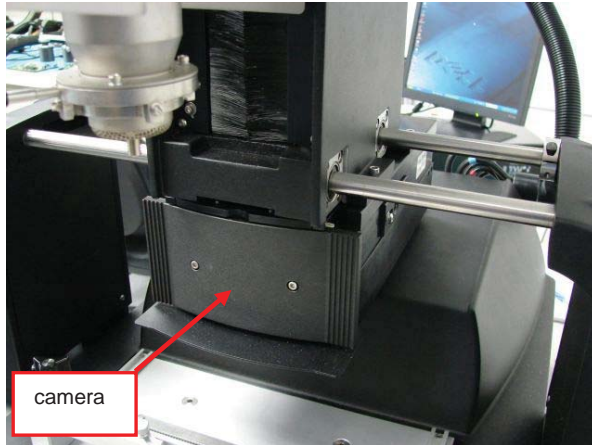


# CAMERA ASSEMBLY

## Removal/Replacement of the Camera Box Assembly APR-CA



### **REQUIRED TOOLS:**

- 9/64" hex key
- Small flat-tip screwdriver

### **Remove Camera Assembly**

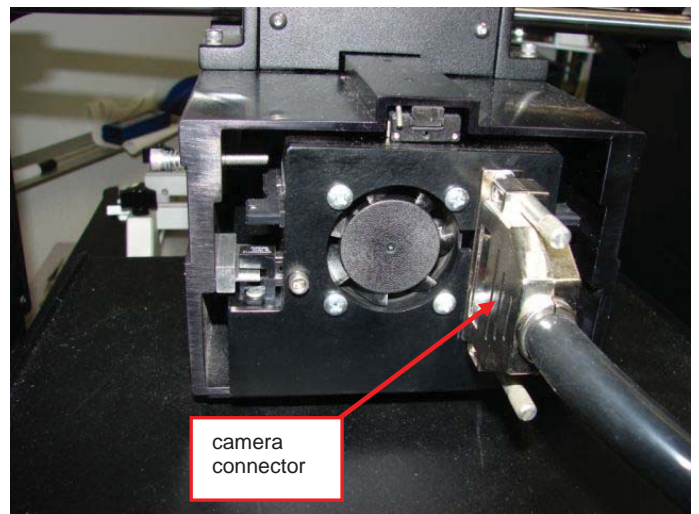
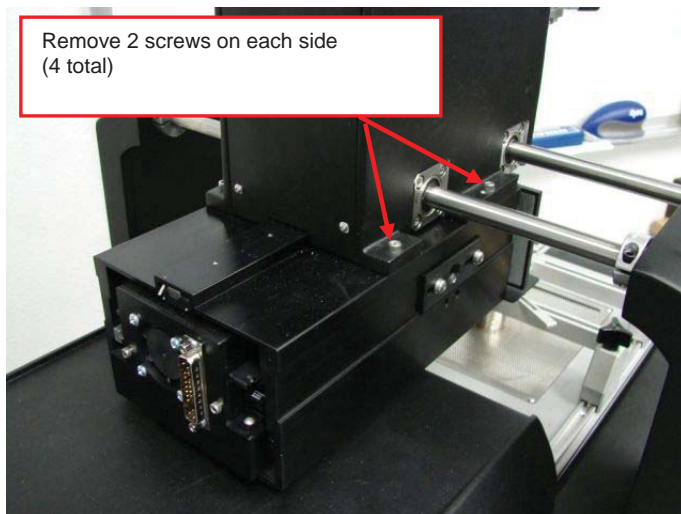
1. Locate the camera assembly underneath the head/motor mount assy. While supporting the camera from the bottom, loosen the four screws holding the camera assembly to the head/motor mount.
2. Unplug the connector to the camera and carefully remove the camera assembly from the head.

