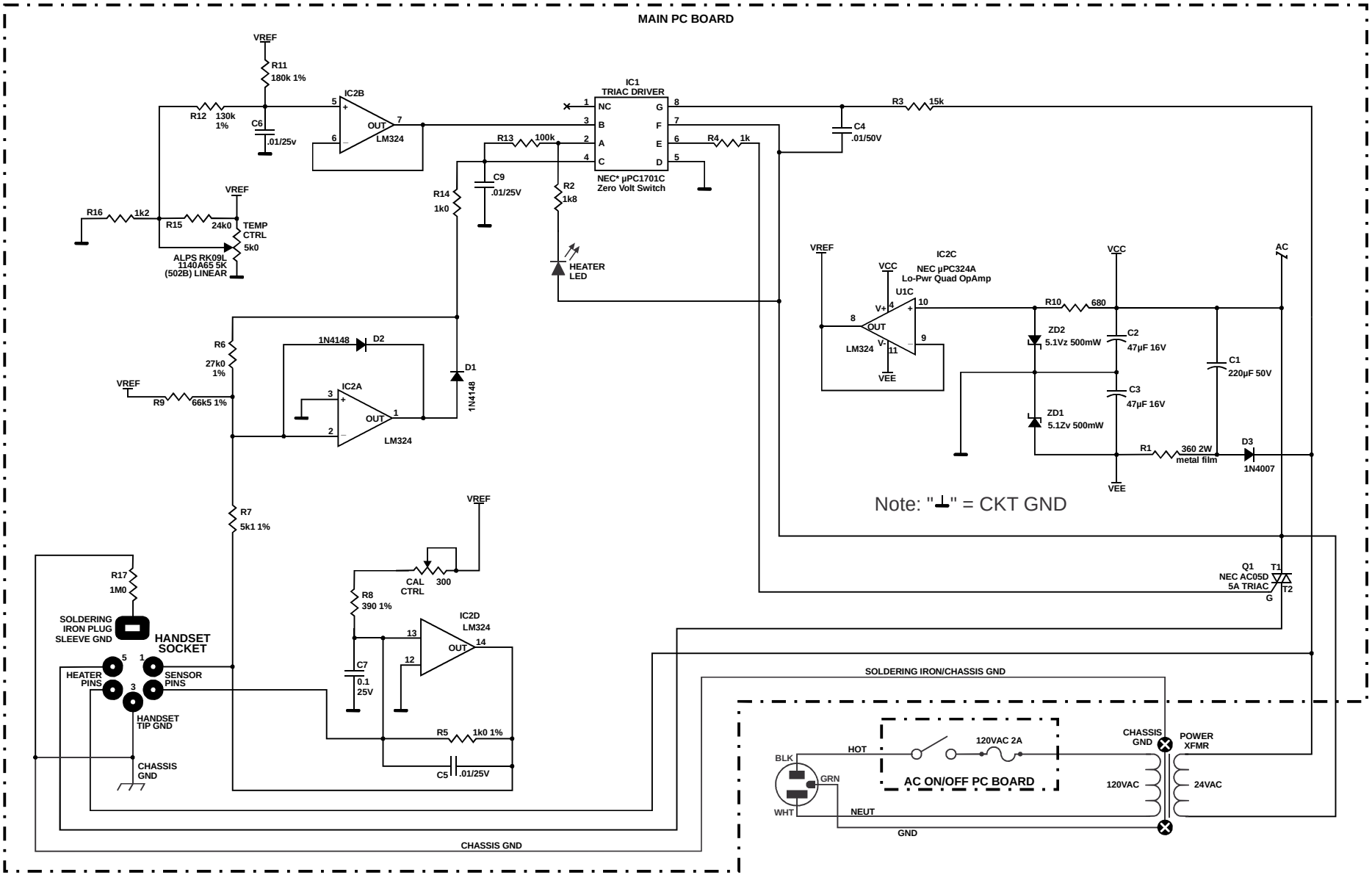
HAKKO 936 - Schematic

