Picotrace system: Temperature programs

1) Main display.
2) Program number currently active.
3) Relay lights.
4) Program select button.
5) Program start/stop button.
6) Don't touch.
7) Press to display vessel temperature. Reverts to hot plate temperature after 15 seconds.
8) Increase or decrease temperature or time while setting program segments.
9) Look at the previous program segment value.
10) Look at the next program segment value
11) Program segment currently active.
B) On green if everything is OK.
K, U, T) On red if something is wrong.
Start) Heating relay on.
Stop) Heating relay off.

This is the controller box front panel. The box stores and runs temperature programs for the hot plate, and it displays the hot plate temperature, if you press the **select button** (#7), the block temperature is displayed. To write a program, you will have to use the displays and buttons shown in red text in this image. Don't try to write a program without learning how.

Temperature programs all assume the hood is turned off, the sash is closed, and the Teflon jacket and wind break is in place. The hold instructions in the programs below keep the blocks hot until you come along to turn them off, and then process the samples. This avoids the possibility that leakage or condensation, which might occur if they cooled to room temperature and were left sitting around for long periods. Keep the vessel block hot until you are ready to process the samples. Process digested samples quickly, don't just leave them in this expensive equipment forever! That includes throwing out samples you are done with, and rinsing the vessels for the next person.

Cleaning program: #1

This program is to clean the sample vessels if there is a chance of cross contamination (not normally the case). New vessels, and vessels used to dissolve mineral separates, and suspiciously dirty vessels should probably be cleaned.

1. Turn the control box on.

2. After it boots, press the **prog button** (#4) until "1" is shown in display #2.
3. Press the **start/stop button** (#5), then the big **green start button**.
4. Be sure the thermocouple on the white wire is in one of the block thermocouple wells.

Time segment	Each segment has two numbers associated with it		
	Hours the segment runs	Plate temp at time segment end	Vessel temp at time segment end
0	Skip	20°C	10°C
1	2.00	225°C	180°C
2	12.00	225°C	180°C
3	1.00	150°C	120°C
4	Hold	150°C	120°C
5	End	-	-

Skip basically means zero time.
Hold basically means continue the segment forever.

Dissolution program: #2

This program is to dissolve samples. Four days is sufficient for samples containing radiation-damaged zircon.

1. Turn the control box on.
2. After it boots, press the **prog button** (#4) until "2" is shown in display #2.
3. Press the **start/stop button** (#5), then the big **green start button**.
4. Be sure the thermocouple on the white wire is in one of the block thermocouple wells.

Time segment	Each segment has two numbers associated with it		
	Hours the segment runs	Plate temp at time segment end	Vessel temp at time segment end
0	Skip	20°C	10°C
1	2.00	225°C	180°C
2	Hold	225°C	180°C
3	End	-	-

Skip basically means zero time.
Hold basically means continue the segment forever.

Evaporation program: #4

This program is for overnight, sub-boiling evaporation of HNO_3 and HF. Boiling should not be reached for 50% HF (108°C) or HNO_3 (120°C), especially considering the dissolved salts in most of the vessels.

1. Turn on the control box.

2. After it boots, press the **prog button** (#4) until "4" is shown in the display #2.
3. Press the **start/stop button** (#5), then the big **green start button**.
4. Be sure the thermocouple on the white wire is in one of the block thermocouple wells.

Time segment	Each segment has two numbers associated with it		
	Hours the segment runs	Plate temp at time segment end	Vessel temp at time segment end
0	Skip	20°C	10°C
1	0.30	125°C	105°C
2	Hold	125°C	105°C
3	End	-	-

Skip basically means zero time.
Hold basically means continue the segment forever.

Note: I have noticed considerable loss of the Re internal standard from the blank solutions (not from the dissolved rock solutions) at *vessel* evaporation temperatures of 120°C (hot plate ~150°C). Re is probably lost as a volatile fluoride and/or oxide. There seems to be no discernable Re loss at 105°C. However, to avoid this problem completely we now add internal standards during the last dissolution step.

Final solution program: #5

This program is to put the residual salts back into solution for analysis.

1. Turn the control box on.
2. After it boots, press the **prog button** (#4) until "5" is shown in the display #2.
3. Press the **start/stop button** (#5), then the big **green start button**.
4. Be sure the thermocouple on the white wire is in one of the block thermocouple wells.

Time segment	Each segment has two numbers associated with it		
	Hours the segment runs	Plate temp at time segment end	Vessel temp at time segment end
0	Skip	20°C	10°C
1	1.00	190°C	150°C
2	Hold	190°C	150°C
3	End	-	-

Skip basically means zero time.
Hold basically means continue the segment forever.