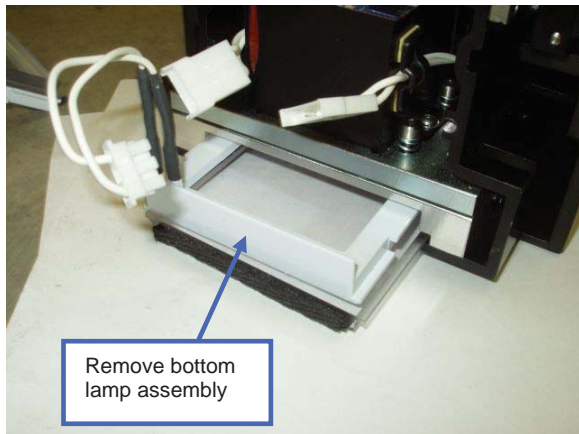
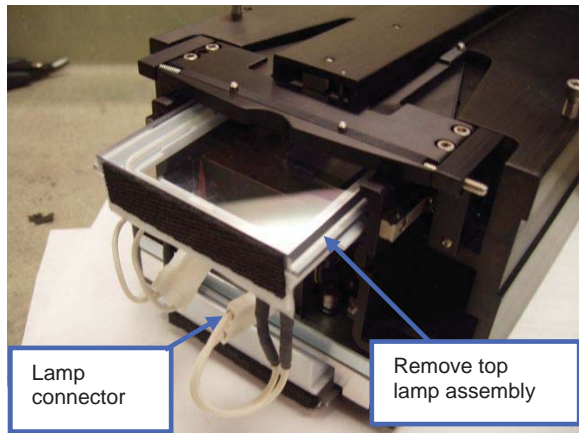
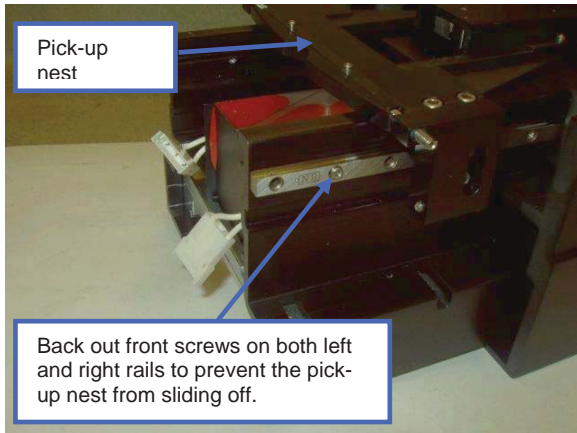
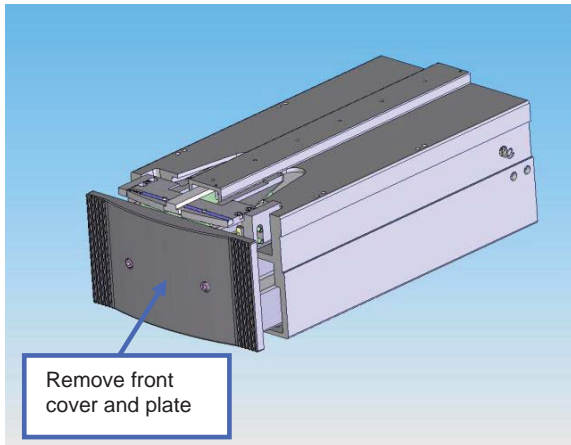
**NOTE:** *It is necessary to support the camera so it does not fall as screws are removed.*

### **Install Camera Assembly**

1. Attach new camera assembly to the head/motor mount assembly with four screws.
2. Plug in connector to the rear of the camera.

**IMPORTANT:** *When the camera is replaced with a new or replacement camera, it will be necessary to perform complete optical calibration procedures. The pick-up nest coplanar calibration should also be verified.*





