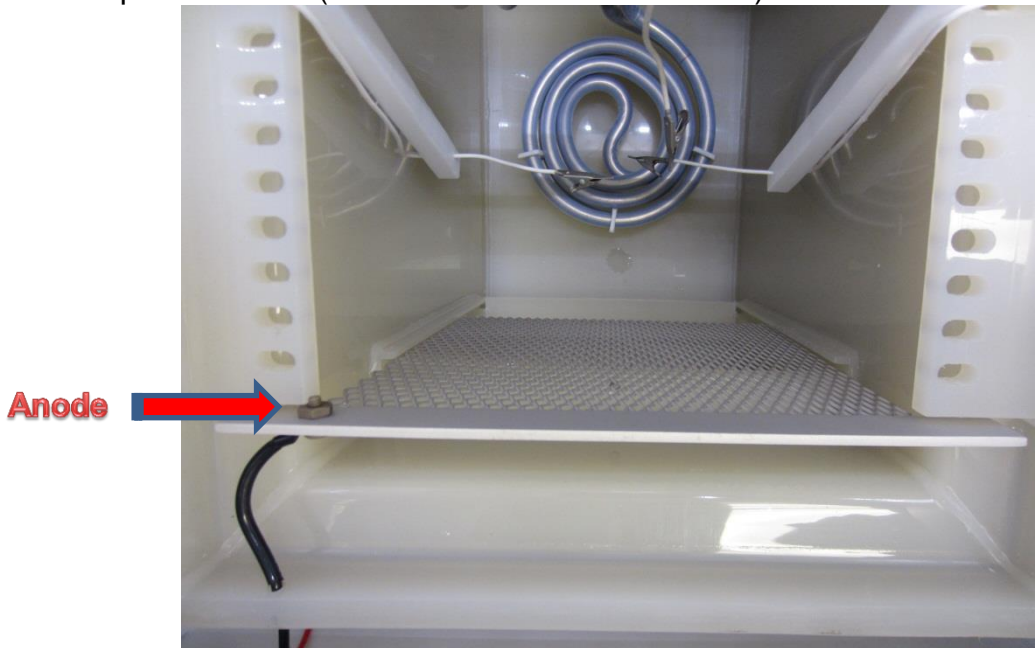
7. Allow solution to come to temperature and stabilize. Keep the lid on the solution as much as possible during your work to reduce evaporation.



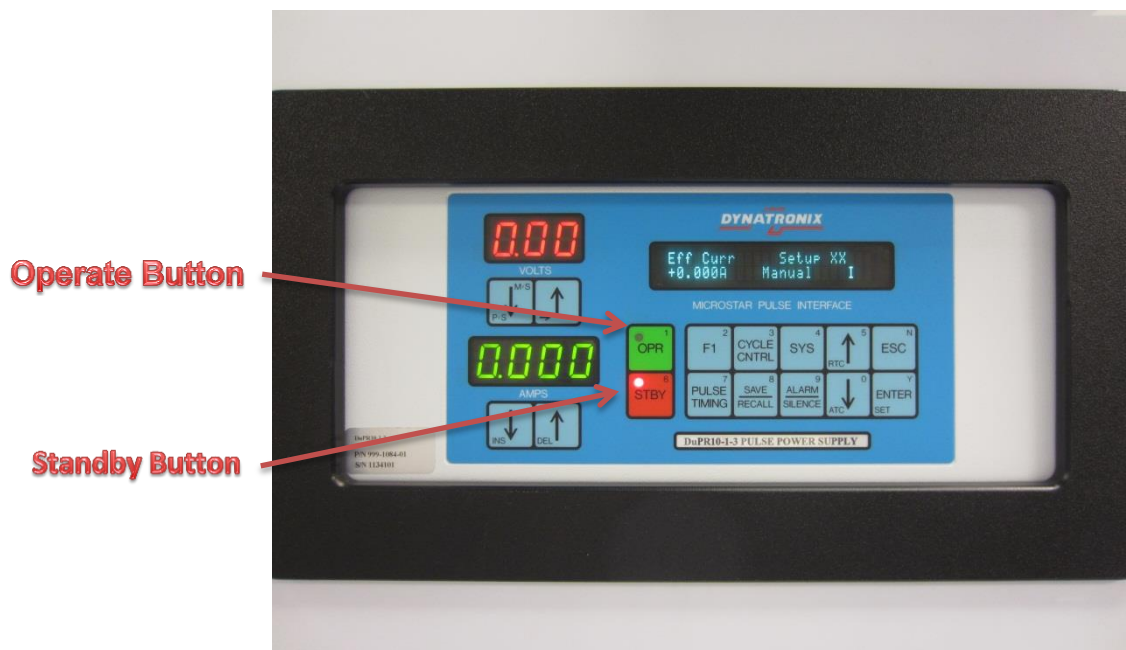
8. Verify that the power supply is in STANDBY mode. Power Supply is interlocked and will not operate if you are not logged into the tool in Coral; error message on the display like this:



9. Verify that the proper anode is in the tank, held in place by the grooves on the sides in the front end of the tank. Ring terminal to anode should be secured with screw. Typically this should always be left in this state shown in picture below (shown with no solution in bath):



10. Dynatronix power supply is shown in picture below, see appropriate manual section for programming parameters for your process (follows this page).

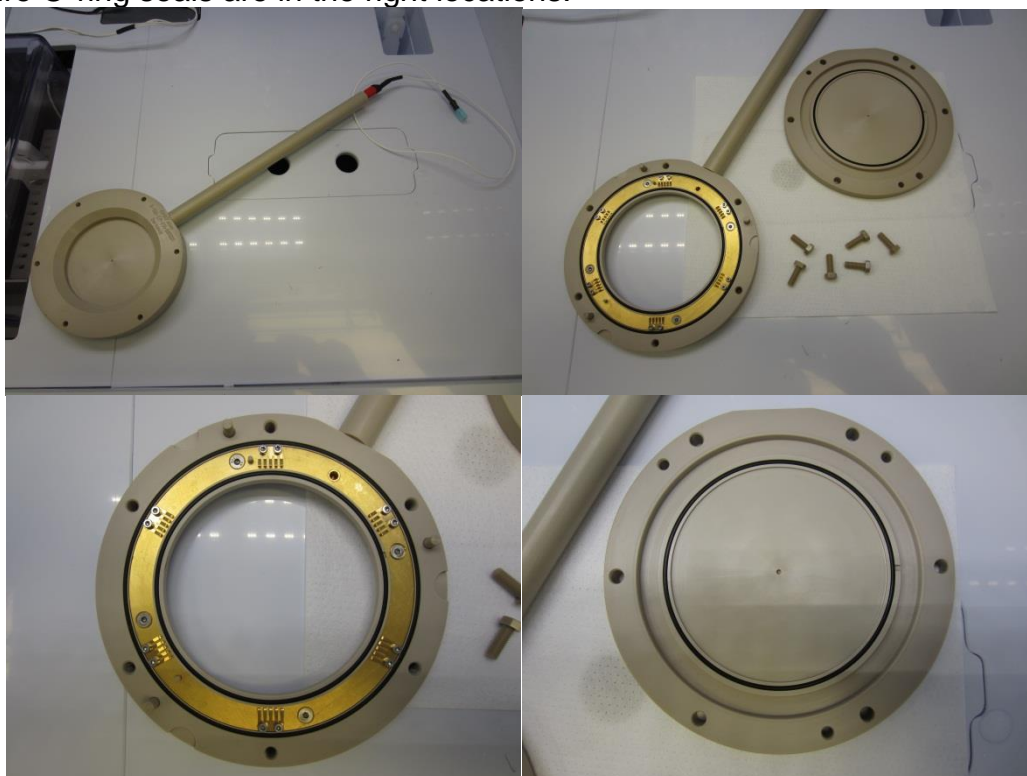


11. Define your plating recipe in the power supply controller (see power supply documentation section of this manual, following this page).
12. Reset the totalizer (charge meter) on the power supply to zero.

