

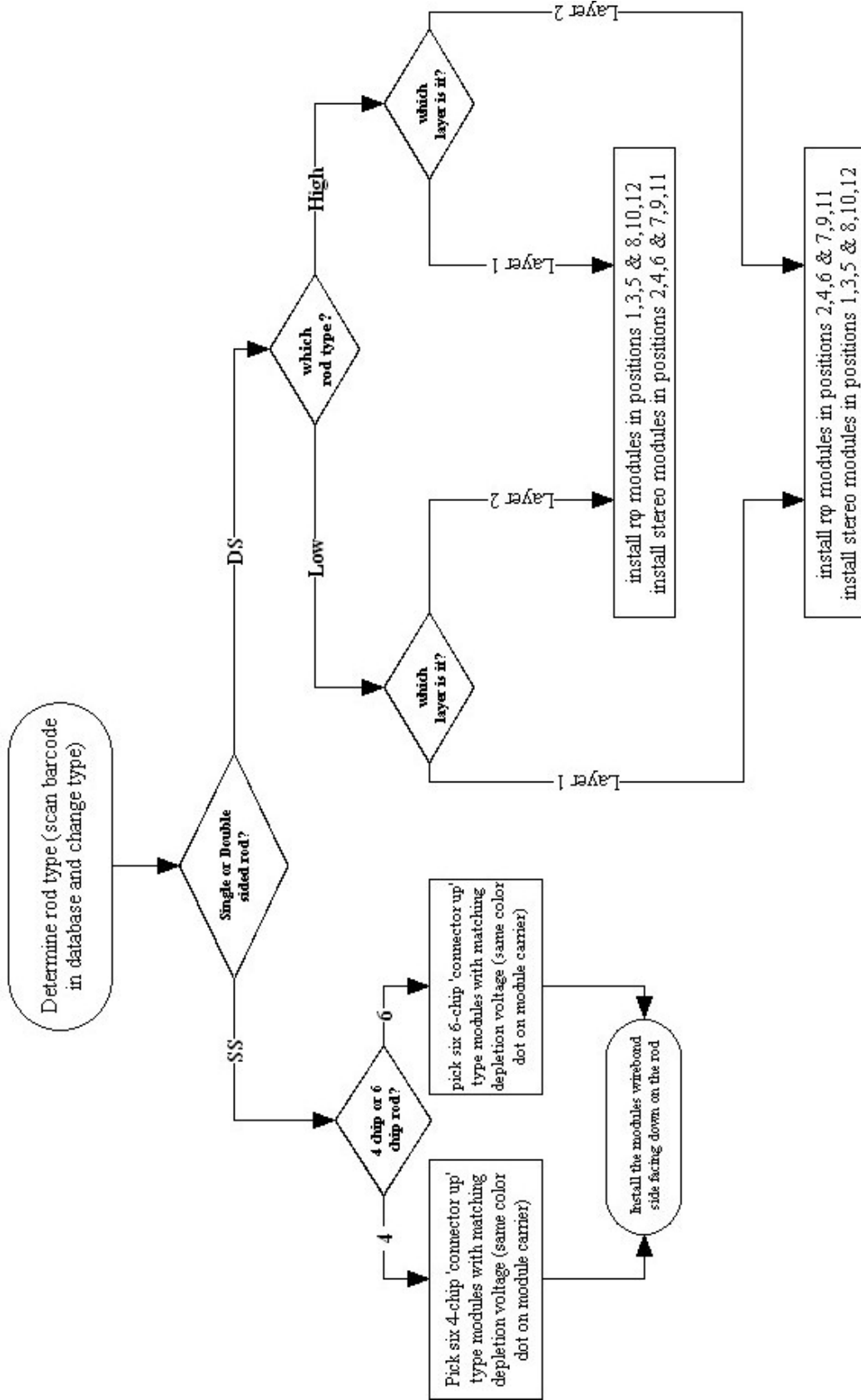
Installation of Modules on Rods

- Database entry
- Rod/module type flowchart
- Preparation of the rod
- Preparation of the modules and bending of the hybrid tail
- Installation of modules on a Single Sided rod
- Installation of modules on a Double Sided rod
- Making the electrical connections
- Gluing of the HV tails
- Removing modules from the rod

Datebase entry

1. Open Big Browser
2. Connect to the database
3. Enter the logon password: UdBP!\$p
4. If the Rod assembly tab is not open already, click on Plug-Ins and select Rod Assembly
5. In the Rod assembly window enter the rod barcode by clicking on the “scan” button and scanning the 2D barcode at the readout end of the rod
6. Open the file Smallabels on the desktop and enter the rod barcode in the label field
7. Print 2 barcode labels
8. Place one barcode label on the rod box and one on the outside of the storage drawer
9. Back in the Big Browser rod assembly window click on “Change Type”
10. Select the rod type given (there is only one choice)
11. Use this rod type and the flowchart in the following section to determine which modules get installed in which position
12. Once the rod type is successfully changed, the rod barcode needs to be entered again
13. Click on “Add/Remove components”
14. Enter the module barcodes in the positions they are going to get installed in and write the position number on the barcode label on the module carrier
15. Once all positions are filled, click on “Update Assembly”

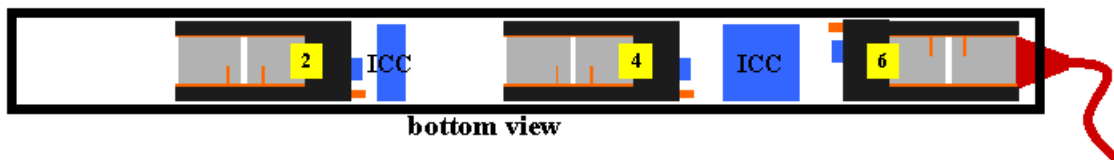
Installation of modules on rods



Positions 1-6 are always mounted wirebond side down and need 'connector up' style modules
Positions 7-12 are always mounted wirebond side up and need 'connector down' style modules

