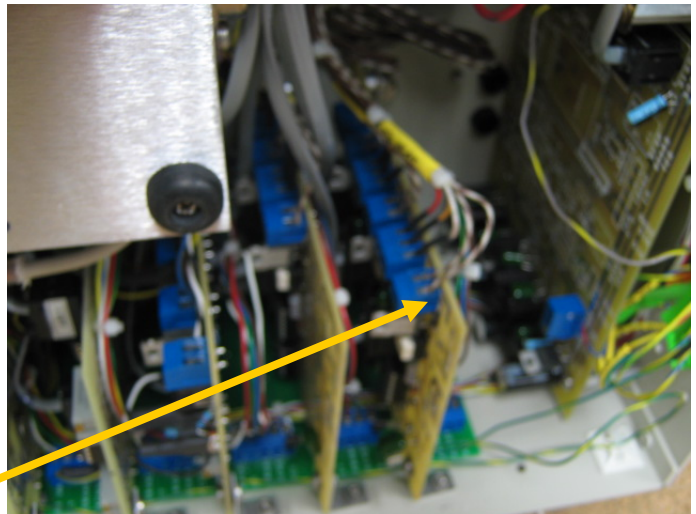
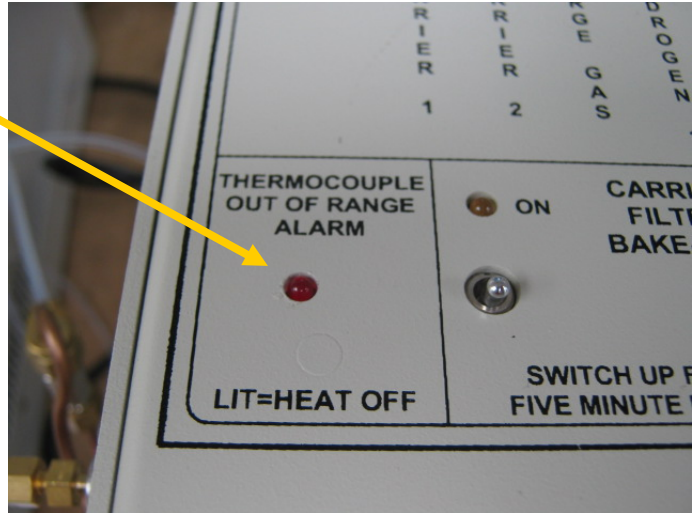


Troubleshooting Heat Boards on SRI GCs

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The “Thermo-couple Out of Range Alarm” (TORA) will illuminate if any of the ACTUAL heater temperatures are less than 5C or more than 425C.

The TORA will also illuminate if the TOTAL OVEN setpoint (middle button of Column 1) is greater than the Oven Max setting.



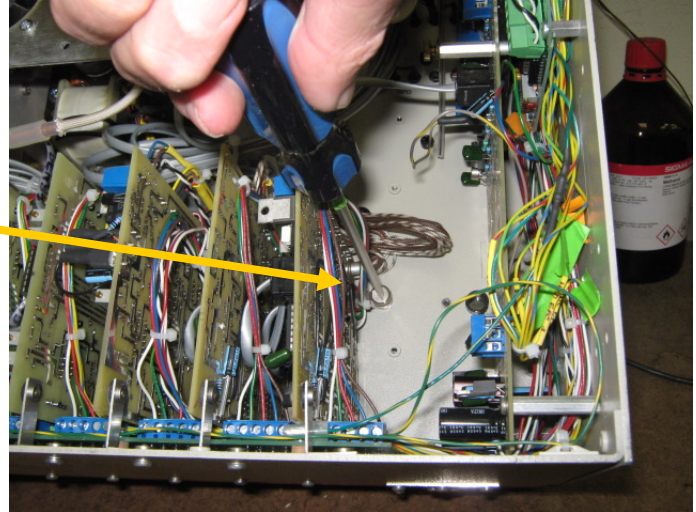
If the TORA appears to be illuminated because one of the heater ACTUAL temperatures is less than 5 or greater than 425, then the problem may be located on the heat control board located inside the GC. There may be several heat boards in the GC depending on the number of heaters installed. Locate the board which controls the heat zone which has triggered the TORA and remove the two screws (phillips#2 screwdriver) on the back of the GC which hold it in place.