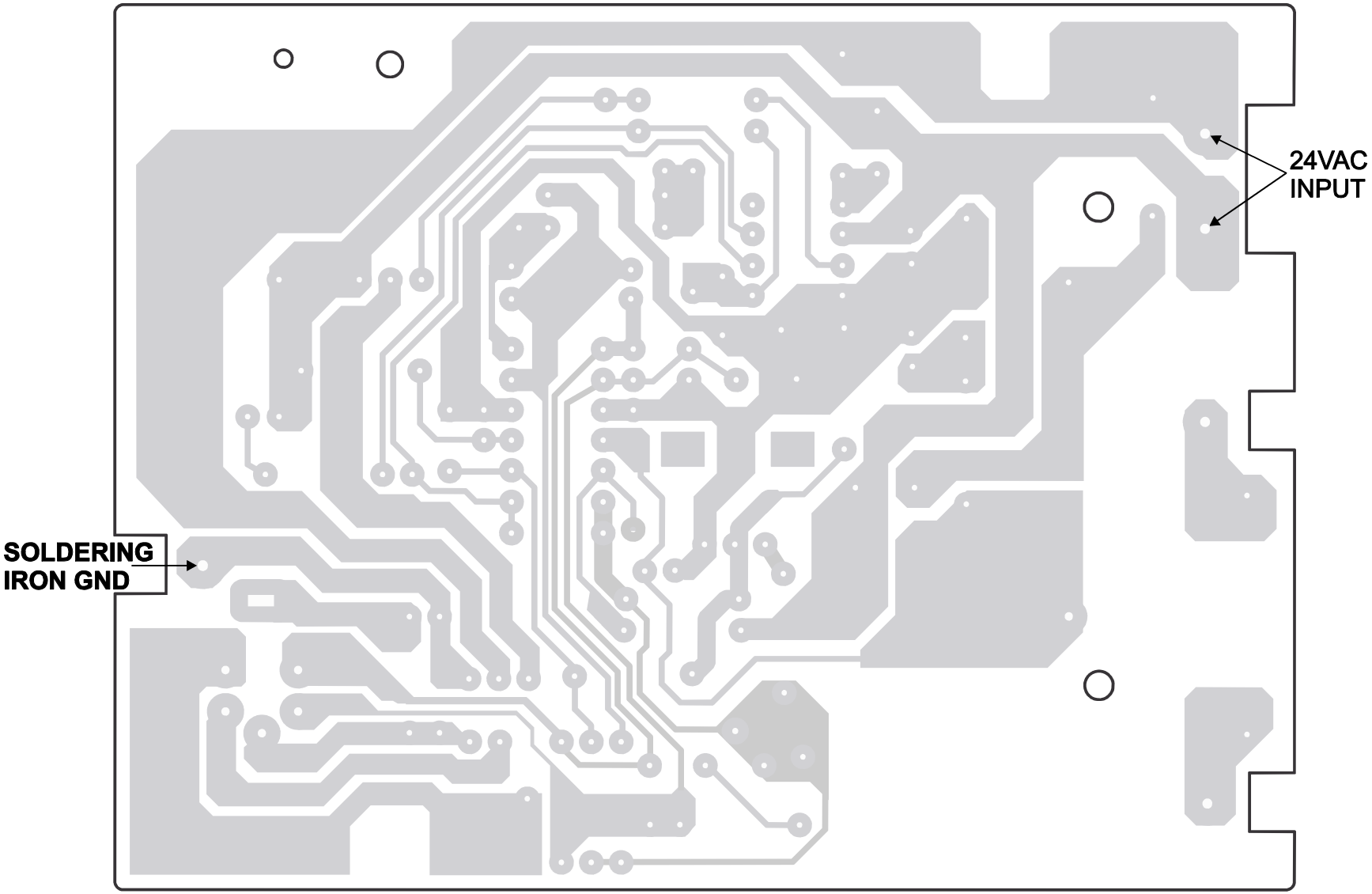
Rendered by: Tom Hammond - NØSS 26 MAR 2011 v1.7



