In this edition I'll detail how I repaired the headphone jack on a Roland M-DC1 sound module. The headphone jack was physically loose, and didn't work. I suspected a couple of potential faults:

1: The socket connectors were no longer making contact with the PCB tracks;

2: the headphone socket had been inadvertently connected as an input, destroying the internal amp IC.

The main PCB is accessed from the top of the unit. The top panel is held on with eight small, self-tapping(!) screws. Facing the front of the unit, removing the top panel exposes the following components (from right to left): The mains power input/filtering/switch board; the transformer; rectifiers (there are at least two full bridge rectifiers); smoothing caps, and main/sub-board assemblies which also contain the DC regulators. The front vertical panel is connected to the main/sub boards with soldered ribbon cables.

In order to access the track side of the main PCB on which the headphone socket is mounted, it's necessary to remove the entire main/sub board assemblies.

I didn't want to remove the top sub-board screws until I was ready to remove the entire assembly, so I decided to remove the screws in approximately the following order:

1: Remove the main board screw by the by the smoothing capacitors;

2: remove the nut/spring washer to the rear of the unit, which holds the 78xx regulator heat sink to the case;

3: remove the three screws in the rear wall of the unit which secure the rear of the main board and the output/MIDI jacks;

4: remove the screws underneath the unit toward the front. There are four, three securing the front panel and one which holds the headphone jack/volume control bracket in place. Remove the volume control knob and move the front panel forward;

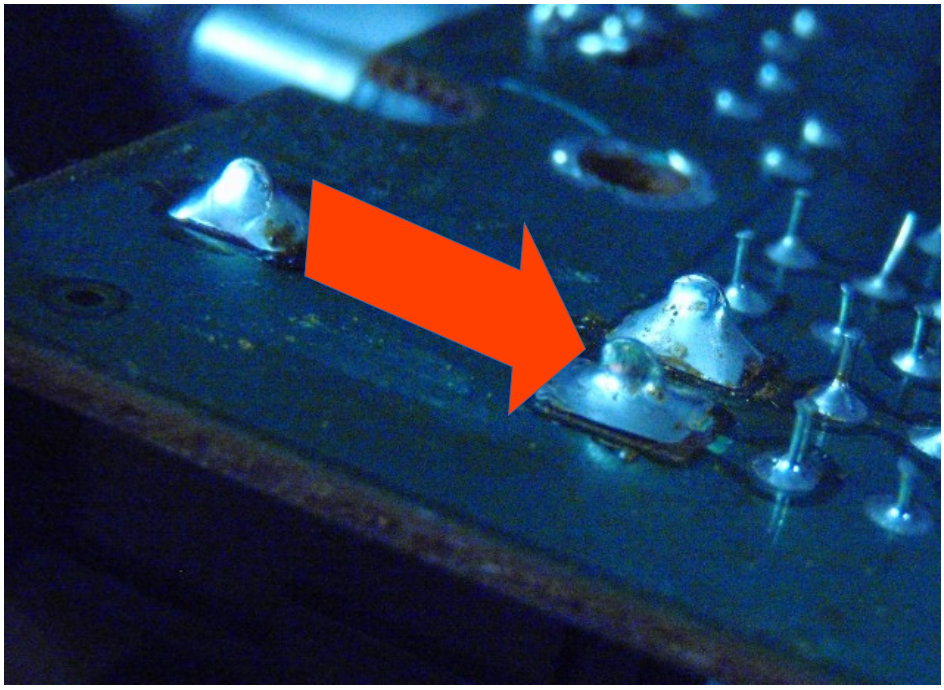
5: remove the nut holding the volume control to the bracket, then remove the sliding clip from the front of the headphone socket;

6: remove the machine screws which hold the sub-PCB in place above the main PCB. Lift the sub-PCB out the way to provide access to the main PCB;

7: remove the remaining machine screws on the main PCB.