## Replace Lamp Assembly APR-CL

## Replace Top and Bottom Camera Protective Plexiglass Covers APR-PCGC (top) 7050-2264 (bottom)

### REQUIRED TOOLS:

7/64" hex key  
small Phillips cross-tip screwdriver

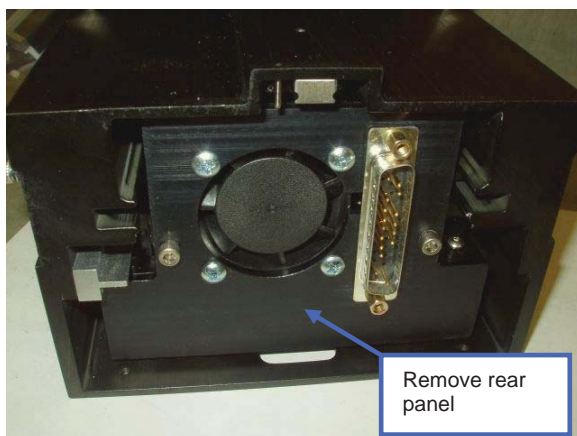
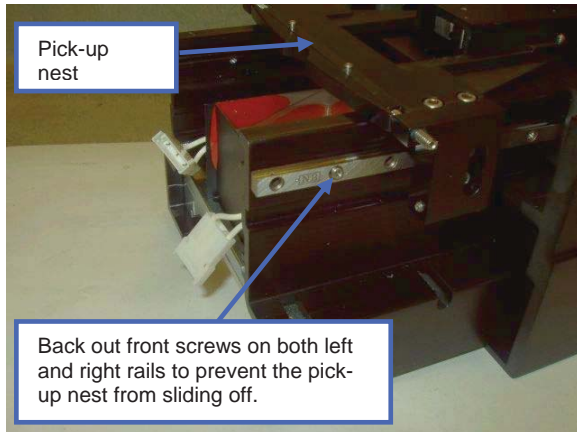
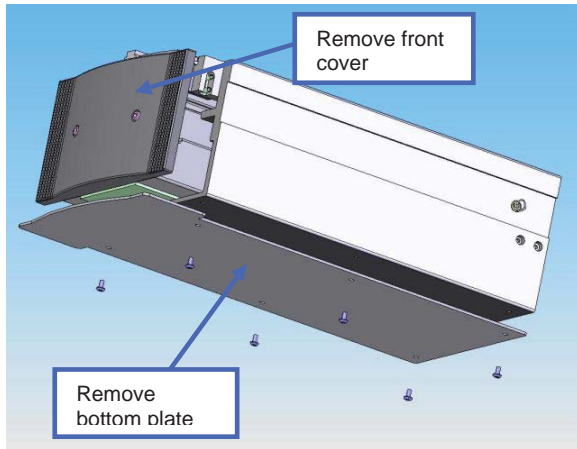
1. The top and bottom lamp assemblies can be replaced with the camera assembly attached to the head. Pull the camera out and forward.
2. Remove the front cover and plate, held by two screws.
3. With the front cover removed, slightly back out the two frontmost small screws on the rails. These screws will act as a stop to prevent the nest from sliding completely off the rails (and losing bearings). Alternative: tape nest in place.

**NOTE: Do not allow pick-up nest to come forward off the tracks or the ball bearings will be lost**

4. TEST: the top and bottom lamp power connections are now accessible at the front of the prism. If the one light is out but the other works, swap the connectors. If the light that was out is still not working, the lamp needs replacement. If the light that was out is now working, the lamp power inverter board needs replacement (refer to procedure).
5. To replace the top or bottom lamp assembly, disconnect the harness connector from the lamp and carefully pull the lamp assembly out of the camera box extrusion.
6. Remove the clear plexiglass lamp cover. If it is damaged or scratched, replace. Otherwise, clean and use for re-assembly.
7. Install the clear lamp cover onto the new lamp assembly. May need to use tape at front to hold in place.
8. Slide the new lamp assembly and cover into the camera box.
9. Connect the wire harness connector to the new lamp.
10. Tighten the two front screws on the rails that were loosened to act as the pick-up nest stop.
11. Install the front cover and plate (2x screws)

**CAUTION: The prism will be exposed on removal of the lamp and cover; the clear surfaces of the prism cube are very easily scratched so use extreme caution when handling the prism or parts around the prism.**

## Replace APR-CA camera lamp inverter board APR-BLPCB



### **REQUIRED TOOLS/EQUIPMENT:**

1/16" hex key  
7/64" hex key  
9/64" hex key  
Small Phillips screwdriver  
Kapton tape

