



# Stanford Research Systems

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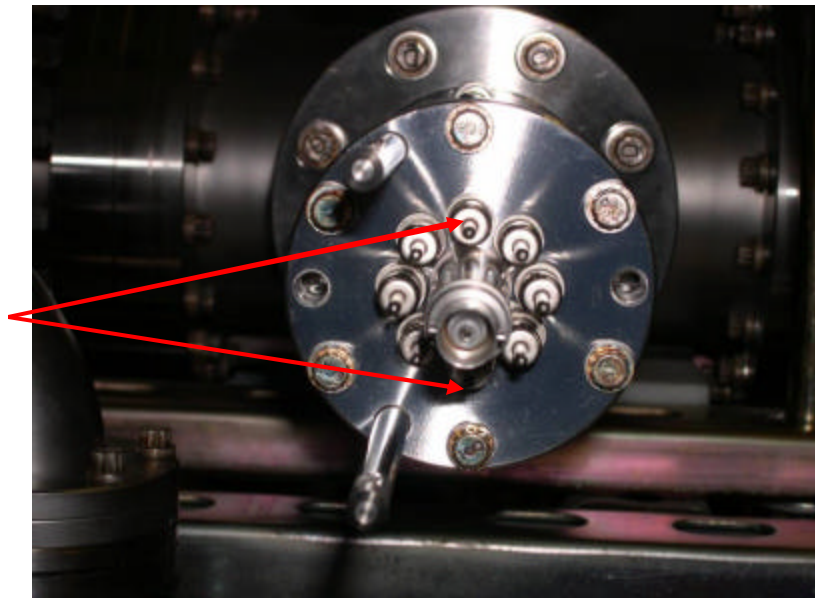
Email: [info@thinksrs.com](mailto:info@thinksrs.com) Web: [www.thinksrs.com](http://www.thinksrs.com)

## Troubleshooting RGAs

### Symptom 1: No signal in analog scan

1. Check the total pressure in your chamber. It should be below  $1e-4$  Torr.
2. Next, in the RGA Windows software, go the Head Menu, and set everything back to defaults. Scan again. If this does not help, go to the next step.
3. The most likely problem is a burnt/broken/degraded filament. Even though you may not see the Error/Burnt/Leak LED light up, the filament may still be damaged.
  - a. Turn off power, and remove the ECU (electronics control unit)
  - b. You will see 8 feedthrough pins on the probe as shown in the manual.
  - c. Measure the impedance (DC resistance) across the filament supply and return pins. This should be less than one ohm. It should not be shorted, or an open circuit. If it is, the filament will need to be replaced.