Dynatronix Quick Start Guide for Microstar Pulse Interface (DPR/DuPR Series) to follow:

## Plating Operation:

13. Preclean your wafer if required, metal adhesion may suffer if sample/wafer is contaminated. Photoresist and other polymers are allowed in the bath if oven cured as a selective masking agent.
14. Select the appropriate fixture for your part; DO NOT move fixtures between different metal plating stations and contaminate other processes and your own. If you cannot find the fixture you desire ask Staff for assistance.
  - Whole wafers may be selectively plated on one side in the AMMT fixture; an O-ring seal precludes plating solution contact on the back of the wafer. Place your wafer in the PEEK wafer holder and carefully tighten evenly, be sure O-ring seals are in the right locations.



See AMMT wafer holder work instructions in this manual for proper usage.

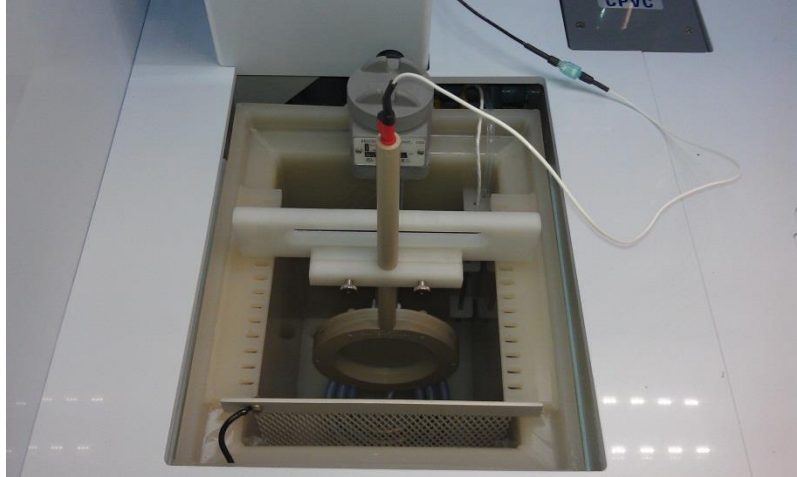
- Whole wafers or pieces may be plated with the open frame and alligator clip fixture – all exposed surfaces will be plated!! Be gentle with the clips as they are coated to prevent plating on them, do not scratch them.



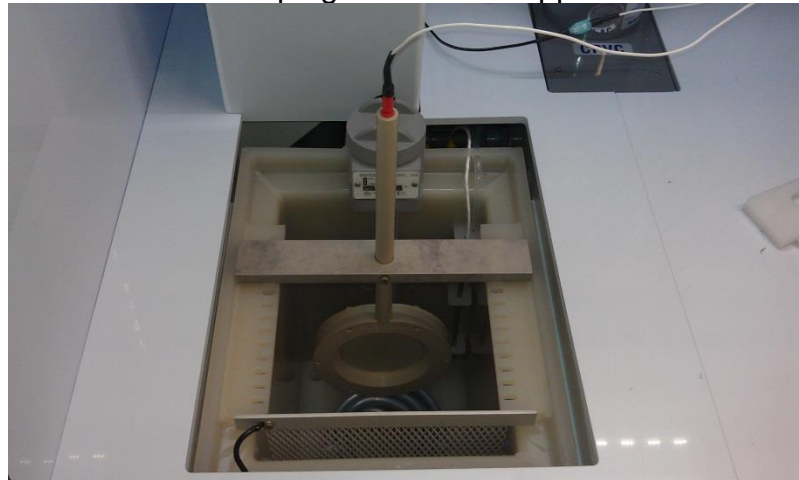
- A single alligator clip fixture is also available for small pieces. There is a white plastic handle that can be used to hang this single wire fixture from into the plating bath.
15. Insert wafer holder, frame fixture or clipped part into the tank, the part can be placed as desired with reference to the solution flow (front to back)/anode grid. There are locating holes down both sides of the tank to help control fixture placement.
  16. Slide handle of AMMT wafer holder into bath support. There are two types tan colored PEEK bar style with one thumbscrew for Au bath ONLY; white colored PVDF support with two thumbscrews for Cu bath ONLY. Gently tighten stainless thumbscrew(s) to grip the handle, not a lot of force is necessary, you will strip the threads out of the fixture if you use too much force.