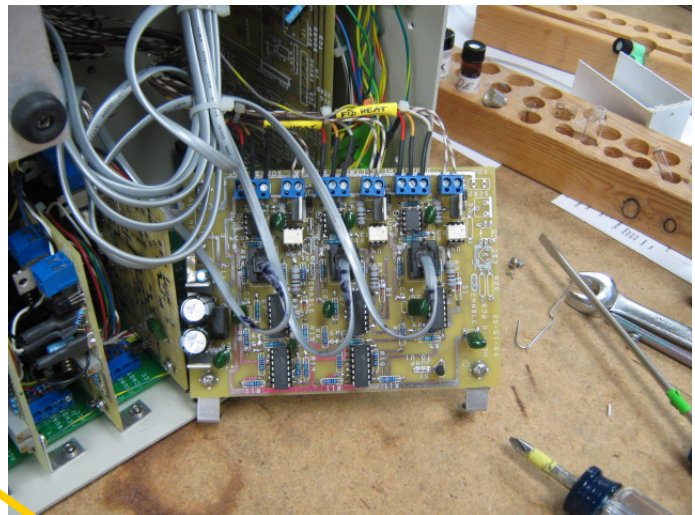
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There is a third captive screw (long straight blade screwdriver) which secures the board to the underside of the chassis.

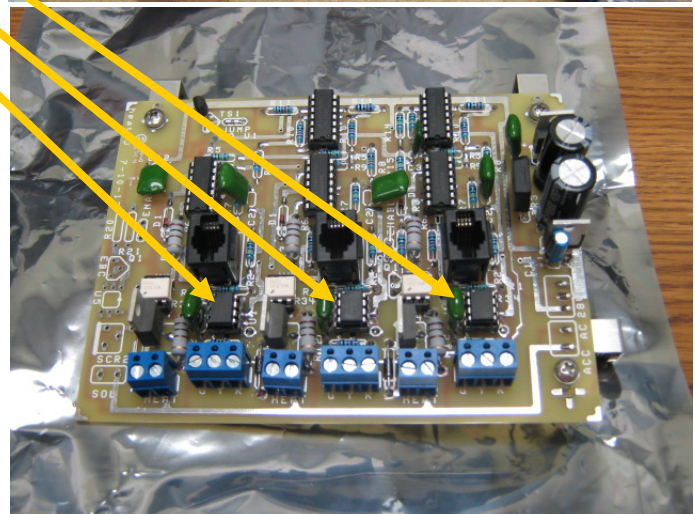


This is the heat board removed from the GC but still connected electrically. If you operate the GC with the board like this, be sure to put something to prevent the board from touching anything. **There is mains power on this board so be careful not to touch it when the power is ON.**



The heat board is divided into 3 identical heat control circuits.

Some boards may have only one or two of the circuits populated with components.



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Each heat control circuit has two terminals to connect the heater cartridge.