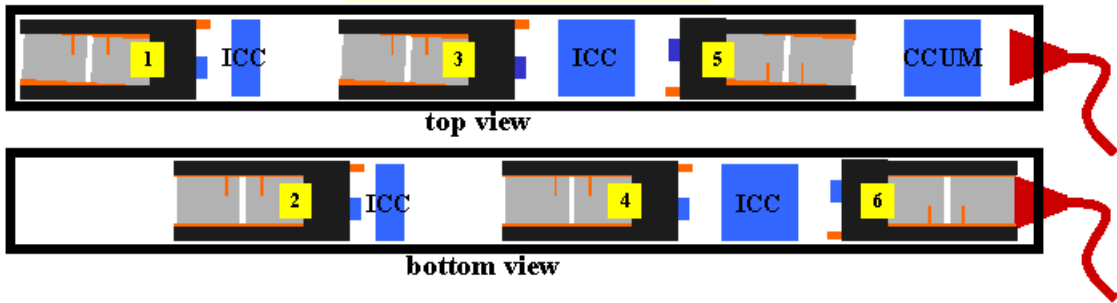
Sketch of TOB Single Sided rod

D. Abbaneo - September 2003

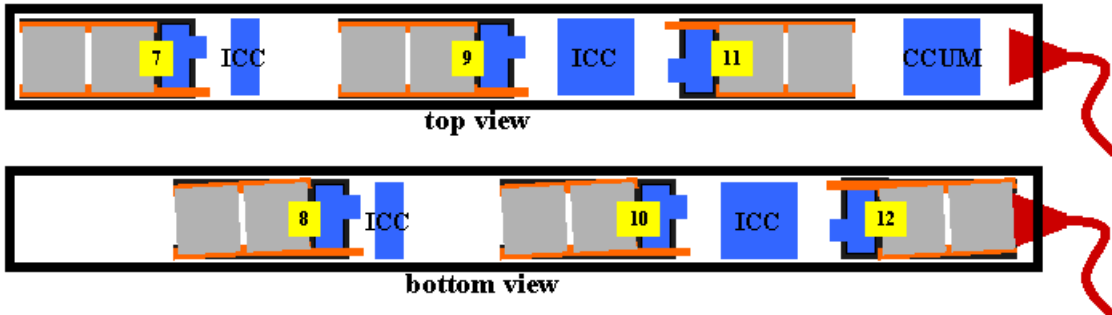


Sketch of TOB Double Sided rod, type L layer 1 OR type H layer 2
D. Abbaneo - September 2003

Populated with modules 1-6



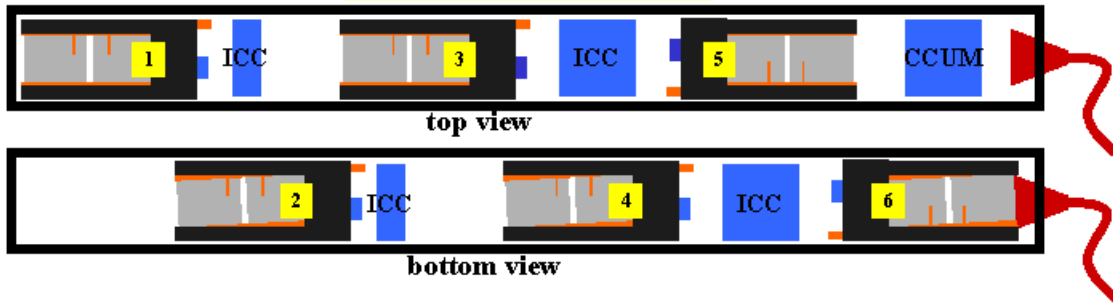
Fully populated



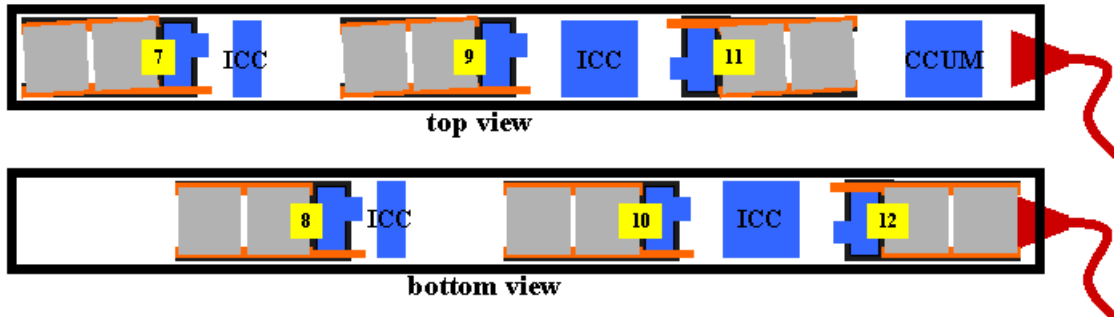
Sketch of TOB Double Sided rod, type H layer 1 OR type L layer 2

D. Abbaneo - September 2003

Populated with modules 1-6

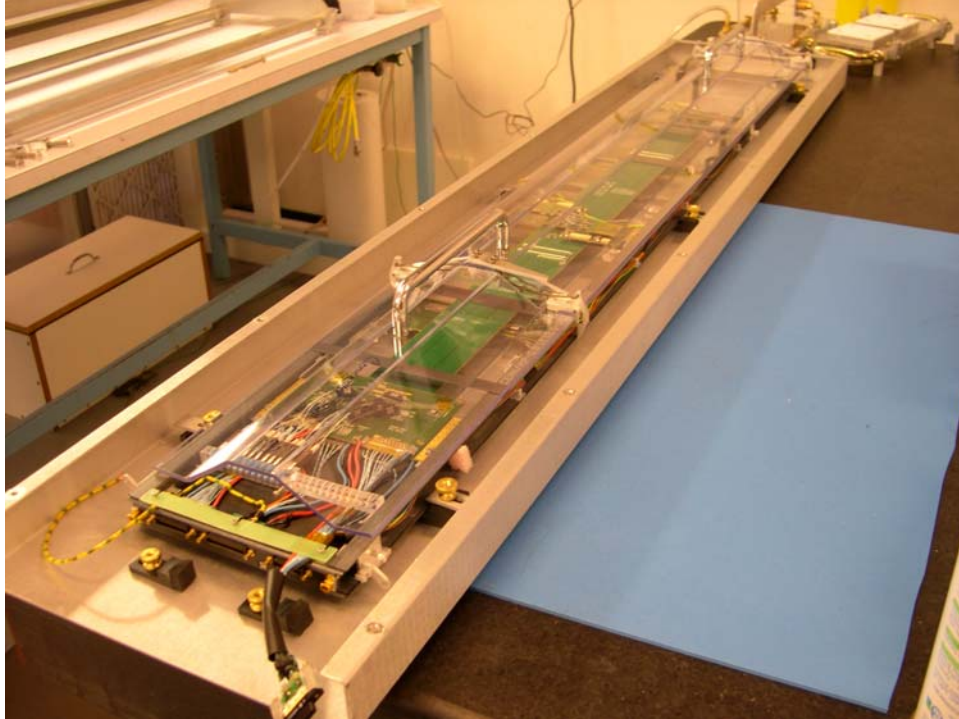


Fully populated

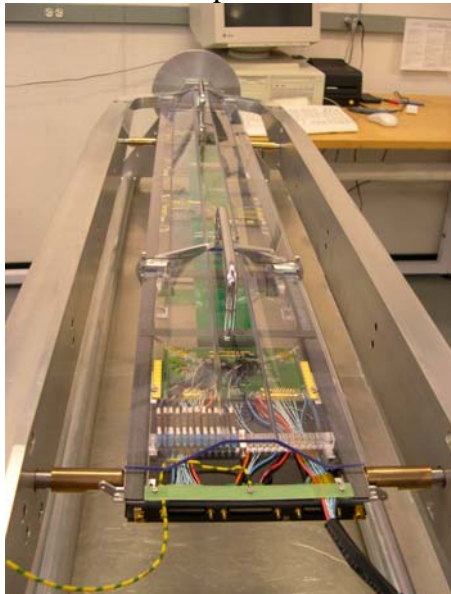


Preparation of the rod

1. Loosen the clamps that hold the rod in the rod box and pull them back
2. Set the rod pick up fixture onto the rod (make sure its orientation is correct)