HAKKO 936 TEMPERATURE-CONTROLLED SOLDERING STATION PC BOARD LAYOUT

Rendered by: Tom Hammond, NØSS 26 MAR 2011 v1.7

PC BOARD AS VIEWED FROM THE COMPONENT SIDE



TEMP CONTROL POT = ALPS RK09L1140A65 5K (502B) LINEAR

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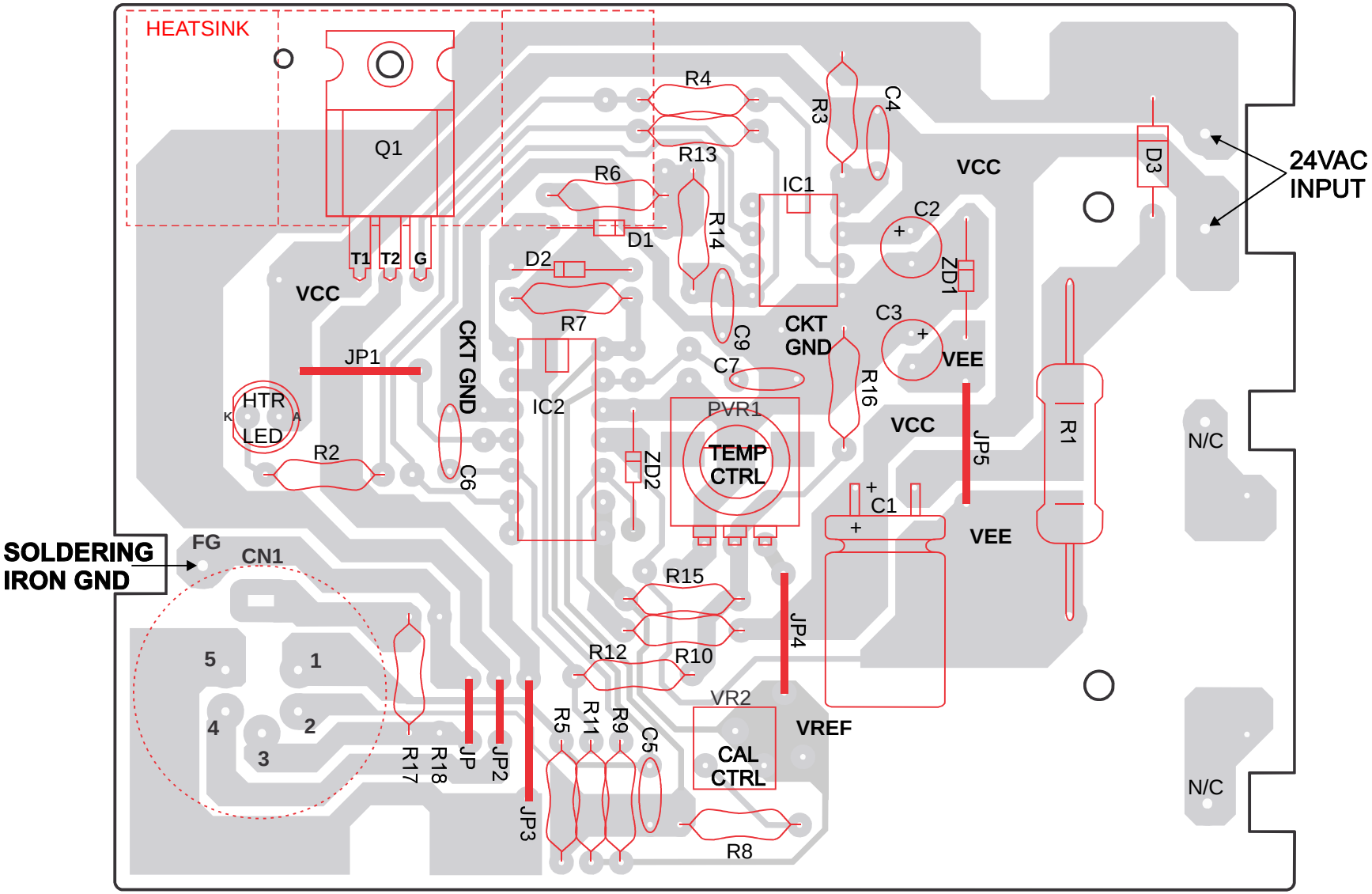