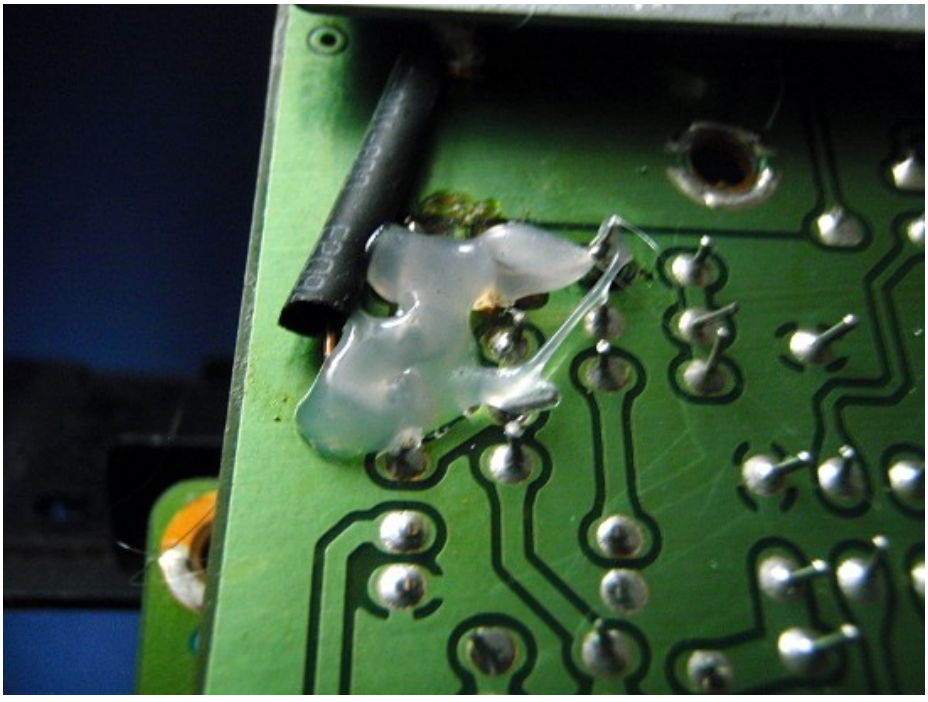
The front panel can then be pulled forward and lifted slightly to give space. The main board then needs to be carefully lifted above the captive bolt to which the nut/spring washer fastens. When this is done, it can be pulled forwards slowly. Fold the main PCB, the sub PCB and the front panel upwards as one, and over itself backwards toward the rear of the case to reveal the lower side of the main PCB tracks.

The headphone jack connectors can be seen toward the upper left part of the (now upturned) main PCB. The L/R jack connections on my unit had become completely detached from the PCB tracks, and although the GND connection seemed to be intact I decided to rebuild/re flow all three connections. The connections, as I found them, are shown below:



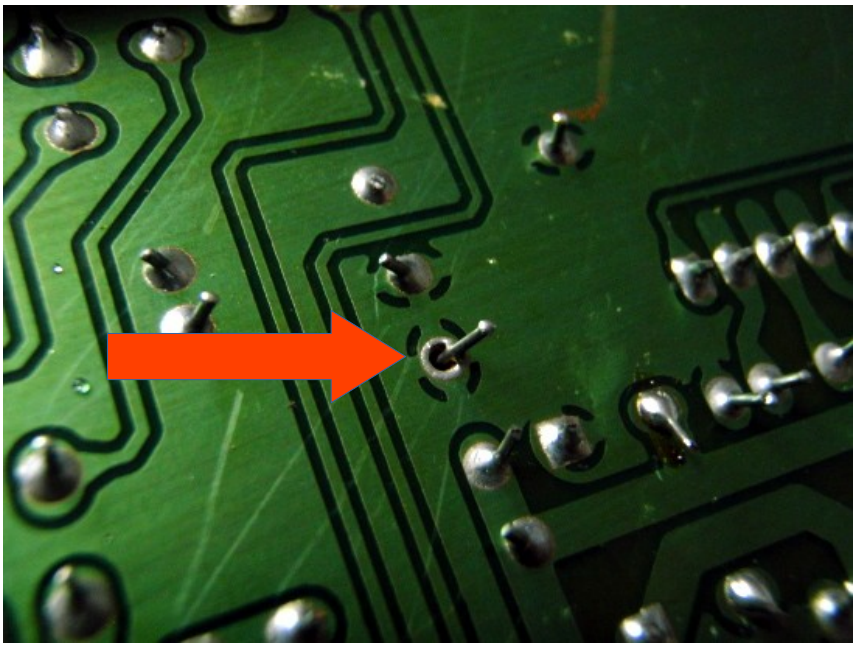
Above: *The L/R connections, indicated, detached from the main PCB*.

I decided there was a risk the large L/R PCB track pads may bridge the surrounding gaps, so I removed these completely. I then remade the paths using thin, solid core copper wire to bridge the jack connections with their previously connected component on the board. Finally, I applied a thin layer of hot melt glue in order to provide some additional physical security to the legs of these components and the new track repairs. First the PCB-side:



Above: *Hot melt glue thinly applied to the PCB and new tracks*.