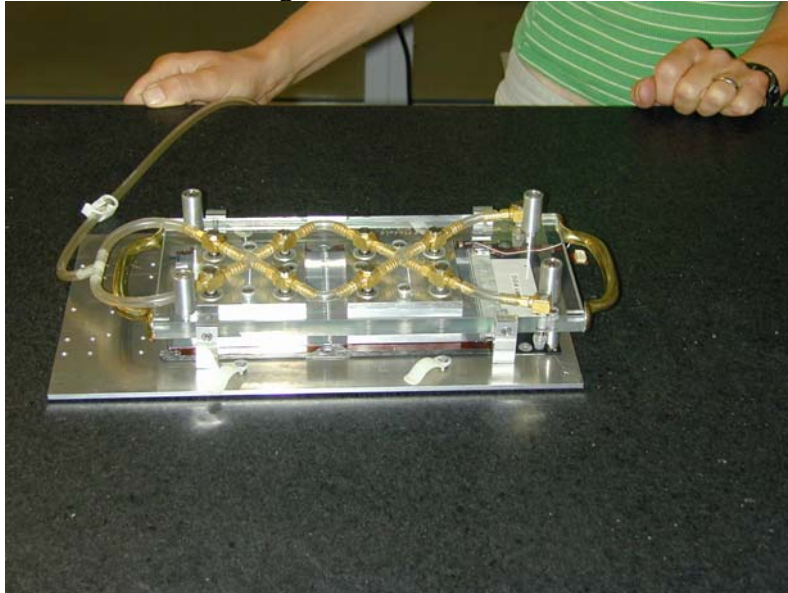
3. Flip the levers to engage the clamps
4. Make sure the rotisserie is turned horizontal and locked into position with the rod mounts facing up and the clamps pulled back
5. Pick up the rod and set it on the rotisserie, making sure all 4 mounts are placed correctly
6. Close all 4 clamps on the rotisserie



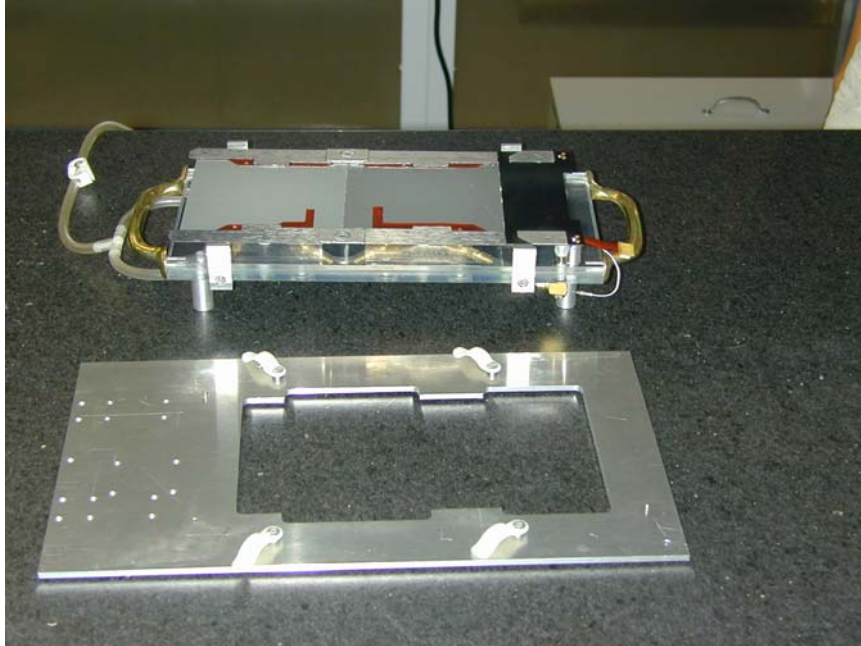
7. Flip the levers on the rod pick up fixture to release the fixture and remove it
8. The rod will now sit in the rotisserie with the odd numbered module positions facing up
9. Make sure all the loose wires are taped out of the way of the modules

Preparation of the modules and bending of the hybrid tail

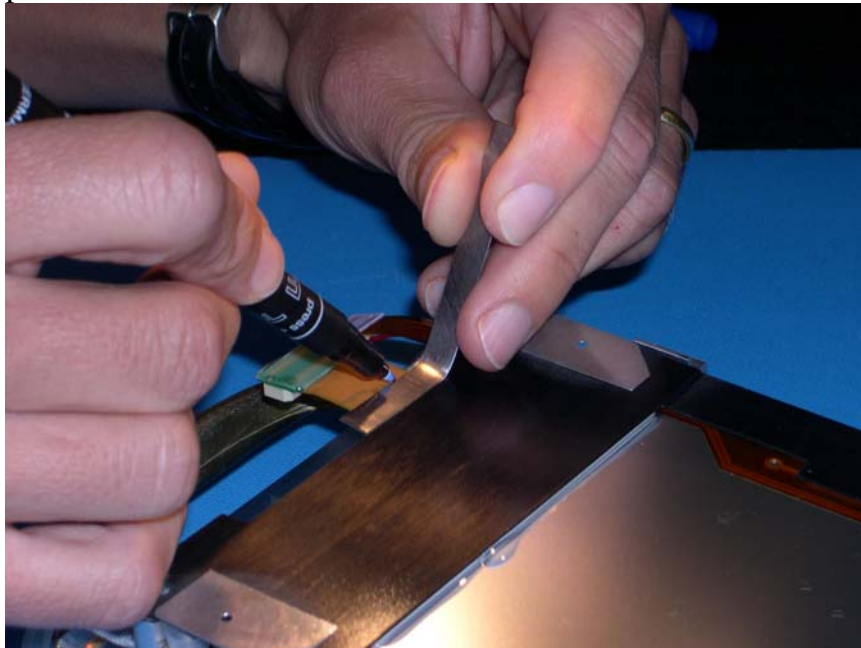
1. With module in module carrier, remove the test tails
2. Remove all barcode labels and stickers from the module and clean off the residue with isopropanol
3. Use fixture labeled “R-Phi Module flip fixture, back side”
4. Plug in the vacuum line and close the hose clamp on the vacuum line
5. With the module in the module carrier, remove the white clamps from the C-fiber frame
6. Lower the fixture onto the module, making sure that the semicircular downstops make contact with the rivets on the clips
7. With the fixture resting on its downstops, open the hose clamp on the vacuum line, the module will get lifted onto the fixture