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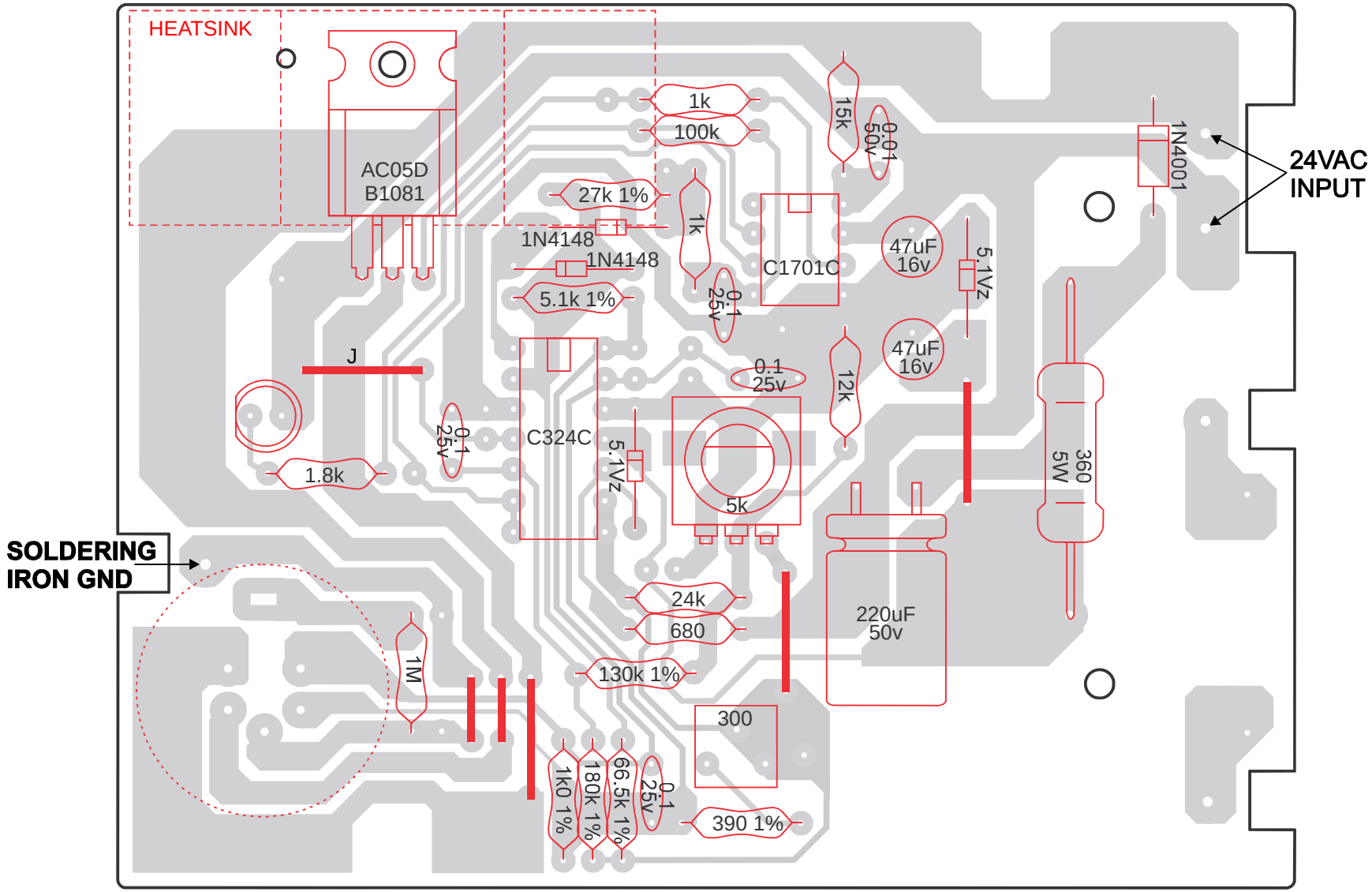