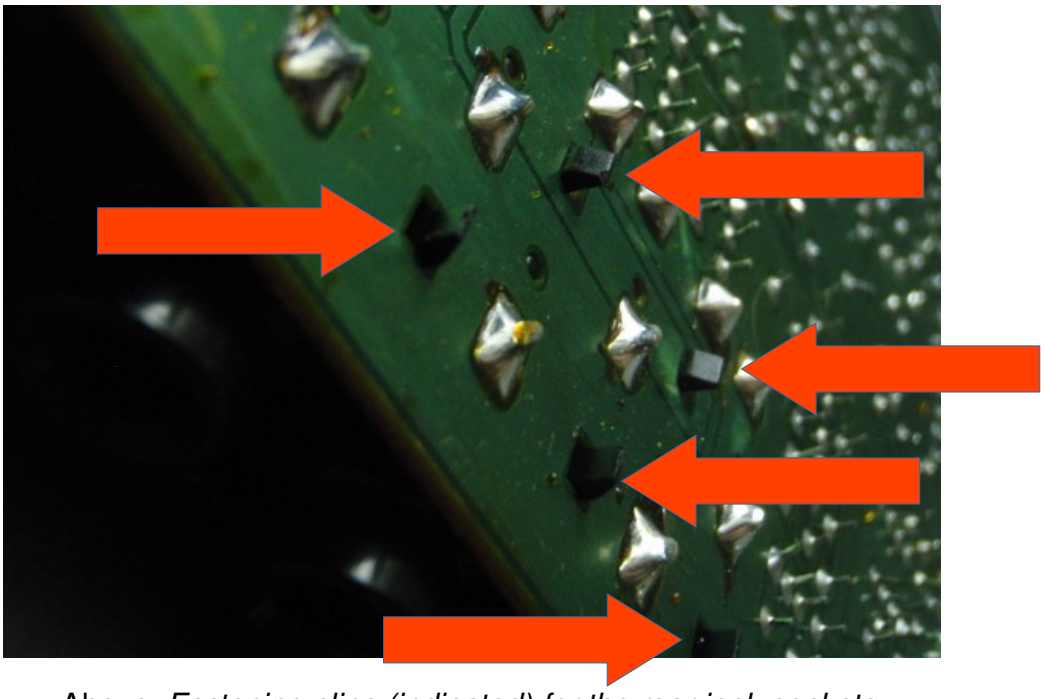
I noticed the GND connection of C123 was unsoldered, so I decided to solder it. It originally presented as in the picture below:



Above: *Unsoldered/badly soldered C123 GND connection*.

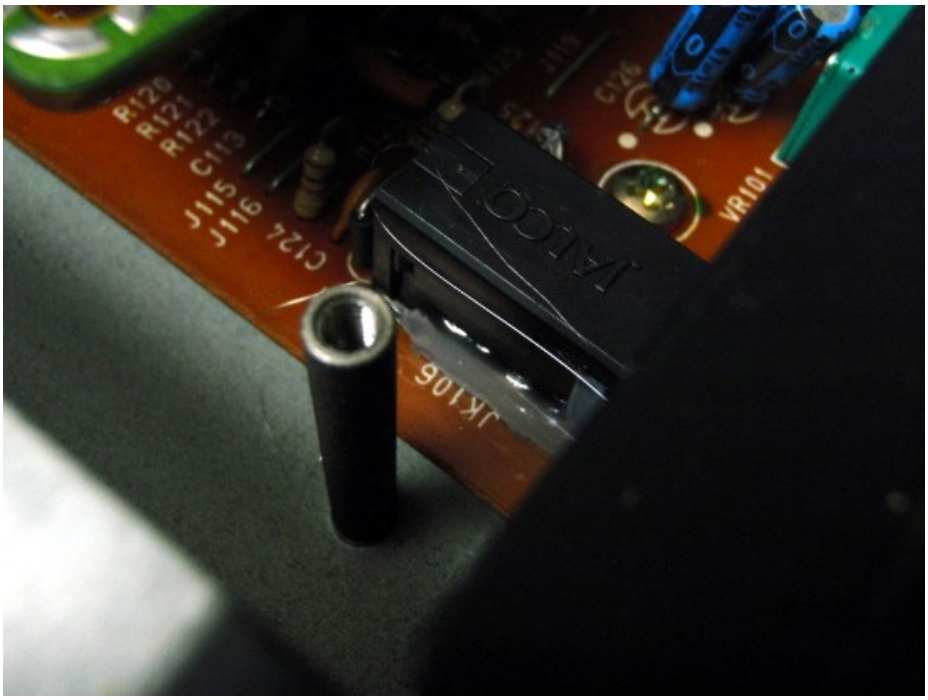
C123 appears at first glance to be a decoupling capacitor for one of the positive supplies to a C4570HA op-amp. It probably isn't absolutely essential, but it is important and it's present so it should be soldered.