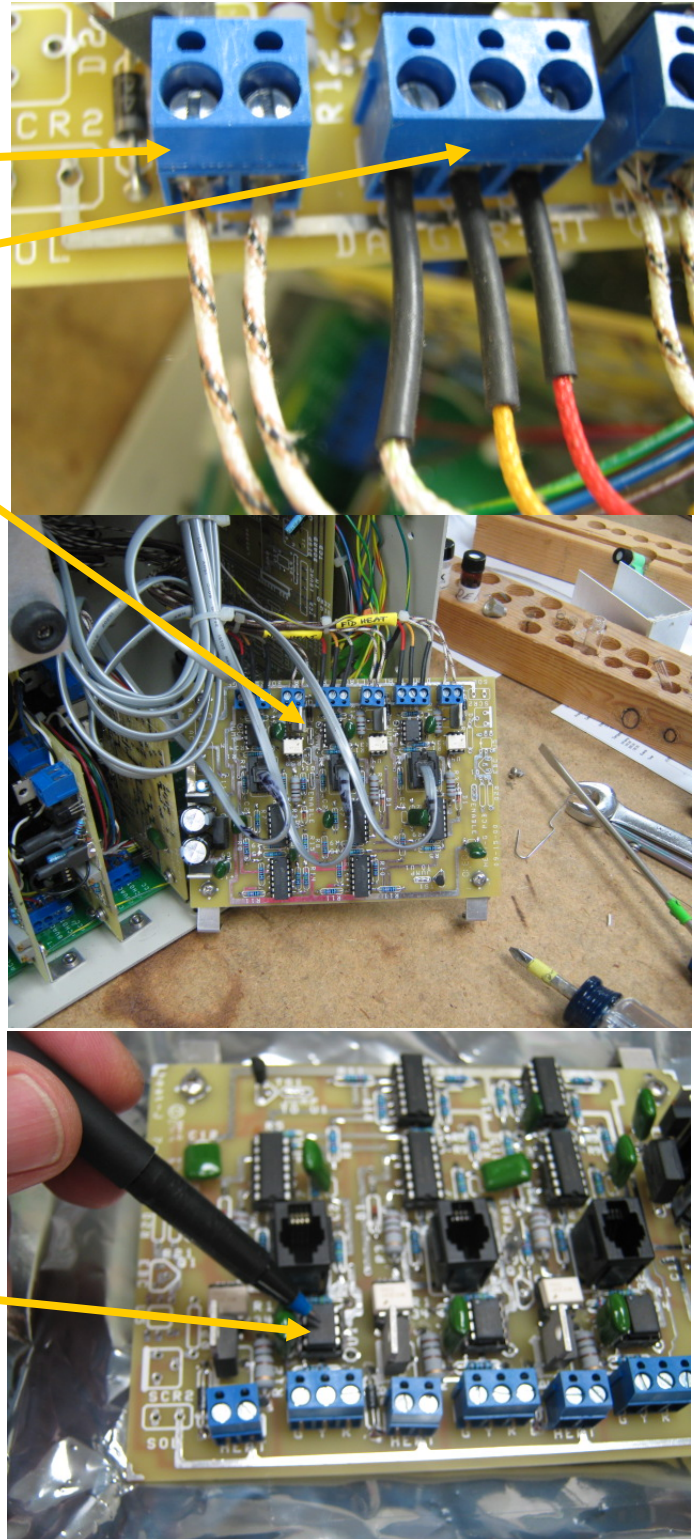
And 3 terminals to connect the Type K thermo-couple with grounded tip.

There is also a phone cord which connects each heat board to the display board on the front of the GC. The board in the photo has 3 circuits with 3 phone cords.

You can connect the suspected bad thermocouple, heater and phone cord to another one of the heat zone circuits to see if it reads and works correctly on the other circuit.

If it DOES read correctly on another circuit then the thermo-couple amplifier chip (INA 114) is the likely problem.

Be sure to replace all wires back to their original positions after the test.