**CAUTION!!!: This procedure involves handling ESD sensitive components. Proper ESD precautions should followed.**

### **Test Inverter Board / Lamps**

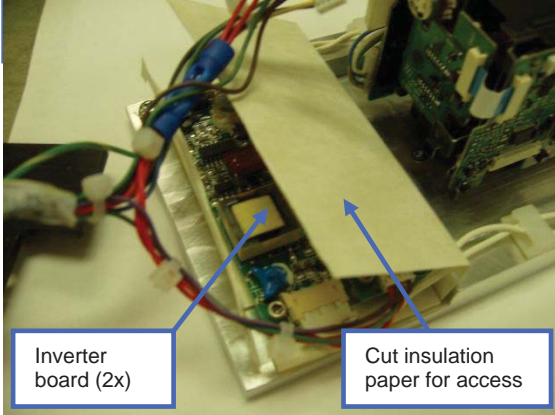
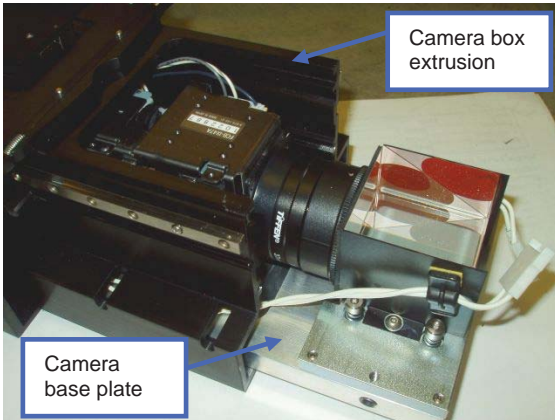
1. Remove the camera assembly from the head.
2. Remove the six screws holding the bottom heat shield. Remove the bottom shield.
3. Remove the front cover, held by two screws.
4. With the front cover removed, slightly back out the two frontmost small screws on the rails. These screws will act as a stop to prevent the nest from sliding completely off the rails (and losing bearings). Alternative: tape nest in place.

**NOTE: Do not allow pick-up nest to come forward off the tracks or the ball bearings will be lost**

5. The inverter board connections to the top and bottom lamps are now accessible to the front of the prism. If the one light is out while the other one works, swap the connectors. If the light that was out is still not working, the lamp needs replacement. If the light that was out is now working, the inverter board needs replacement.

### **Removal of Inverter Board**

1. Follow camera disassembly steps above.
2. Remove the rear panel, held by two screws.
3. Disconnect the 6-pin connector just inside the rear panel.
4. Carefully slide the camera base forward and remove the four screws on the bottom that hold the camera base plate to the camera box extrusion.
5. Carefully slide the base plate and rear panel out of the extrusion. Facing the prism, there are two springs located on the right bottom edge of the base plate. While sliding the base plate out, carefully hold these in place to prevent them from springing out.
6. The lamp inverter boards are located to the rear of the base plate, behind the camera. Carefully cut along the edge of the insulation paper to access the inverter boards.



7. Locate the inverter board that needs removal. The board furthest to the rear by the fan is for the top lamp. The board closer towards the front is for the bottom lamp. Disconnect the two connectors to the board. Label the connectors for installation of the new board. Remove the inverter board, held by two screws.

### **Install New Inverter Board**

1. Install the new inverter board onto the rear of the camera base using two spacers and screws.
2. Install two connectors to the new inverter board. One connector goes to the lamp, and the other is for the wire harness. The board closest to the rear by the fan is for the top lamp. Facing the front of the camera, the top lamp harness will run along the left side. The short control wire harness will connect on the right side. The board closest to the front is for the bottom lamp. Facing the front of the camera, the bottom lamp harness will run along the right side, and the longer control wire harness will connect on the left.
3. Tape together the previously cut insulation paper, using kapton tape.
4. Slide the camera base and rear panel into the camera box extrusion. Carefully insert each of the two springs on the base so that they are compressed when sliding the base into the extrusion.
5. Install the the four screws on the bottom holding the base to the extrusion.
6. Connect the 6-pin connector and install the rear panel.
7. Ensure top and bottom lamp harnesses are connected.
8. Tighten the two front screws on the rails that were loosened to act as the pick-up nest stop.
9. Install the front plate and cover.
10. Install the bottom heat shield.
11. Mount the camera assembly onto the head.