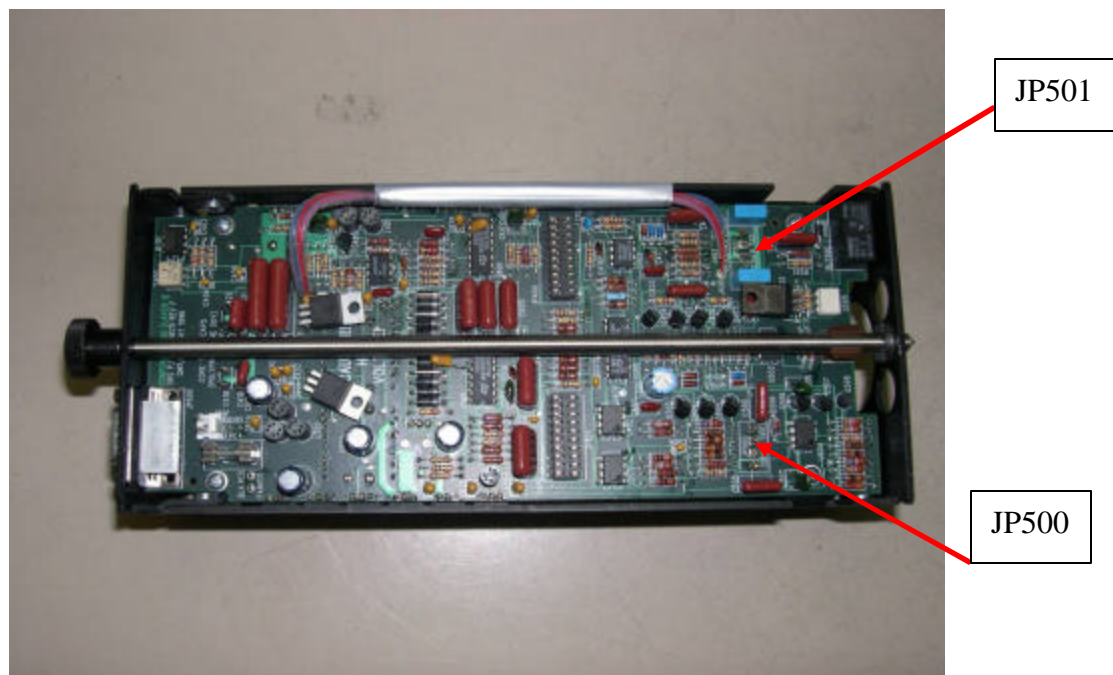
Filament Supply and  
Return

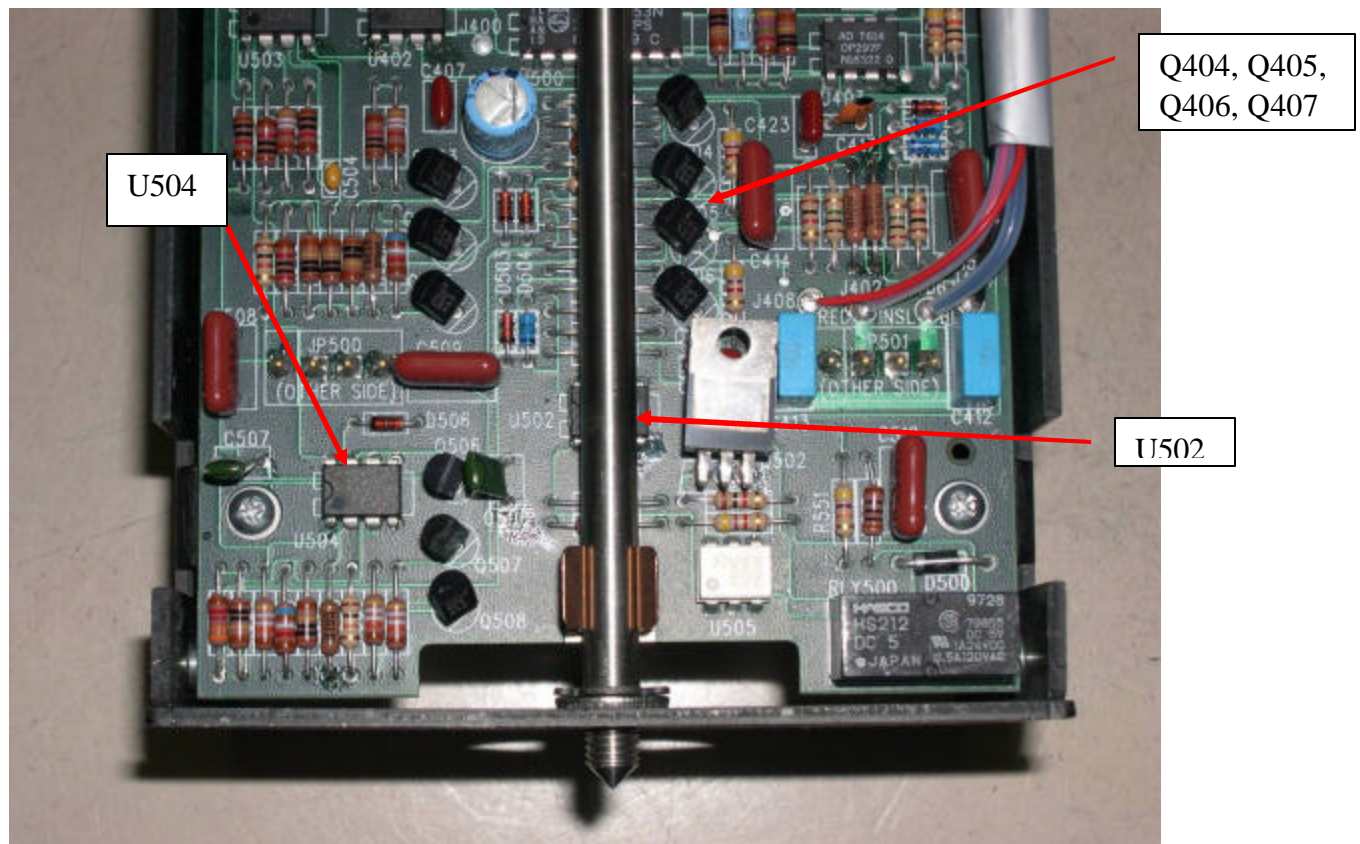


4. If the filament resistance is ok, then check that none of the pins are shorted to each other, or to ground (use the flange as ground). If you see a short, most likely the Repeller Cage is touching

the installation port. You can easily remove the repeller cage by unscrewing it. This will not affect the performance of the RGA measurably.