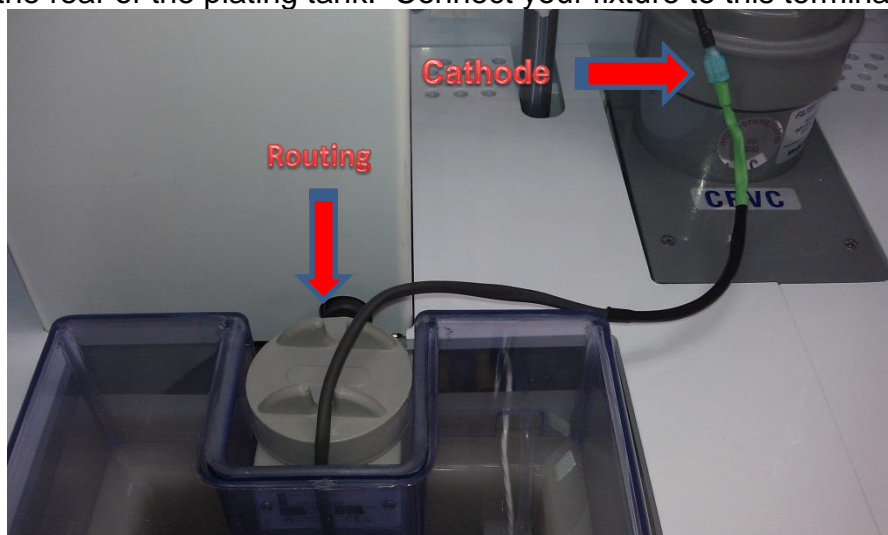


Picture shows AMMT clamping fixture and support for Cu electroplate bath

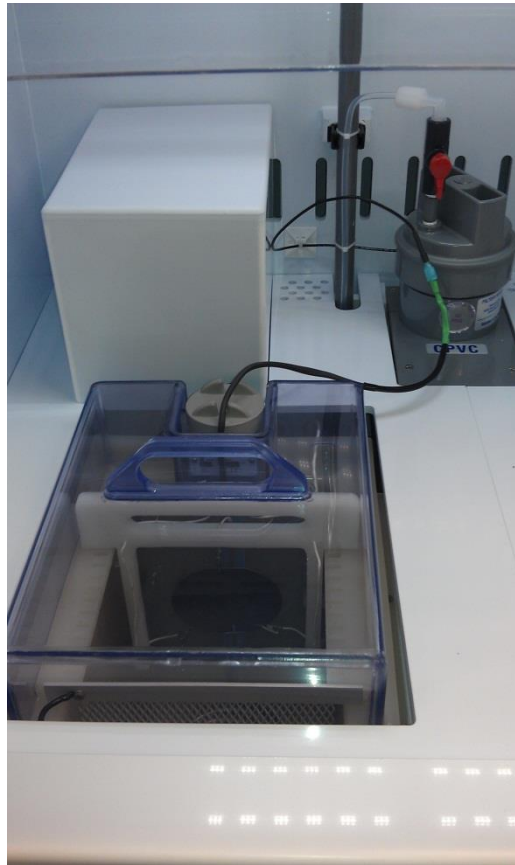


Picture shows AMMT fixture and PEEK support bar for Au electroplate bath

17. Connect wafer holder or frame to circuit. The cathode line is the black wire running from the right front corner of the tool around the inside wall terminating at the rear of the plating tank. Connect your fixture to this terminal connector.