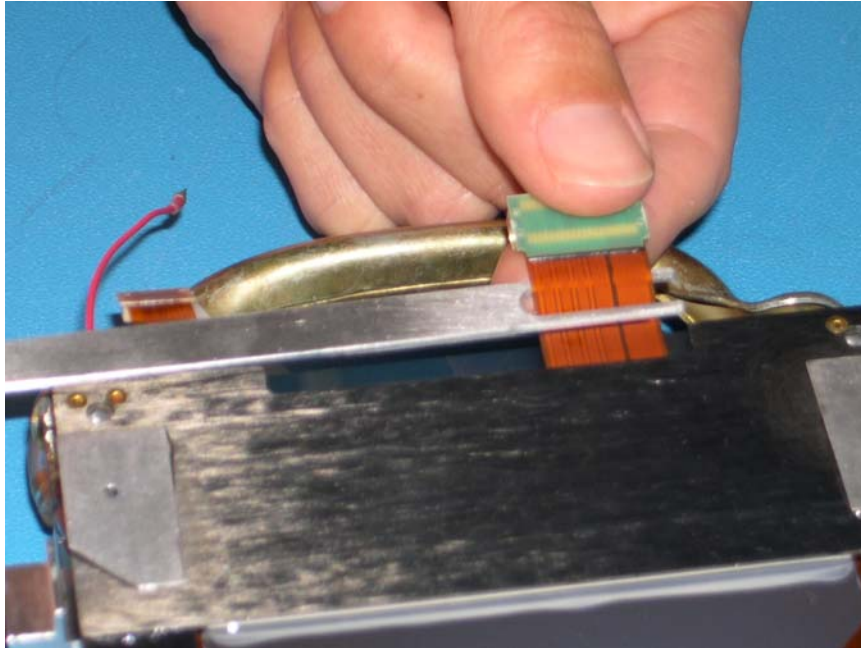
8. Lift the fixture with the module straight up, flip it over and set it down on the feet



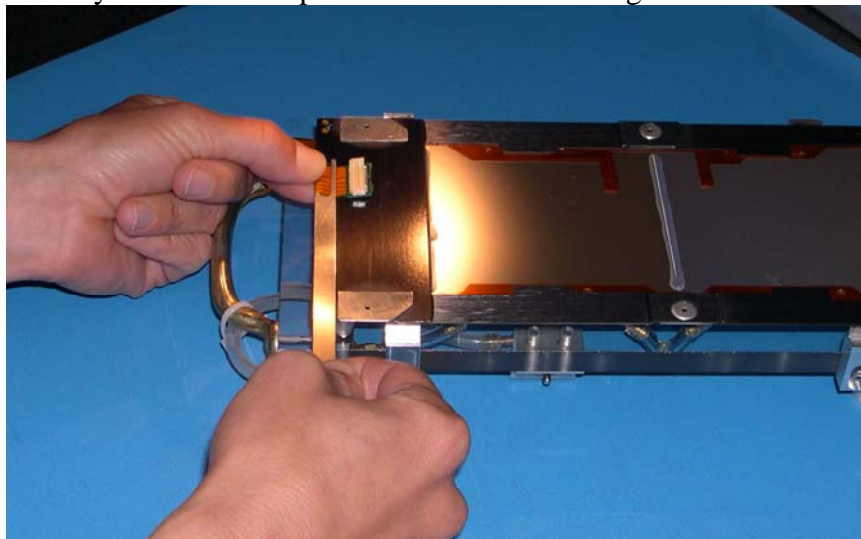
9. Using the tail bending gauge, mark the location of the bending fork with an ink pen



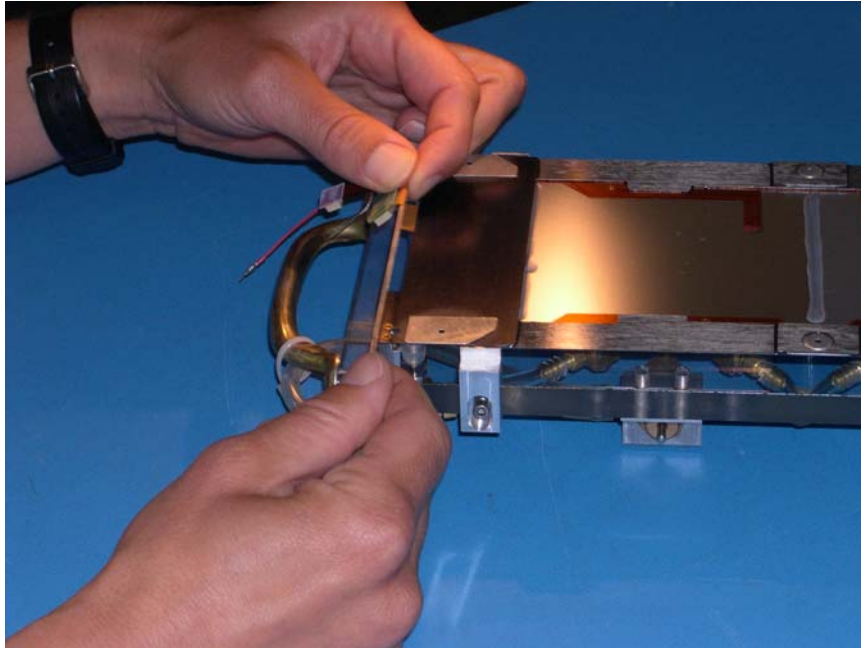
10. Insert the tail bending fork, lining up the edge of the fork with the pen mark



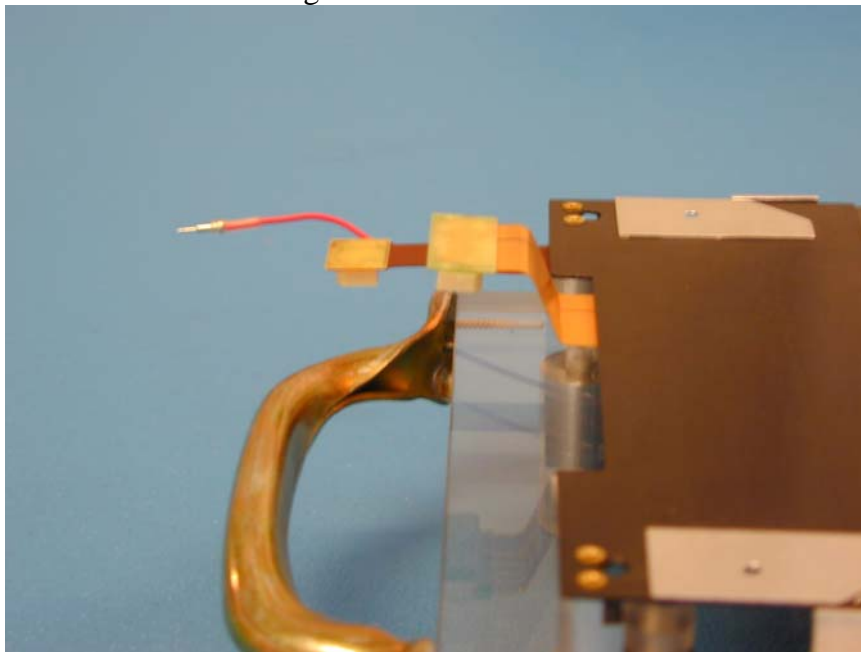
11. Make the bend closest to the module by twisting the fork to bend the tail back on itself by 180° and crimp the tail between two fingers