I noticed the jack sockets to the rear of the unit had clips fixing them to the PCB. The headphone socket doesn't have these clips, and they're shown below for reference:



Above: *Fastening clips (indicated) for the rear jack sockets*.

Reassembling the system is, as the saying goes, the opposite of removal. Before refitting the sub-PCB, I added some more hot melt glue along the upper sides of the headphone connector edges:



Above: *Additional hot melt glue along the edges of the headphone connector*.

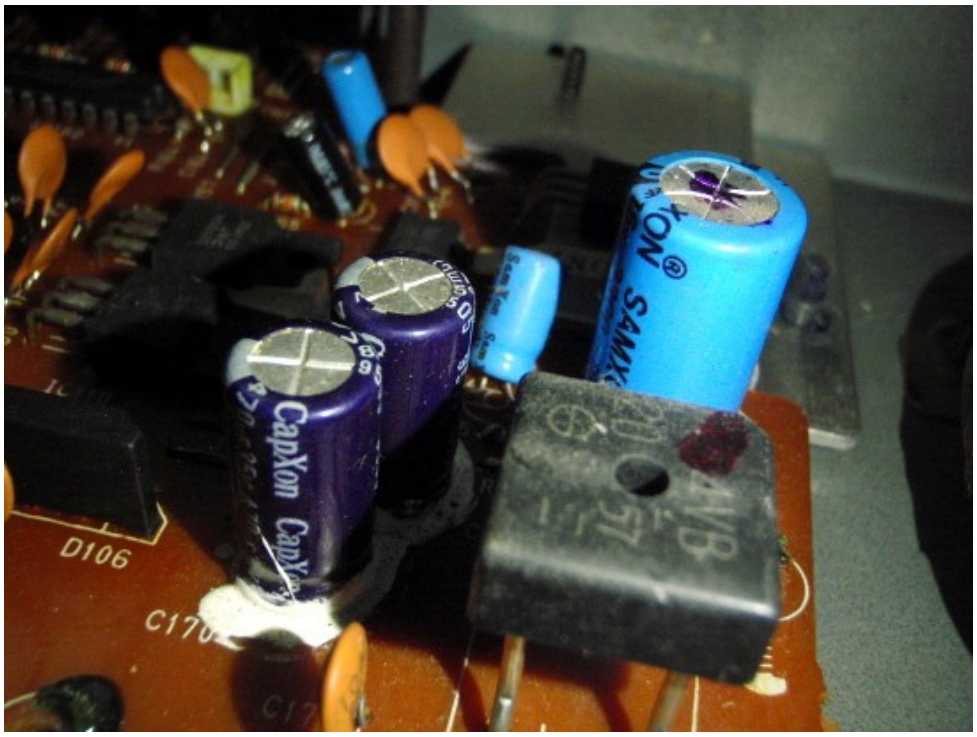
Final thoughts

I don't know why Roland decided to use two different jack socket types. I would have thought the design found at the rear (for the outputs) would have been a significant improvement over the headphone socket design, as the clips in the rear types provide additional holding force to the main PCB. I assume the headphone socket possibly fits into two main use-cases: Either it doesn't get used at all (in which case it's not very important), or it gets used a lot. The sheer size of the component suggests it could use all the physical anchoring possible, and the rear connectors show that such a design not only exists but is known to the manufacturers. Why, then, isn't this used for the headphone socket?

The unit has a mains power switch, so it can be switched off. This is good, as so many synthesisers/effects units don't have one. Not having a mains switch means the electronics are continually powered as long as the mains cable is plugged in/switched on, meaning the powered-on hours of the equipment can be orders of magnitude higher than the duration the device is actually in use (not to mention the energy wastage). This puts unnecessary wear on components in a way which is totally avoidable, had the designers added a half-decent mains switch at a small additional increase to the overall BOM.

This unit contains the mysterious CapXon/SAMXON electrolytic capacitors which have since been faked into oblivion. I've no reason to doubt the authenticity of the components in this particular unit, and I didn't replace them as I don't have the correct (or compatible) values. They don't show any physical signs of failure and the unit doesn't seem to get unduly hot, as I might expect from a regulator having to work harder to overcome

shorted electrolytics. These capacitors are shown below:



Above: *CapXon/SAMXON electrolytic capacitors, behind a rectifier*.

Finally, as it can be difficult to find suitable replacement transformers for 1U equipment, I've included a picture of the transformer in this unit for future reference. The markings are "00785801 KRT-18D-A-004S2 K5X2AT KITAMURA KIDEN". The transformer is shown below:

Above: *Transformer, showing markings for future reference*.