Swiss Army Knife Rev A PCB Corrections

1. In production of Rev A PCBs, one row of pins (20 to 38) on the ESP32 socket was reversed.
2. The tracks from Relay 2 to the front panel connector were also reversed.
3. Opamp units A, C & D may oscillate under some circumstances.

Rev B boards are not affected.

Rewiring pins 20-38 of the socket is the most straightforward means of rectifying the problem.

1) Remove the top left (GND) pin 20 from the ESP32 socket OR, on the ESP32, cut off the CLK pin.

   Cutting the connector at pin 20 and de-soldering the pin is a straightforward way to achieve disconnection.

   Pin 26 (IO4) is also grounded, but unused. There is no need to disconnect this pin from GND.

2) A small hole will be needed to pass the wires on the component side through to the silkscreen side of the PCB, as the ESP32 socket prevents the wires being connected to the socket on the component side.

   The hole can be placed between pin 20 and the power socket, slightly away from the centre of the PCB.

   A 2.5mm hole should be adequate if wire wrap wire is used. 4 or 5mm may be required for hook-up wire.

3) Cut the copper of all the tracks leading to the inner row of the ESP32 socket at the points marked X in the diagrams.

   There are two on the silkscreen side, and three on the rear.

   On the silkscreen side, the cuts should be made as close to the socket as possible to avoid visibility when the PCB is mounted in the case.

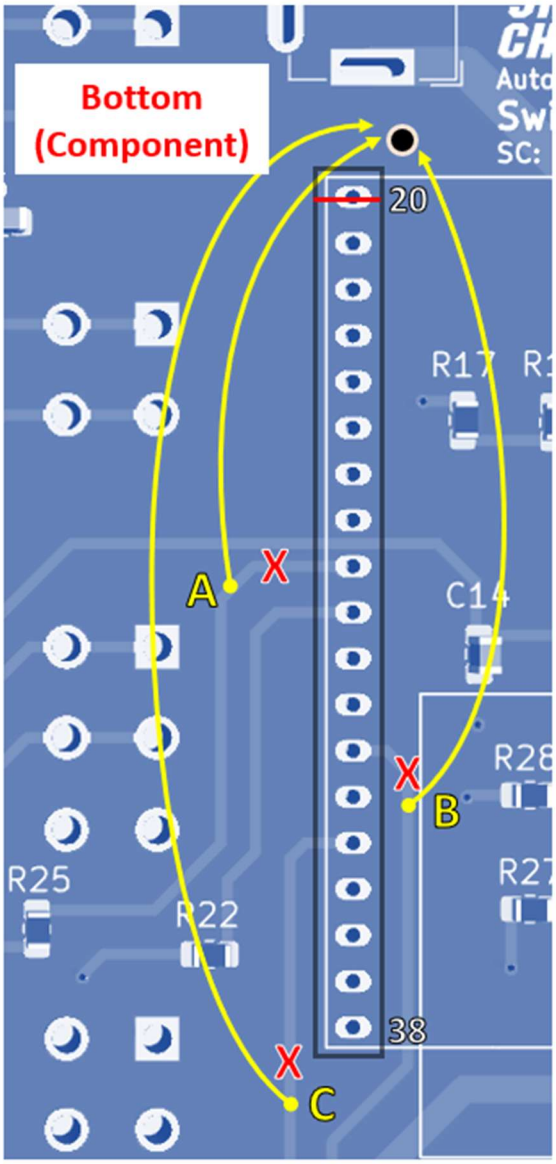
   DIN_LED1 (pin 29) does NOT need to be cut or re-routed.

   Rewire all five signals to the correct pins, using fine hook-up or wire-wrap wire.

   On the silkscreen side, route the wires away from the centre of the PCB, so that they are not visible when the PCB is mounted in the case.

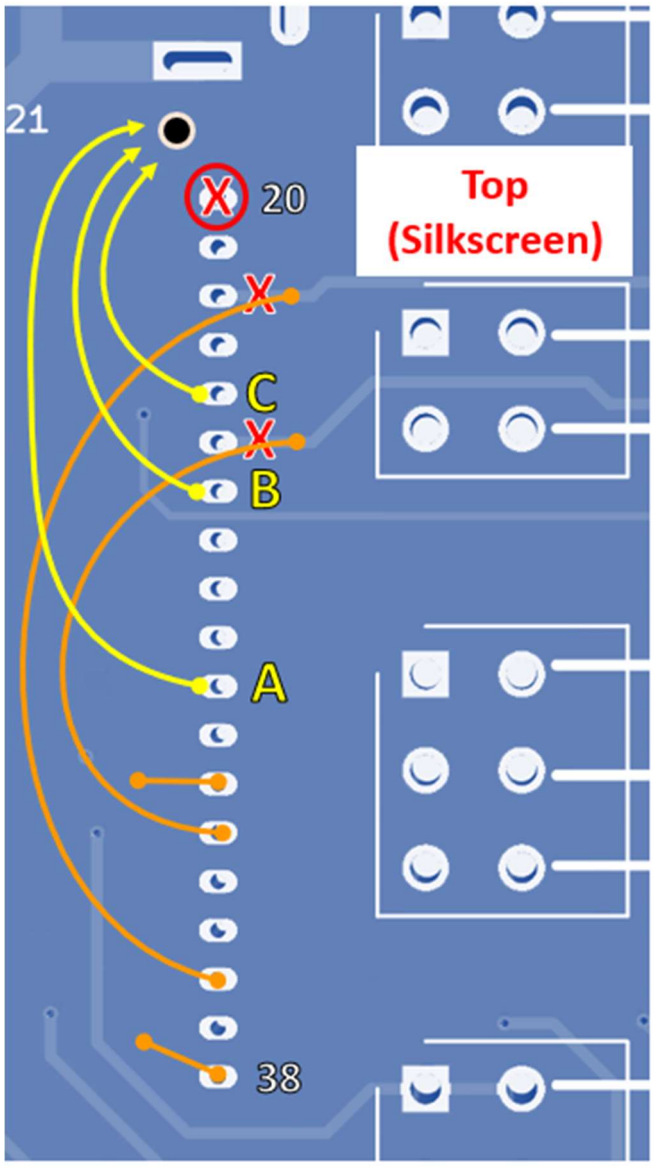
4) Connect pins 32 and 38 (ESP32 GND2 and GND3) to the ground plane.