12. Make the bend closest to the connector by twisting the fork back 90° , bend the connector end of the tail back on itself by 180° and crimp the tail between two fingers

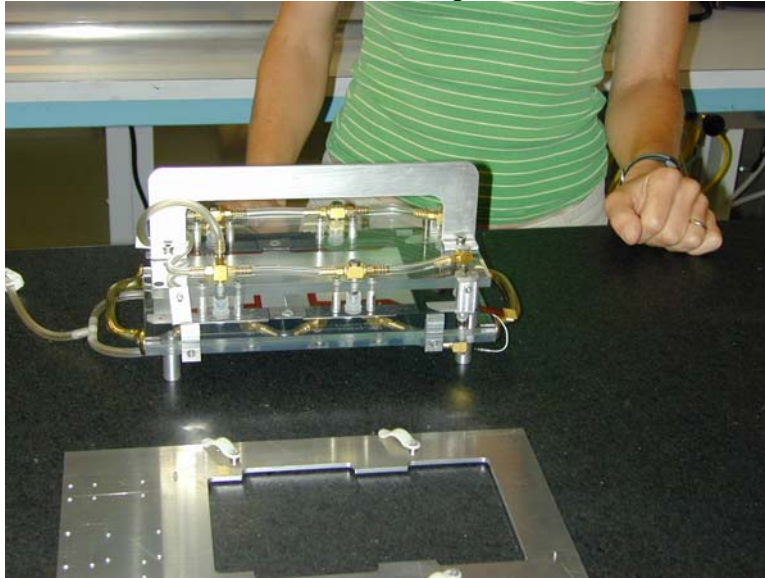


13. Remove the tail bending fork

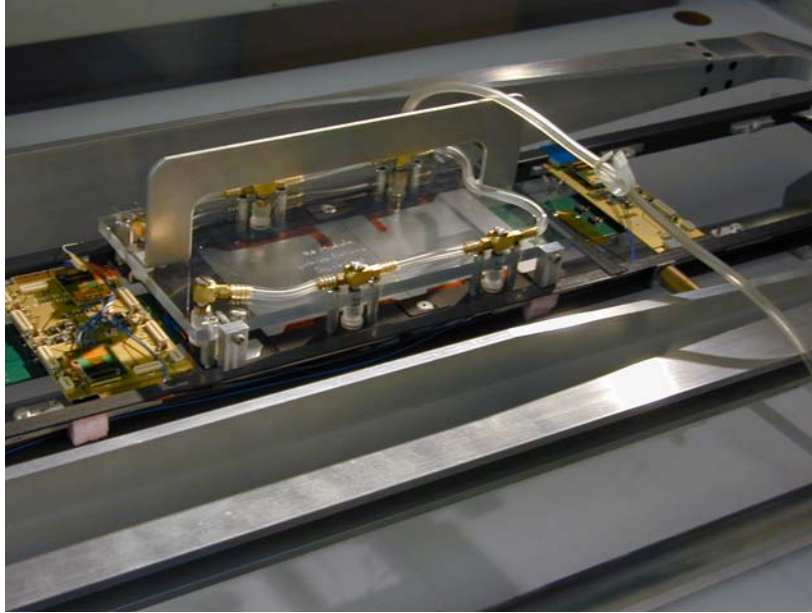


Installation of modules on a Single Sided rod

1. All modules for a single sided rod are 'down' type modules, that get installed with the wirebond side facing down
2. After bending the tail leave the module in the flip fixture
3. To pick up the module from the back side, use the fixture labeled "R-Phi Module pick-up fixture, back side"
4. Plug in the vacuum line and close the hose clamp on the vacuum line
5. Lower the fixture onto the module which is back side up in the flip fixture, making sure the pin engages the clearance hole in the heat spreader
6. Note that the semicircular downstops make contact with the rivets on the clips



7. With the pick-up fixture resting on the flip fixture, open the hose clamp on the vacuum line of the pick-up fixture, the module is now held by both fixtures
8. Close the hose clamp on the vacuum hose of the flip-fixture and push the release valve, the module is now held by the pick-up fixture
9. Lift the fixture with the module straight up and move it over to the correct module position on the rod
10. Holding the fixture horizontal, lower it into position on the rod, making sure that the 2mm hollow pins on the rod engage the clips on the module frame
11. When the downstops on the side of the fixture have engaged the rod frame, let go of the fixture



12. Close the hose clamp on the vacuum hose and push the release valve
13. Lift the fixture straight up making sure that the module stays on the rod
14. Insert a screw and washer into the screwdriver tool
15. Insert a screw into each of the clearance holes on the heat spreader on the frame
(4 screws) and hand tighten screw
16. Using a torque-screwdriver tighten screws to 7.1 in oz (500 g cm)

Installation of modules on a Double Sided rod

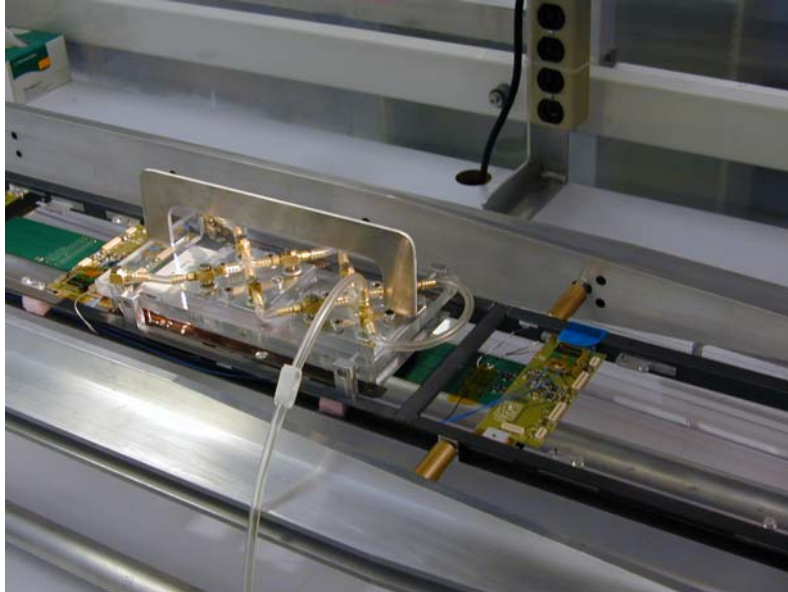
1. Install modules 1,3 and 5 wirebond side down like on a single sided rod, but do not screw the modules down
2. Install modules 7,9 and 11 wirebond side up according to the following procedure
3. After bending the tail, turn the flip fixture back over again and return the module back to the module carrier
4. Use the fixture labeled “R-Phi Module pick-up fixture, front side”
5. Plug in the vacuum line and close the hose clamp on the vacuum line
6. Lower the fixture onto the module, making sure the pin engages the clearance hole in the heat spreader