TEMP CONTROL POT = ALPS RK09L1140A65 5K (502B) LINEAR

HAKKO 936-x PC Board Parts List

C1	220uF 50V
C2	47uF 16V
C3	47uF 16V
C4	0.01 (103) 50V Ceramic
C5	0.01 (104) 25V Ceramic
C6	0.01 (104) 25V Ceramic
C7	0.1 (104) 25V Ceramic
C8, C10-C13	n/a
C9	0.01 (104) 25V Ceramic
D1	4N4148 Small Sig Sil, or similar
D2	4N4148 Small Sig Sil, or similar
D3	1N4001, or 50VDC (or higher) @ 1A
IC1	NEC* µPC1701C, Zero Volt Switch
IC2	NEC* µPC324A, Lo-Pwr Quad OpAmp
Q1	NEC AC05D 5A Triac
R1	360 2W 5% metal film
R2	1.8k 1/4w 5% carbon film
R3	15k 1/4w 5% carbon film
R4	330 1/4w 5% carbon film
R5	1.0k 1/4W 1% metal film
R6	27.0k 1/4W 1% metal film
R7	5.11k 1/4w 1% metal film
R8	390 1/4w 1% metal film
R9	66.5k 1/4w 1% metal film
R10	680 1/4w 5% carbon film
R11	180.0k 1/4W 1% metal film
R12	130.0k 1/4W 1% metal film
R13	100k 1/4w 5% carbon film
R14	1k 1/4W 5% carbon film
R15	24k 1/4w 5% carbon film
R16	12k 1/4w 5% carbon film
R17	1M 1/4w 5% carbon film
ZD1	5.1Vz 500mW, 5.4Vz (measured)
ZD2	5.1Vz 500mW, 5.2Vz (measured)
PVR1	TEMP ADJ POT - ALPS RK09L1140A65 5K (502B) LINEAR
VR2	CAL TEMP POT - Bournes 3362P-1-501LF, see note below

* NOTE: NEC, is now part of Renesas Electronics Corp.

CAL TEMP CTRL

NOTE: In the 936, the CAL TEMP pot is 300 Ohms, however we were unable to find a pot in this physical format rated at 300 Ohms, so a 500 Ohm device has been specified as a suitable substitute.

ADDING AN ON/OFF LED TO HAKKO 936-X TEMP-CONTROLLED SOLDERING STATIONS

by: Tom Hammond, NØSS 03/09/2011, v.4.1

Is it turned ON or not?

By golly, it WAS, but how could you tell?

ADDING AN ON/OFF LED TO HAKKO 936-X TEMP-CONTROLLED SOLDERING STATIONS

by: Tom Hammond, NØSS rev. 03/09/2011

The Hakko 936-x line of temperature-controlled soldering stations has one flaw. It offers no real POWER ON/OFF indication. There is a red LED which illuminates when heat is being applied to the tip of the iron, but it lights ONLY when heat is being applied. As a result, if you glance at the station when no heat's being applied to the tip, you might think the device is actually turned off. I've walked off and left the soldering station running for several days because the red LED was extinguished when I looked at it, even though power was still applied.

Here's a fairly simple-to-install mod which will add a green LED to the right hand side of the front panel on the 936. This LED will be illuminated any time power is applied to the soldering station.

1. Remove four (4) screws from the bottom of the case, and lift off the case top.

2. Remove the temperature control knob and carefully loosen the setscrew in the temp-lock mechanism. Remove the setscrew and nut and set them aside in a safe place.

3. Lift the front panel/PC board combination out of the case and carefully desolder the 6-pin (five [5] pins and one [1] lug) soldering iron cable connector from the PC board. USE CARE HERE.

4. With the 6-pin connector free of solder, hold the front panel on its sides with both bands and use your thumb to press on the shaft of the temp. control pot to push the PC board assembly away from the front panel.

4. Using Figure 1 (see next page), a scale drawing of the front panel, as an overlay of the drilling template, lay the template onto the front panel and CAREFULLY center punch and then drill a 3/16" (4.75mm) hole. Then use a much larger (about 1/2" / 13mm) bit (hand-held), or a hand reamer bit, to 'hollow' out a bit of the back side of the hole just drilled to allow the new LED to extend out the front of the panel just a small distance.

5. Refer to Figure 2 (next page),SOLDER SIDE of the PC board. Using a #60 (0.040") or smaller drill bit, drill four (4) holes, as indicated, to accept the new LED (green, T1-3/4 size), and the current limiting resistor (R**L**,3.0k to 3.9k 1W, the exact value is not terribly critical, a metal film/oxide resistor was selected for its smaller physical size), Mouser Electronics #594-5083NW3K900J (3.9k 2W metal film).

6. Once the four holes have been drilled, use a sharp knife blade and scrape away the solder mask from the two points indicated in Figure 2. Once these two points are cleaned of solder mask, tin the bare copper.