## Replace APR-CA camera module (3700)

### **REQUIRED TOOLS/EQUIPMENT:**

1/16" hex key            Small Phillips screwdriver  
7/64" hex key  
9/64" hex key

**CAUTION!!!: ESD SENSITIVE COMPONENTS INVOLVED.  
OBSERVE ESD PRECAUTIONS DURING PROCEDURE.**

### **Removal**

1. Disconnect 25-pin connector and remove the camera assy from the head (4x mounting screws).
2. Remove the bottom heat shield (6x screws).
3. With the front cover removed, slightly back out (but do not remove) the two frontmost small screws on the rails. These screws will act as a stop to prevent the nest from sliding completely off the rails (and losing ball bearings from slides). Alternative: tape nest in place.
4. Remove the camera box front cover, 2x screws.
5. Carefully slide inner box extrusion partly out and forward.
6. Disconnect 2 lamp connectors.
7. Slide out and remove top & bottom lamp assemblies and plastic covers.

**Note: on new camera assemblies 4x large prism screws sticking up out of holes must be removed prior to removal of the base plate.**

8. Remove the rear panel (2x screws).
9. Disconnect the 6-pin connector just inside the rear panel.
10. Carefully slide the camera inner box forward and remove the four screws on the bottom that hold the camera base plate to the camera box extrusion.
11. Carefully slide the camera base plate and rear panel out of the extrusion. Watch for the 2 springs located on the right bottom edge of the base plate. While sliding the base plate out, carefully hold these in place to prevent them from springing out.

**CAUTION: the glass prism cube will now be exposed; use caution not to scratch the surfaces of the prism.**

12. Carefully flip the camera base plate over and remove the 1x large camera mounting screw.
13. With the camera now loose from the base plate, remove 2x wire harness connectors to the camera, and remove old camera. NOTE: if very old camera module, there will be 3x wire harness connectors and will need to replace the wire harness with new one).
14. Remove the 3x front lenses from the old camera

## INSTALLATION

15. Install the 3x lens on new camera module (same order as old module).
16. Install 2x wire harness connectors to camera module.
17. Position new camera module on the base plate so that it is as far forward as possible (lens cover touching the prism) and as straight as possible. Tighten camera mounting screw to hold in place (needs to be very tight).
4. Insert rear panel carefully into inner box and slide in the camera base and rear panel into the inner box extrusion. Insert 2x springs on right side of base so that they are compressed when sliding the base into the extrusion. These hold base plate in position.
5. Install the the 4x bottom screws to hold camera base plate to inner box. These screws need to be very tight, but be careful not to strip them.
6. Connect the 6-pin connector and install the rear panel.
7. Insert top and bottom lamp assemblies with plastic covers; connect the harnesses.
8. New cameras only: if removed before, install 4x large prism adjust screws.
9. Tighten the two front screws on the pick-up nest rails that were loosened to act as the pick-up nest stop.
10. Install the front cover.
11. Install the bottom heat shield.
12. Mount the camera assembly onto the APR machine and connect 25-pin connector.
13. IMPORTANT! With camera module replacement it is now necessary to check and adjust APR optical calibration & alignment per calibration procedures.

Following adjustment to only be performed if necessary:

If during optical alignment, while centering vacuum tube in vision window, it is seen where cannot center the vacuum tube and have run out of base plate adjustment (all the way over), need to adjust camera module position as follows:

1. Remove bottom heat shield.
2. Remove camera front cover.
3. Remove top lamp assembly as needed.
4. From bottom, loosen 4x camera base plate screws.
5. Use 2x x-axis side adjust screws for base plate to put 4x plate screws in approximate center.
6. From bottom, loosen camera module mounting screw.
7. From top, reach inside and carefully re-position camera side-to-side position as needed, using vision window if possible as a reference.
8. Re-tighten mount screw and base plate screws.
9. Replace all parts removed.
10. Continue with centering vacuum tube in vision window.