7. Note that the semicircular downstops make contact with the rivets on the clips
8. With the fixture resting on its downstops, open the hose clamp on the vacuum line, the module will get lifted onto the fixture



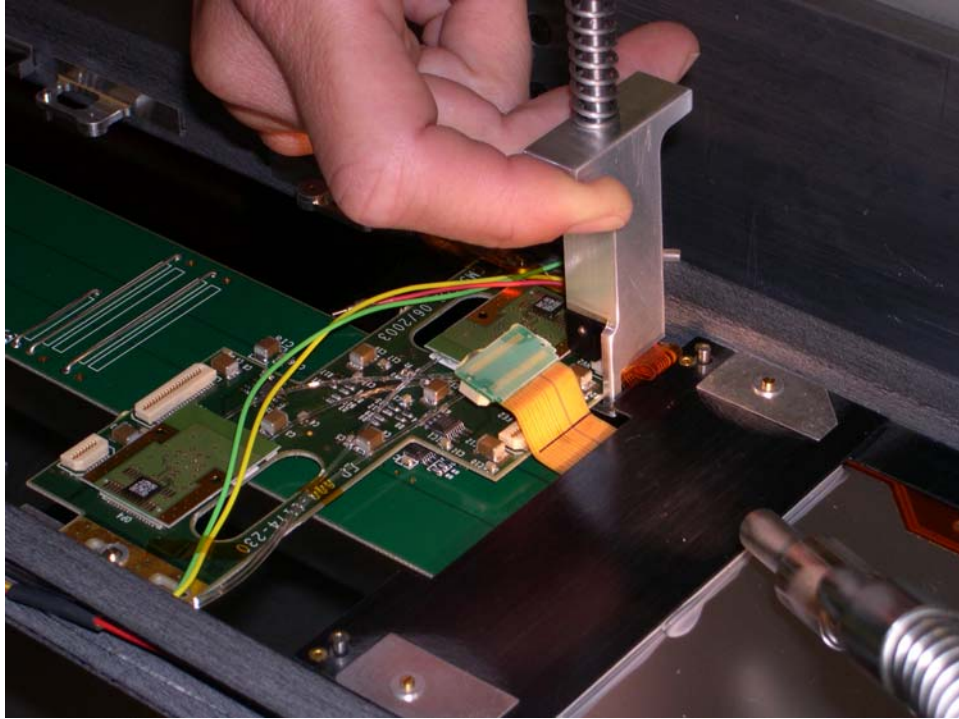
9. Lift the fixture with the module straight up and move it over to the correct module position on the rod
10. Holding the fixture horizontal, lower it into position on the rod, on top of a wirebond down facing module, making sure that the 2mm hollow pins on the rod engage the clips on the module frame
11. When the downstops on the side of the fixture have engaged the rod frame, let go of the fixture



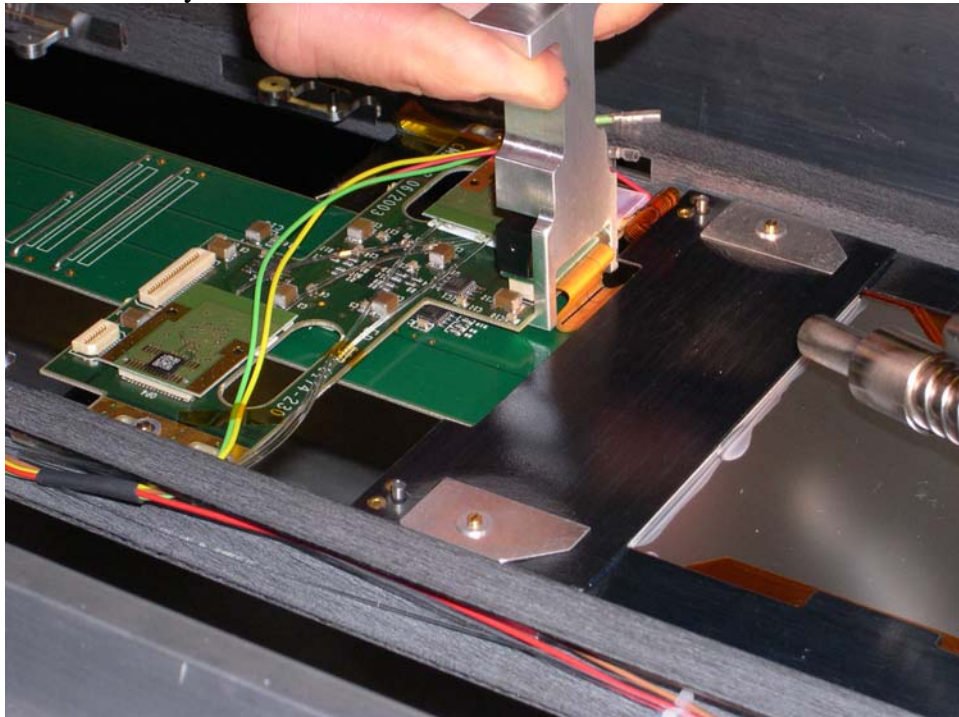
12. Close the hose clamp on the vacuum hose and push the release valve (not shown in picture)
13. Lift the fixture straight up making sure that the module stays on the rod
14. Insert a screw and washer into the screwdriver tool
15. Insert a screw into each of the clearance holes on the heat spreader on the frame (4 screws) and hand tighten screw
16. Using a torque-screwdriver tighten screws to 7.1 in oz (500 g cm)
17. After all 6 modules are screwed down, turn the rod over and repeat the steps to install the 6 modules on the other side