18. Verify and finish setup of your plating process parameters on the Dynatronix power supply. Please refer to the power supply manual section of this work instruction on how to operate the power supply.
19. Once the plating program is setup in the supply, take power supply out of standby mode and place into *OPERATE* (button on power supply).
20. Initiate your plating process. Adjust the voltage/current to the appropriate amount as necessary to maintain your process. Put the lid on the tank if plating for more than a few minutes, the cathode wire may exit in the center rear of the tank cover where the immersion heater is located, with the wire running up and over the heater. NOTE: This is NOT easily possible when AMMT fixture is used, keep bath covered while preheating and recover once you have completed your process - make the best effort possible.

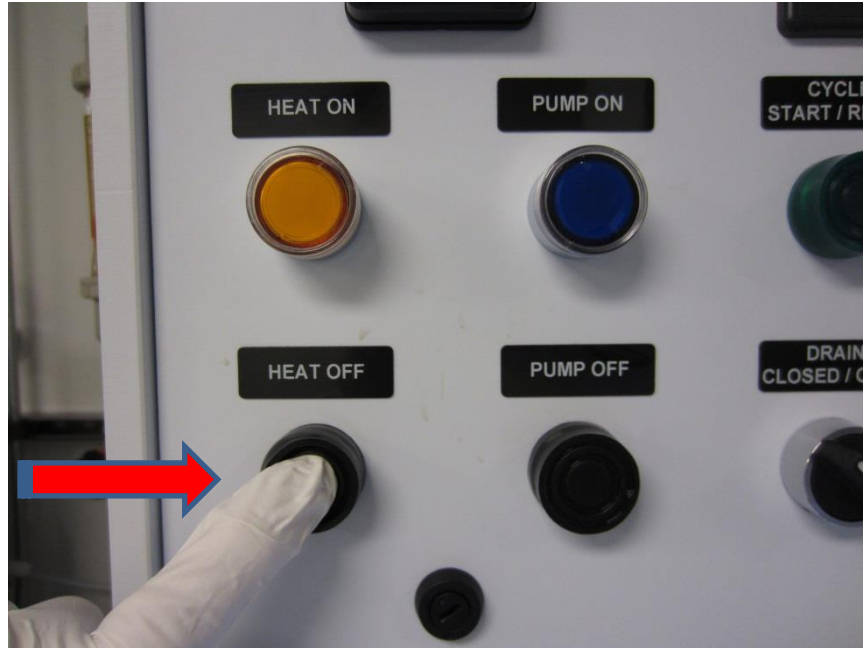


Picture of Typical Setup – ready to plate

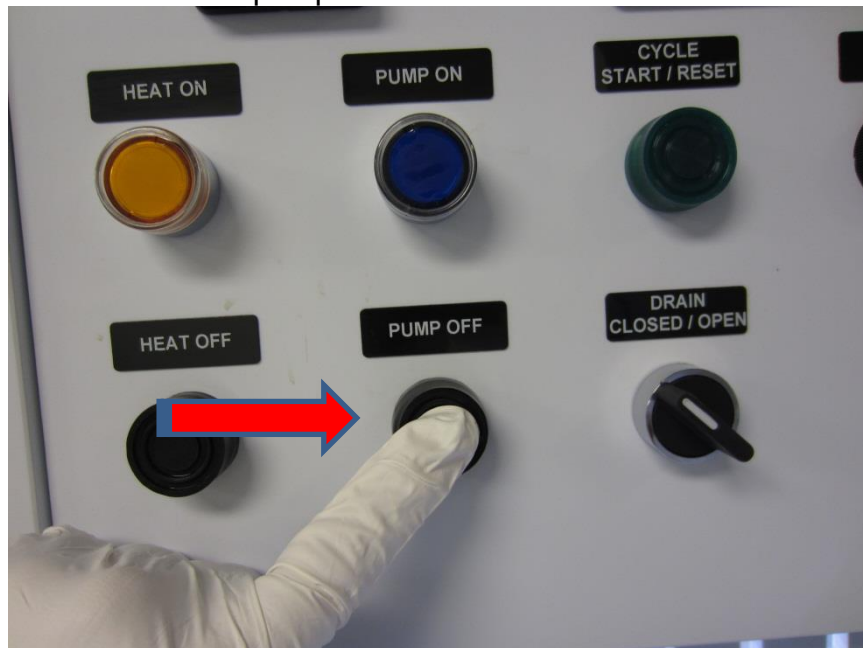
21. Once your target deposition has been attained, or your programmed plating cycle completes, place the power supply in *STANDBY* (button on power supply) again.