***IMPORTANT: When the camera module is replaced, it will be necessary to perform complete optical***

*calibration procedures. For newer camera boxes where the 4x large prism screws need to be removed to slide out bottom plate this is even more critical. The pick-up nest coplanar calibration should also be verified.*

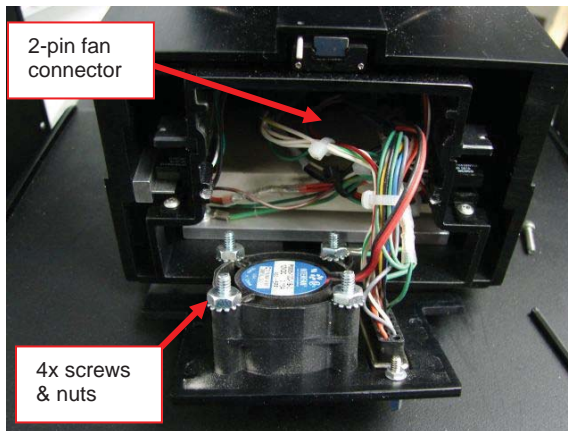
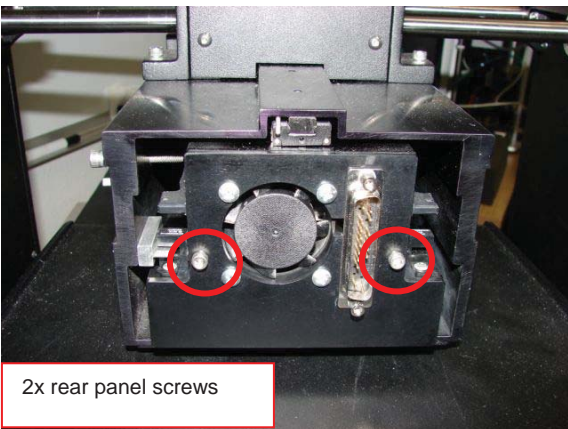
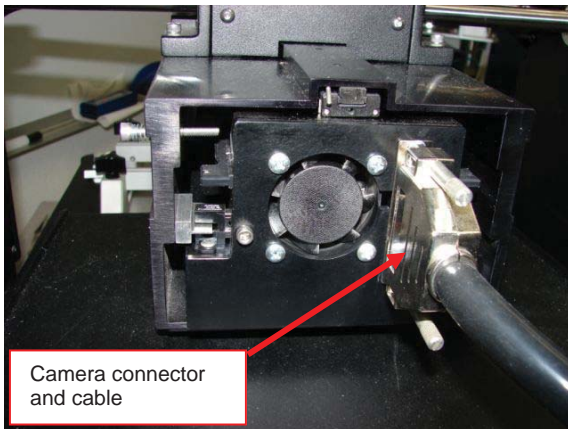
## Replace Camera Cooling Fan APR-CF

### REQUIRED TOOLS:

7/64" hex key  
5/16" open end wrench  
small flat-tip screwdriver  
Phillips screwdriver

### REFERENCED PROCEDURE (optional):

Removal/Replacement of camera assembly



### REMOVAL

1. Remove 25-pin DSUB camera connector and cable.
2. Optional: remove complete camera assembly off of machine and move to work area (refer to procedure).
3. Remove 2x rear camera panel screws (B).
4. Disconnect 2-pin camera cooling fan connector (C). Remove wire harness tie wraps if necessary.
5. Remove 4x screws and nuts (D) and remove fan from camera rear panel.

### INSTALLATION

6. Install new APR-CF camera cooling fan by 4x screws and nuts.
7. Connect 2-pin connector for camera fan. Install new tie wraps for wire harness if necessary.
8. Re-install camera rear panel with 2x screws.
9. If camera box removed from machine, install at this time with 4x mounting screws (refer to procedure).
10. Connect 25-pin DSUB camera connector. Hand tighten, then tighten 0.25 to 0.5 turns with small flat-tip screwdriver.