7. Regarding the LED... generally, there is a flat side on the base of the LED body to indicate the CATHODE side. Additionally, on most (though not all) LEDs, the CATHODE lead is the SHORTER of the two (assuming a new LED with un-cut leads).

8. ALL REMAINING STEPS REFER TO FIGURE 3 (next page). Install (BUT DO NOT SOLDER) the LED with its CATHODE lead in the hole indicated by the illustration. DO NOT BEND THE LED LEADS AND DO NOT SOLDER YET!!!

9. Insulate and bend the leads of R**L** at right angles and at appropriate distances to allow R**L** to drop into its mounting holes. Raise R**L** about 1/8" (3 mm) above the PC board and solder ONLY the lead which is connected at the top of the resistor to the copper land.

10. BEND the bottom lead of R**L** to the right, and around the ANODE lead of the LED. Use wire cutters to trim any excess lead length once the lead has been bent around the LED anode lead. DO NOT SOLDER YET.

11. Temporarily re-assemble the front panel and the PC board, ensuring that the 6-pin connector is properly inserted into its PC board holes. Ensure that the front panel and the PC board are well mated and parallel to each other, then press the green LED into its hole in the front panel so it seats properly.

12. With the new LED in place, solder the junction of R**L** and the LED anode lead.

13. Bend the CATHODE lead of the LED flat against the PC board and so it touches the adjacent area of the PC board from which you scraped away the solder mask. Solder the LED CATHODE to this point on the PC board.

14. Re-solder all (6) of the 6-pin heating element connector leads.

15. Reassemble the soldering station.

Figure 1 - Cut out the template at right. Then cut out the two marked areas so the template will clear the temp. control bearing and the heating element jack when laid on top of the front panel. Tape the template into place on the FRONT SIDE of the front panel. CAREFULLY center punch the point where the hole is to be drilled. Drill a 3/16" (4.75mm) hole from the front. You may want to first drill a smaller 'pilot' hole and work up, in steps, to the larger final hole diameter. This will often help reduce the chances of paint chipping, etc. Then, use a larger (hand-held) bit (or a reamer) from the back side to 'hollow out' the back of the hole just enough to allow the tip of the new LED to extend out the front of the front panel to the same extent as that of the red LED. If the green LED is allowed to protrude a bit farther than the red LED, it will be more readily noticed as you use the device in a normal working environment.

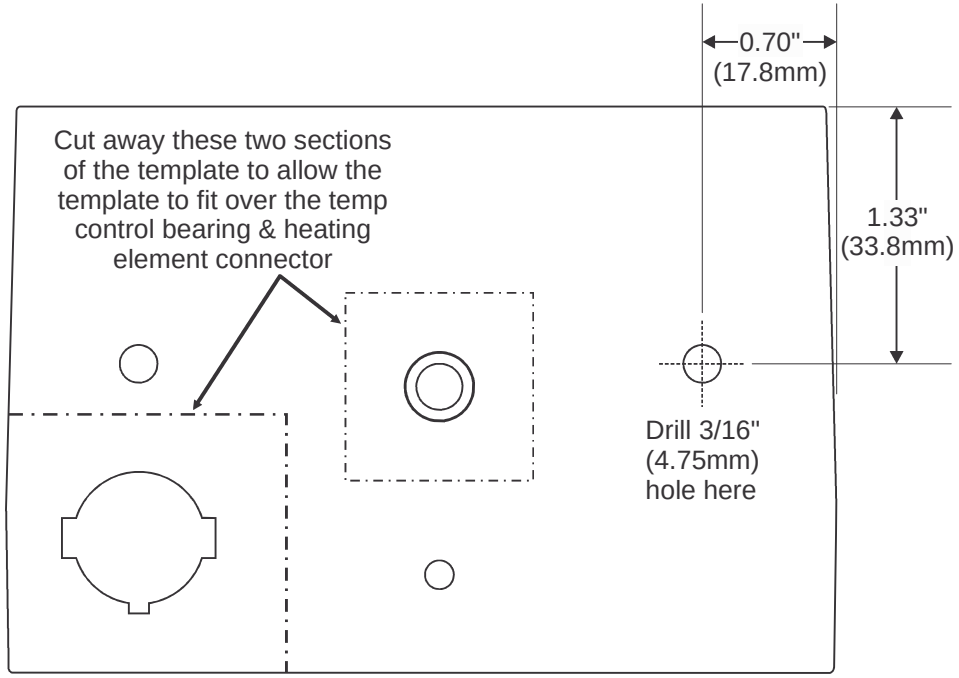

Figure 1.
HAKKO 936-X T/C Soldering Station Front Panel
(Viewed from the FRONT SIDE)