22. Turn off the tank heater.

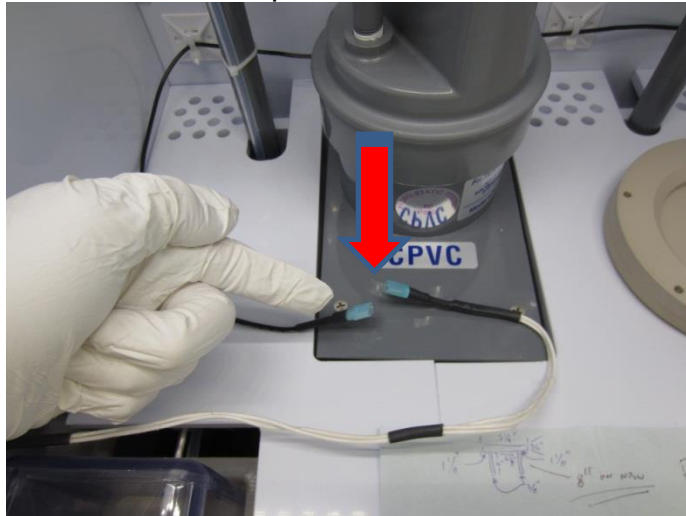


23. Turn off the recirculation pump.

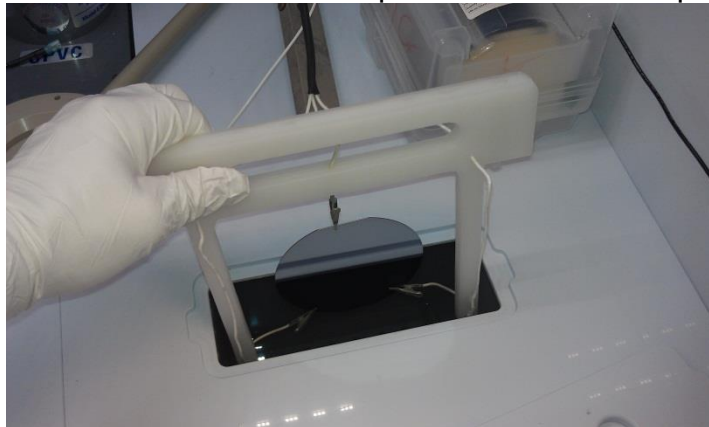


### Part Retrieval and Clean up:

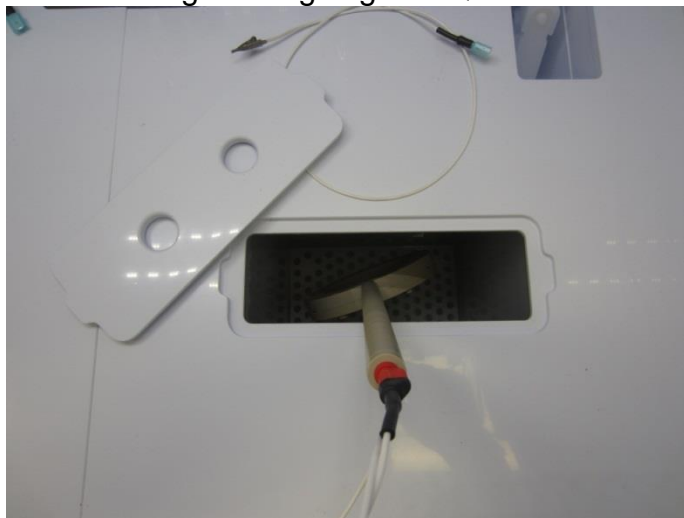
24. Lift off tank cover and place safely to the left side of the tank or to the rear.
25. Disconnect the wafer holder or piece frame holder from the circuit.