5. If everything is ok so far, then the next step is to check the ECU.
6. You will need to remove the bottom cover of the ECU.  
(Note: If the RGA has Option 02 Built in AC power module, then pull out this module by unscrewing it, but leave the DC power cable connected to the bottom board on the ECU.)
7. Reconnect the ECU to the probe.
8. Turn power on.
9. Use the RGA software to turn on the filament (of course, assuming that you still have the probe exposed to high vacuum), but do not scan.
10. Locate two jumpers marked on the bottom board – JP500 and JP501. Each jumper has 4 pins.
11. Measure the DC voltage on each of the 8 pins w.r.t. ground (use analog ground or chassis as ground).





### JP500 Voltage Measurement

	Expected Voltage	Problem and resolution
Pin 1	-90 VDC	U504 which controls the bias for the focus plate is bad, and will need to be replaced. Part # LM358 (SRS part# 3-508)
Pin 2	0	No connection
Pin 3	0	No connection
Pin 4	-57 VDC	Filament Return Voltage. Contact SRS for repairs

### JP501 Voltage Measurement

	Expected Voltage	
Pin 1	-56.5 VDC	Filament Supply. Contact SRS for repairs
Pin 2	< +2 VDC	+DC Supply for Quadrupole rods. Q404 (MPSA92, SRS Part# 3-627) and Q405 (MPSA42, SRS part# 3-628) need to be replaced.
Pin 3	12 VDC	Anode Grid Voltage. U502 (LM358, SRS part# 3-508) needs to be replaced
Pin 4	> -2 VDC	-DC Supply for Quadrupole rods. Q406 (MPSA92, SRS Part# 3-

627) and Q407 (MPSA42, SRS part# 3-628) need to be replaced.

12. If everything is ok so far, the electrometer itself may be damaged. Contact SRS for details.
13. Start RGA COM program. Connect to the head, and type "ID?" and hit enter. If you see a return string from the RGA identifying itself with its serial number, then proceed.
14. For the Faraday Cup mode only, use this procedure

CL<enter> This takes upto a minute, and will return a 1 or 0 when complete  
AD12<enter> This should return -0.4 approx  
AD13<enter> This should return -0.4 approx also.  
AD14<enter> This should be the delta between the two previous results.

If you get different answers, the electrometer is probably malfunctioning. Contact SRS.

15. For the Electron Multiplier Mode only, use this procedure

CL<enter> This takes upto a minute, and will return a 1 or 0 when complete  
AD12<enter> This should return +0.4 approx  
AD13<enter> This should return +0.4 approx also.  
AD14<enter> This should be the delta between the two previous results.

If you get different answers, the electrometer is probably malfunctioning. Contact SRS.

16. Remove ECU from probe. Measure the resistance of diode D501 between pin 4 of JP500 and pin 1 of JP501. If it's a short, the diode will need to be replaced (SRS part# 3-625).

## **Symptom 2: Analog scan looks offset**

Due to contamination of the ionizer from oils/carbons/acids etc, an offset can occur in the graph.

1. To confirm this effect, run the RGA Windows program. Go the Head menu, and Ionizer settings.
2. Go to step 11 in the previous section, and check pin 1 of JP500.
3. Increase the focus voltage from the 90V default (actually, all these voltage are negative in the unit) in 5V steps, and scan after each step. If the analog scan gets back to normal, it confirms contamination. You should clean the ionizer, as described in the manual, or better still, replace it with an O100RI kit from SRS. This kit also includes a new filament.

## **Symptom 3: No Communication with PC**

1. Try connecting with the RGA COM program (it's in the same program group as the main RGA Windows program). On connection, send command "ID?" and hit enter. If you see an ID string returned, then there is probably a short somewhere – either the repeller cage to flange/port, OR one of the feedthrough pins.

2. If you cannot connect, most likely U104 (SRS part# 3-109) and U105 (SRS part# 3-110) will need to be replaced.