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Figure 2. Hakko 936-x PC board preparation
(as viewed from the *SOLDER SIDE* of the PC board)

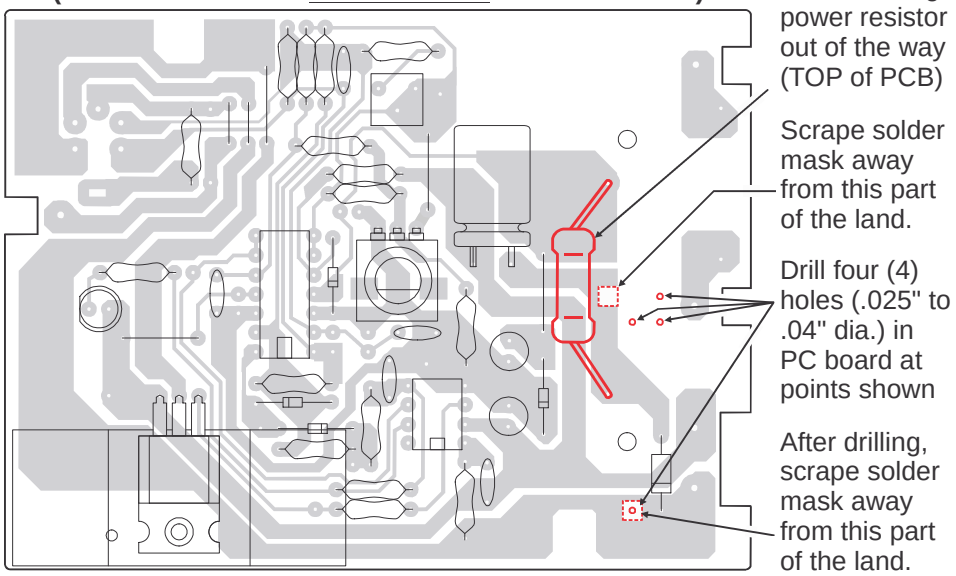
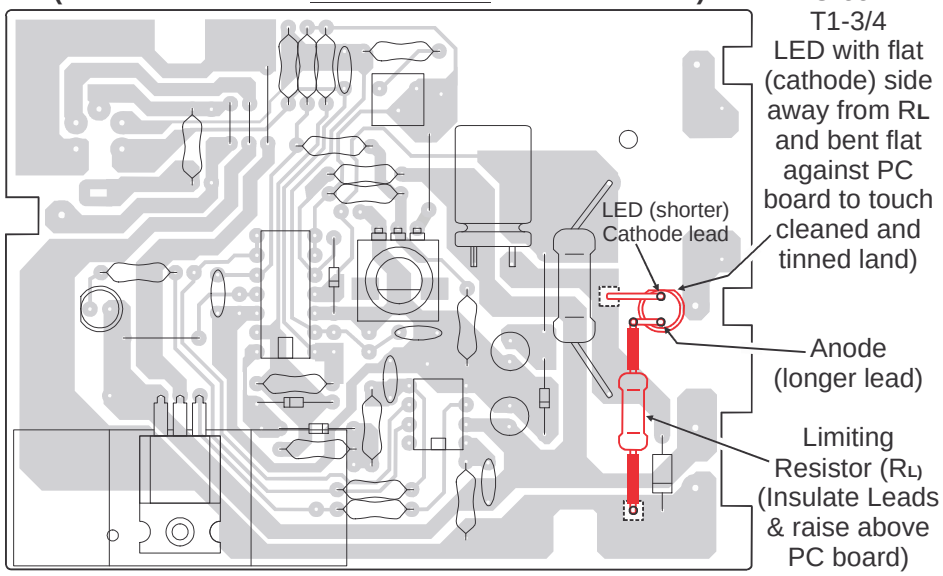
Figure 3. Hakko 936-x PC board - New Components
(as viewed from the *SOLDER SIDE* of the PC board)