Making the electrical connections

1. Connect the high voltage tail first using either the “left” or “right” HV tail closing tool



2. Connect the hybrid tail



3. Connect the bias wire according to the following tables
- Single sided rod:

Wire color	Module #
Brown	1
Yellow	3
Green	5
Red	2
Blue	4
Violet	6

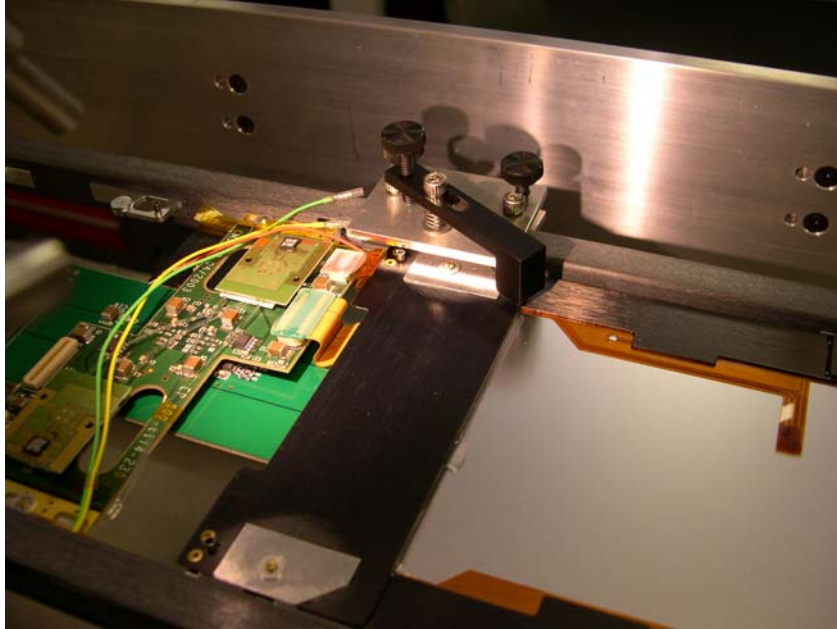
- Double sided rod:

Wire color	Module #
Brown	1
Black	7
Yellow	3, 11
Green	5, 9
Red	2
Orange	8
Blue	4, 12
Violet	6, 10

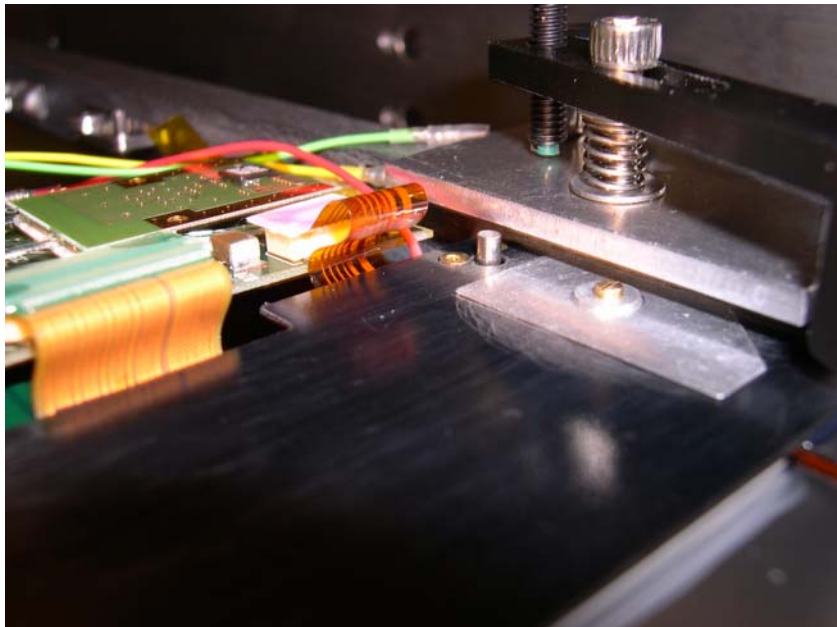
4. Tape the bias wire to the interconnect card using kapton tape

Gluing of the HV tails

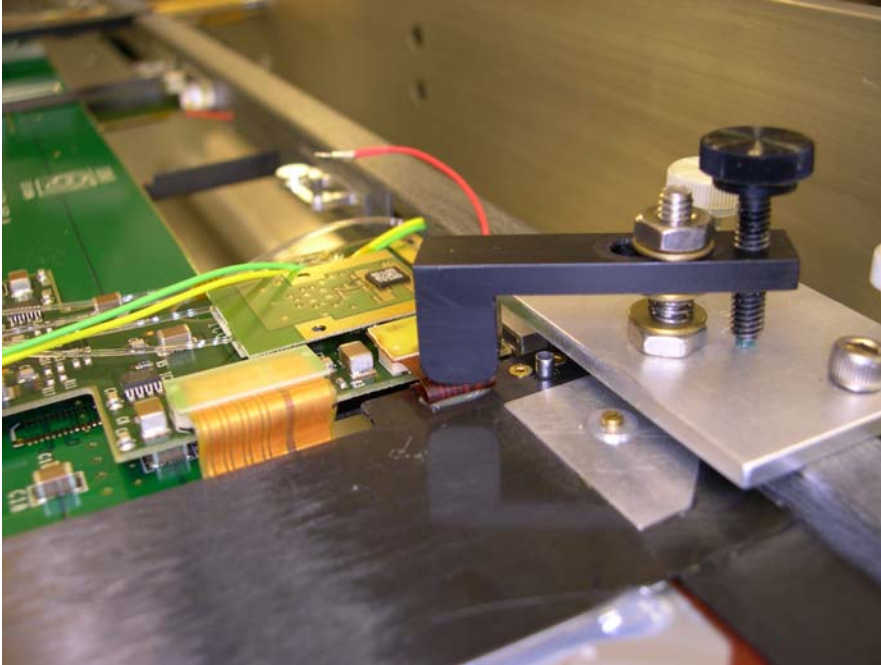
1. Wipe the HV tail and the surface of the c-fiber frame in the area where they are to be glued together with isopropanol
2. Attach 6 (for single sided rod) or 12 (for double sided rod) glue clamps to the rod frame in the location where the HV tails are being glued



3. Mix a small amount of DP110 epoxy using the static mixer and dispense it into a small cup
4. Using a small applicator tip (needle tool) add a line of epoxy across the width of the tail to the underside of the HV tail in the area where the tail will contact the c-fiber frame