26. Quickly and CLEANLY move the sample to the Quick Dump Rinser (QDR).

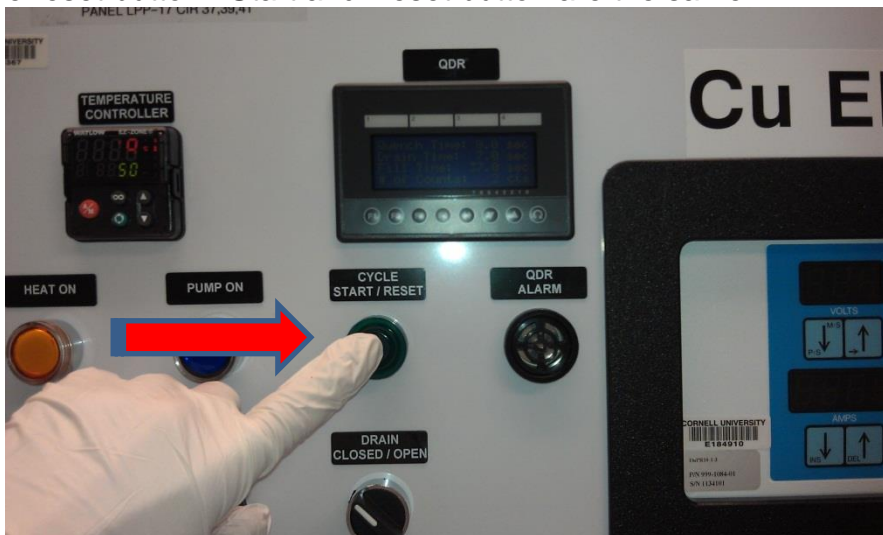


Plating frame going into QDR



AMMT fixture in QDR

27. Start the QDR (Quick Dump Rinse) cycle, your wafer or piece will now be rinsed with DIH<sub>2</sub>O, when the alarm sounds the cycle is complete and you may press the reset button. Start and Reset button are the same.



28. Some part fixtures or piece(s) may not fit nicely into the QDR, use best judgment to clean your part; some fluoroware is available for this purpose. There are PTFE spray DIH<sub>2</sub>O and N<sub>2</sub> guns in the right rear of the hood for parts, fixture and hood deck cleaning and drying. Do not get water in the plating tank!!! Keep cover on the tank!!!
29. If using the wafer holder remove your wafer and place the holder in the QDR to soak in the DIH<sub>2</sub>O, rinse clean and leave unassembled to dry on a beta wipe in the hood – Please do not move fixtures or pieces between hoods/different baths.
30. The QDR will stay filled upon completion of the recipe, once done rinsing parts and fixtures press F1 on the QDR controller to drain the QDR dump tank, if necessary.
31. Wipe down all spills and drips in the hood that have occurred during your work. Thoroughly rinse in water.
32. DO NOT DRAIN THE PLATING SOLUTION TANK!!! DO NOT MAKE ANY AMMENDMENTS TO THE BATH SOLUTION!!! These are staff responsibilities.
33. Fill out log sheets, recording charges from meter, and notes about your plating.
34. Log out of the hood in Coral. Be sure to enter in your material charge and comments as needed.

## Electroplating Solution Quick Reference Data Fields

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