The PCB views have been rendered in blue to improve clarity.



Cut the traces at the X marks and connect wires at A, B & C which pass through a small hole drilled between pin 20 and the power socket.

Cut the ESP32 socket at pin 20 and remove the pin.



Cut traces at the X marks and rewire SDA and SCL on the silkscreen side of the PCB, keeping the wires away from the centre of the board.

Connect the wires from the other side of the board to the ESP32 socket pins at A, B & C.

Remove the pin from the socket at pin 20.

Connect pins 32 and 38 to GND.

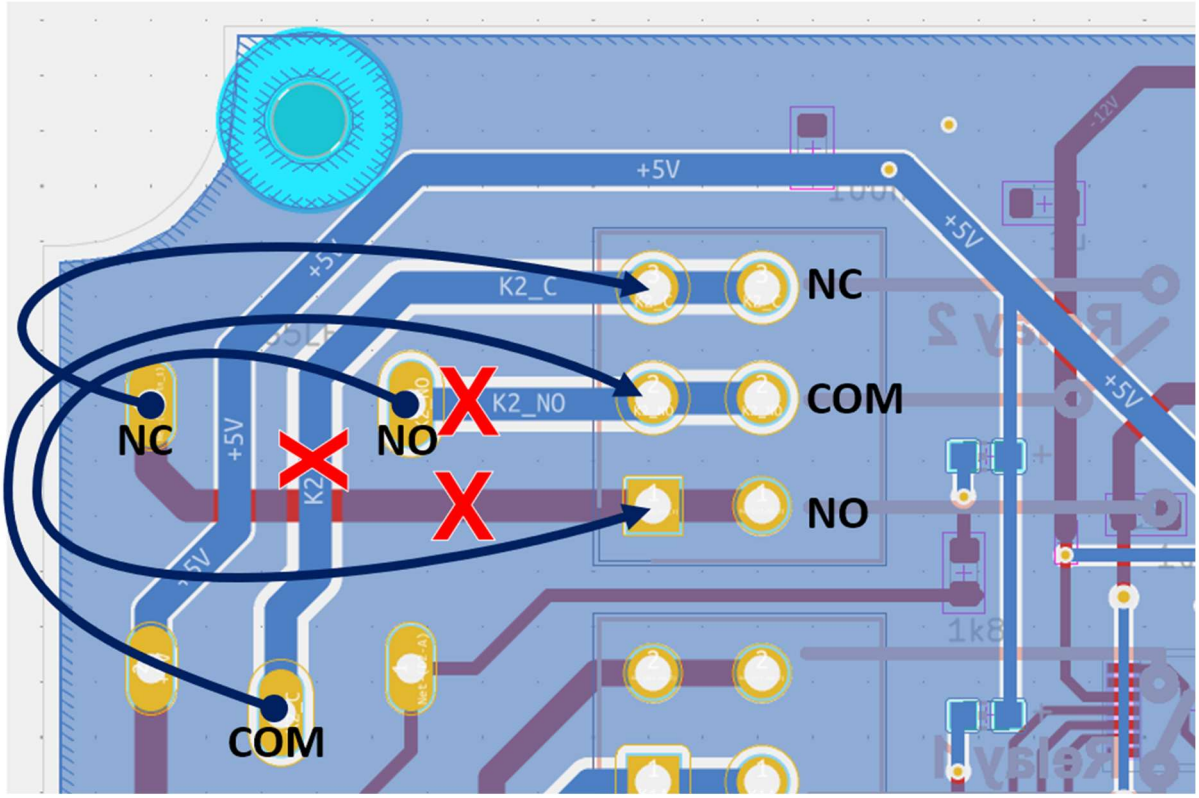
Relay 2 contacts

The contacts of Relay 2 were transposed on Rev A PCBs.

The issue can be corrected by cutting the tracks on the PCB and creating wire bridges to the correct terminals. Keep the cuts close to the relay pins so that the changes are not visible in the front panel cut-out.

It is recommended that hook-up wire is used to bridge from the relay pins on the silkscreen side to the backs of the connectors on the component side.

The issue has been corrected on Rev B PCBs.



Component side view.

The tracks are cut between the relay pins and the front panel connector – two cuts on the silkscreen side and one on the component side. On the silkscreen side, ensure that the cuts are made close to the relay pins so that they will not be visible in the finished unit.

Hook-up wire connects the relay pins to the front panel connector, looping around the edge of the PCB. Looping around the top of the PCB may interfere with the case.

Updated program

A revised binary is available at https://github.com/palmerr23/SwissArmyKnife/

Opamp oscillation

Under some circumstances Op amp units A, C & D can oscillate at a frequency of approximately 1 MHz. 100-270pf capacitors should be added in parallel to R12, R18 and R29.

C17, C18 and C19 have been added to Rev B PCBs.