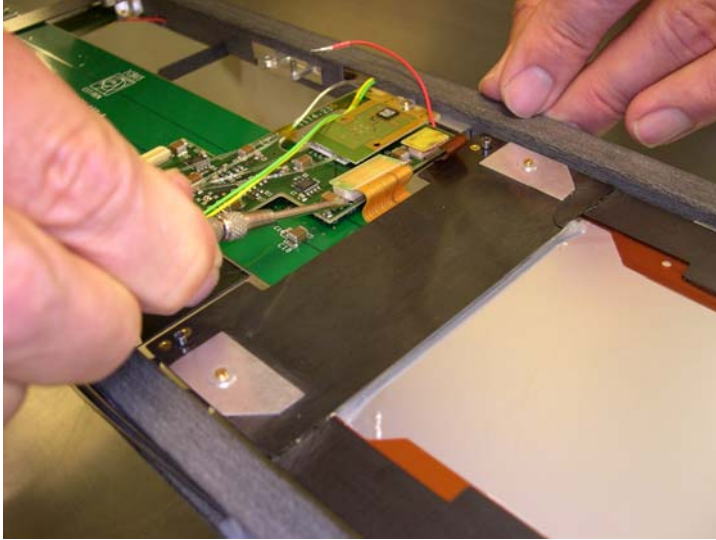
5. Swing the clamp over the HV tail and apply pressure to the tail until a small fillet of epoxy is visible between the tail and the c-fiber frame



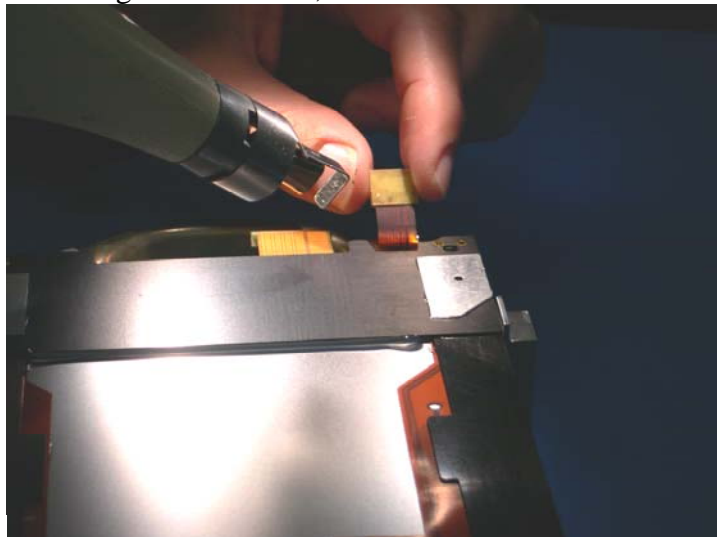
6. Repeat steps 4 and 5 for all HV tails
7. Note that the worklife of the epoxy is about 10 minutes
8. Cure for at least 30 minutes before releasing the glue clamps and taking them off the rod

Removing modules from the rod

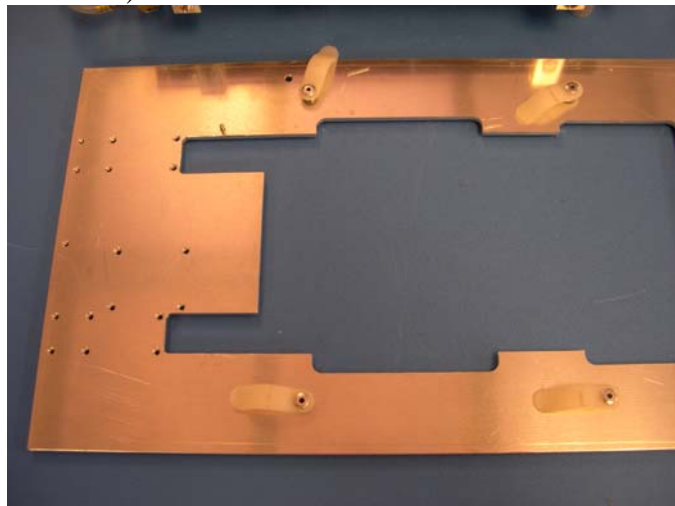
1. Mount the rod in the rotisserie
2. Disconnect all HV and hybrid tails from the interconnect cards by using a small screwdriver to pry apart the connectors, do not pull on the tail or the tail stiffener while doing this



3. Disconnect the bias wires and remove the kapton tape holding the wires to the interconnect cards
4. If the module is to be installed back in the same position in the rod, the HV tail does not have to be released from the c-fiber frame, if it is to be installed in a different location on a rod, the glue holding the HV tail to the c-fiber frame might have to be removed
 - To release the glue on the HV tails, heat the glue with a small heat gun until the epoxy softens and the HV tail can be pulled off the c-fiber frame (note: this doesn't take much heat, at a distance of about 1" between the heat gun and the tail, it takes about 10 seconds for the epoxy to soften)



- Clean off any epoxy residue with isopropanol
- 5. Remove the 4 screws and washers from a modules using the special screwdriver, after loosening the screw by one turn push down on the washer holder to pick up the washer together with the screw
- 6. For a wirebond down facing modules:
 - Set up the flip fixture labeled “R-Phi Module flip fixture, back side” on the table, plug in the vacuum line and close the vacuum clamp
 - Use the fixture labeled “R-Phi Module pick-up fixture, back side” to pick up the module from the rod
 - Plug in the vacuum line and close the hose clamp on the vacuum line
 - Lower the fixture onto the module in the rod, making sure the pin engages the clearance hole in the heat spreader and that the semicircular downstops make contact with the rivets on the clips
 - With the down stops on the side of the fixture resting on the rod frame, let go of the fixture and open the vacuum clamp
 - The module will get pulled up onto the fixture
 - Lift the fixture with the module straight up and move it over to the flip fixture
 - Lower the module onto the flip fixture, making sure the semicircular down stops line up on both fixtures
 - Open the vacuum clamp on the flip fixture, the module is now being held by vacuum on both fixtures
 - Close the vacuum clamp on the module pick up fixture and push the release valve
 - Remove the module pick up fixture
 - Get a module carrier ready; if the HV tail is still glued to the c-fiber frame, a special modified module carrier is needed (it has a cutout where the HV tail is)



- Turn over the flip fixture, align the holes in the c-fiber frame with the pins on the module carrier and lower the module onto the module carrier
- With the fixture resting on the down stops, close the vacuum clamp and push the release valve button

- Remove the flip fixture and swing the white clamps onto the module to secure it to the module carrier
- 7. For a wirebond up facing module:
 - Get a module carrier ready; if the HV tail is still glued to the c-fiber frame, a special modified module carrier is needed (it has a cutout where the HV tail is)
 - Use the fixture labeled “R-Phi Module pick-up fixture, front side”
 - Plug in the vacuum line and close the hose clamp on the vacuum line
 - Lower the fixture onto the module, making sure the pin engages the clearance hole in the heat spreader and that the semicircular downstops make contact with the rivets on the clips
 - With the down stops on the side of the fixture resting on the rod frame, let go of the fixture and open the vacuum clamp
 - The module will get pulled up onto the fixture
 - Lift the fixture with the module straight up and move it over the module carrier
 - Align the holes in the c-fiber frame with the pins on the module carrier and lower the module onto the module carrier
 - With the fixture resting on the down stops, close the vacuum clamp and push the release valve button
 - Remove the fixture and swing the white clamps onto the module to secure it to the module carrier