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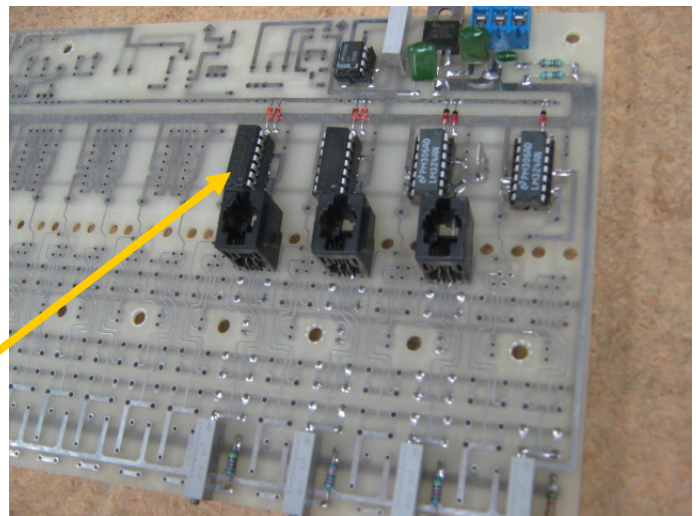
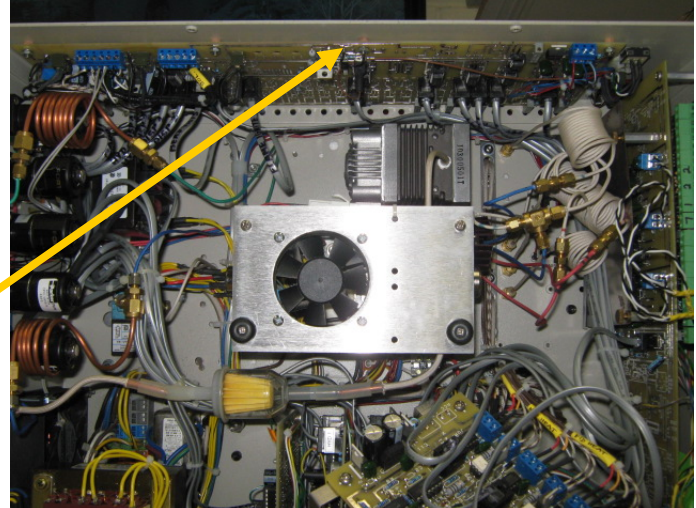
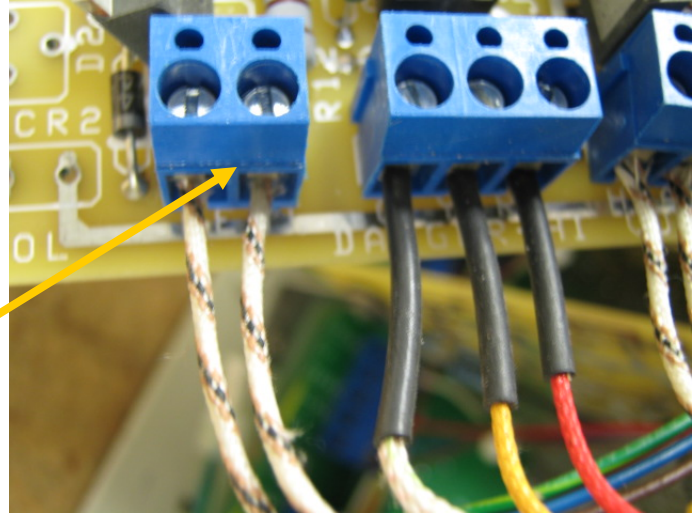
If the heater circuit which is triggering the TORA is not essential to the operation of the GC, you can temporarily disable the heater by removing the heater wires from the board and wrapping them with electrical tape to prevent the exposed ends from touching anything.

There is a supervisory circuit located on the display board which is connected to the heat board by a grey phone cord. The display board is mounted to the inside of the GC's front panel.

Each heater circuit is connected to one supervisory chip by a phone corded. In some cases, one chip may supervise two heaters.



Next to each phone cord jack on the display board is the supervisory chip (LM324). When the chip senses the temperature is too high or low it triggers the TORA .



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Note the orientation of the dimple on the chip when you remove and replace it.

Sometimes the TORA is triggered because of a failure of the supervisory chip itself. If all the ACTUAL temperatures ARE between 5 and 425C, and no other explanation is likely (Oven Max), then you can experimentally remove the supervisory chips one by one (there may be up to 8 of them on the board).

Turn off GC power, remove one chip, then power on to see if the TORA is still illuminated. If not, then that chip may be bad.

If the TORA is still illuminated, remove the next chip until the bad chip is located.

Be sure to replace the bad chip as soon as possible since it performs a vital safety function.

The LM324 is a very common part available almost everywhere in the world for about US\$1.00. Call SRI for a replacement if you can't find it locally.

