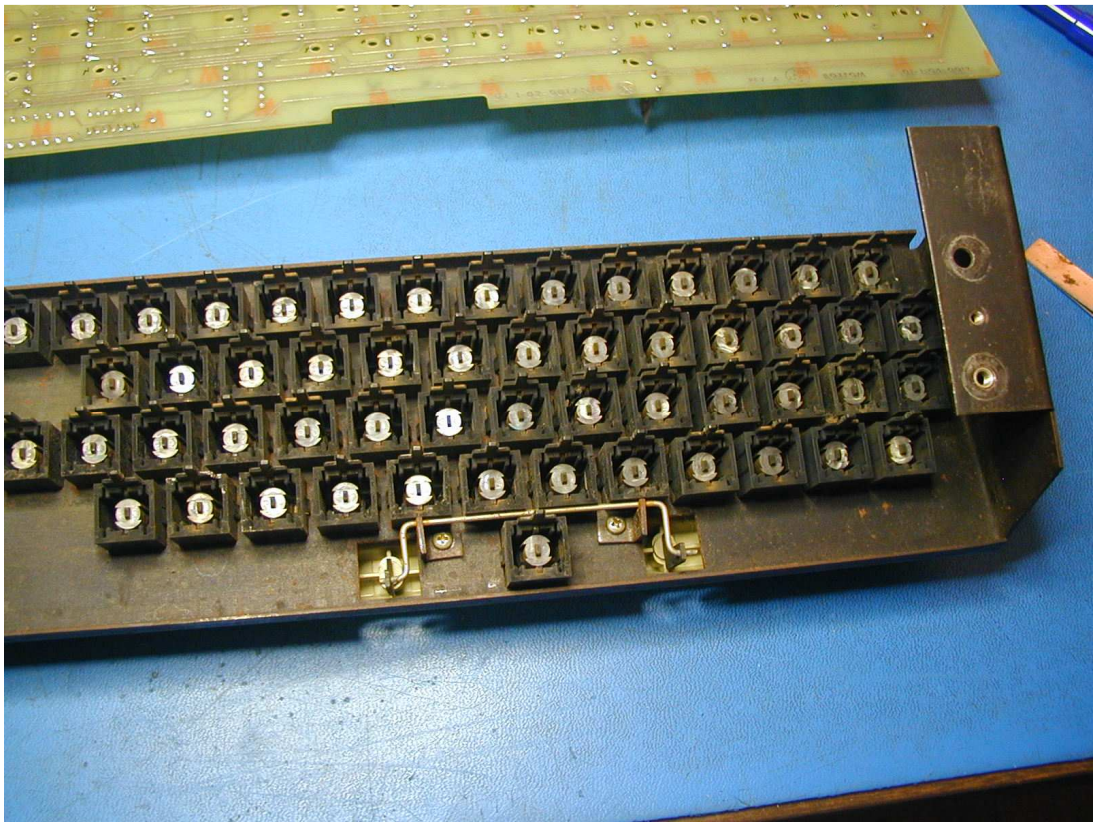
Datapoint 3300 Keyboard disassembly/reassembly tips. R Grieb July 18, 2022

The instructions for taking the keyboard apart in the service manual did not apply to the keyboard in the unit with serial #1030. This is an early unit. Here is what I worked out:

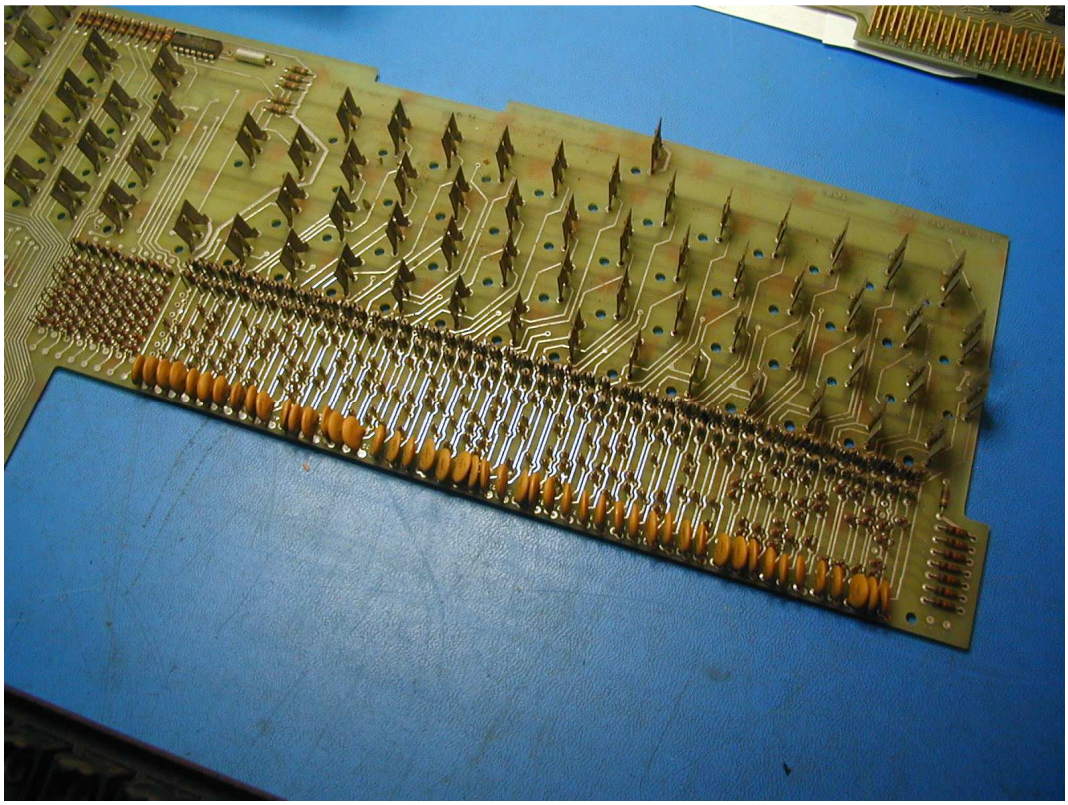
The keyboard in this unit had two problems. The first is that all of the round rubber pads under the key caps had dried out and crumbled. Only three were still complete, and they were no longer soft. The second issue is that some of the reed switches were no longer working. The glass on one had broken, and another had gotten corroded and was always closed. Several others were no longer closing when the key was pressed, which I think was due to their magnets getting weaker. To address these issues it was necessary to disassemble the keyboard.

Here is how to do it:

1) Unplug the keyboard connector and unscrew the power switch mounting bracket as well.
2) Turn the keyboard over and put a mark on the pcb next to each of the small nuts, then remove them.
3) Lift the pcb away from the key frame until it's clear, then slide it out and remove it. Here is the key frame from the back with the pcb removed:

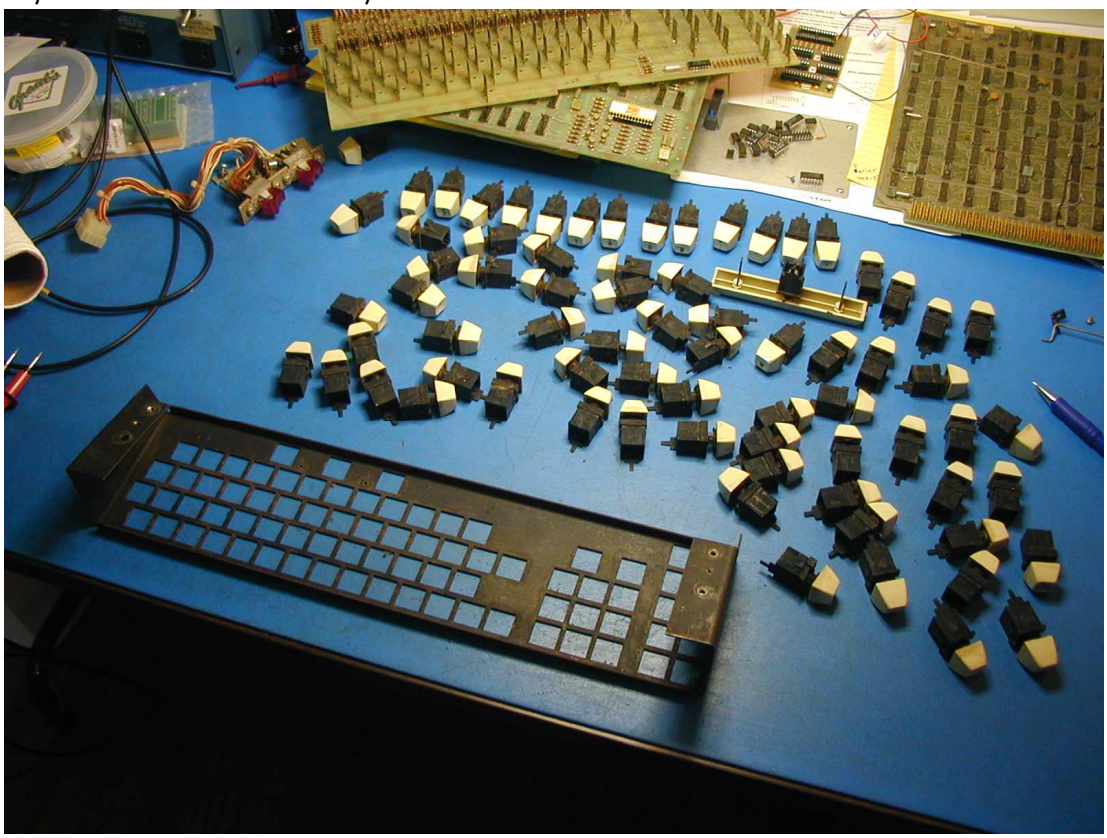


And here is the pcb showing the reed switches mounted vertically and the diode matrix for encoding each switch:



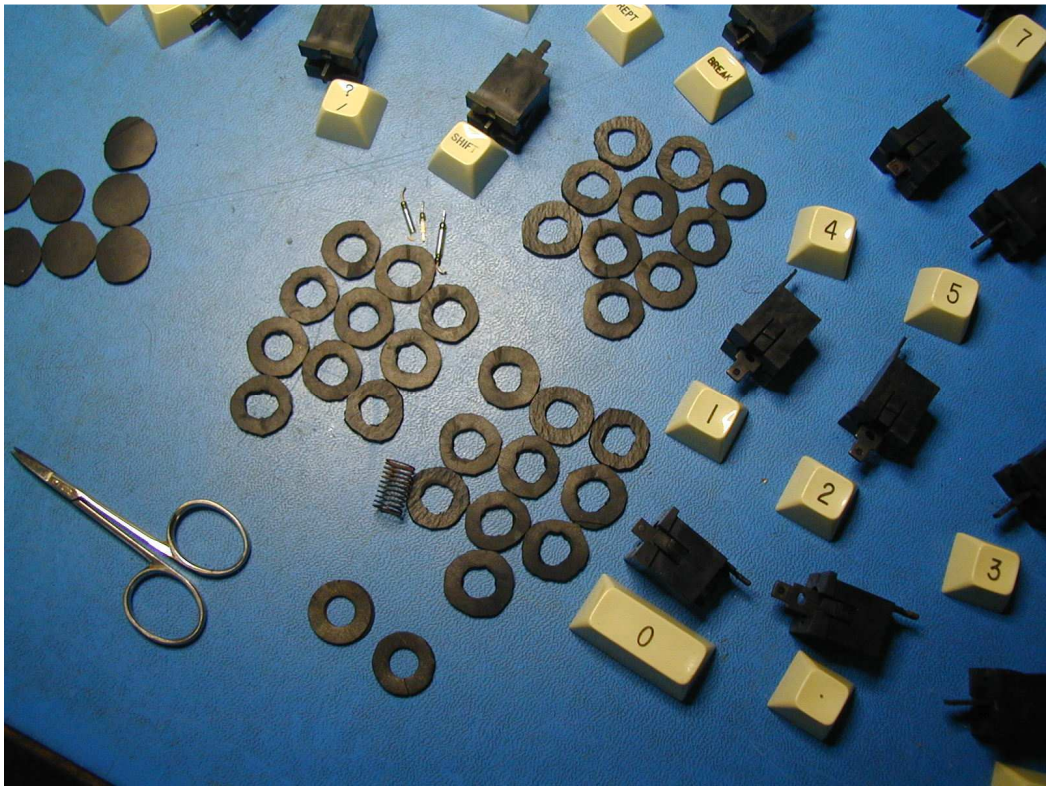
The reed switches can now be inspected and replaced if necessary. The top wire is welded to the metal bracket, but can be separated with a pair of sharp diagonal cutters. The new switch can be soldered instead.

4) To replace the rubber washers under each key, you will need to remove the key caps. In my opinion, the best way to do this **safely** is to remove the key plastic holders from the keyboard metal frame. The holders snap into square cutouts in the frame, and can be released by carefully pressing in on the snaps on the underside of the keyboard frame. With a small screwdriver, push one of the snaps in, then rock the plastic holder a little to hold that snap in, and push the snap on the other side in to release the plastic holder, which can now be removed carefully from the keyboard frame. There are 75 keys, so removing all of them will take a little time, but I think it's the best plan. If you try to simply pull the key caps off without first removing the key holders, something may break, as they don't come off easily. Here are the keys after removal from the key frame:



5) I labeled the black plastic key holders after cleaning them, so that I could keep them together with their key caps. You can write on the plastic with a pencil.
6) Each key consists of a key cap, the rubber washer, a small spring, a metal actuator with a magnet on it, and the black plastic piece that holds the actuator and snaps into the frame. To install new rubber washers, it is necessary to remove the key caps. To do this safely, I pressed down on the key in its holder, to expose the bottom three small metal tabs on the actuator. I placed these three tabs into the jaws of a small vise, so that the actuator was held firmly, with the key cap facing up. Next I pried up with two small screwdrivers, one on each side of the key cap, between the bottom of the key cap and the top of the black plastic holder. Quite a bit of force was necessary to remove the key caps, but I got them all off without breaking anything.

7) I did not find any suitable washers to buy, but I had a scrap section of a tractor tire inner tube that was soft rubber and the right thickness. Using a pair of curved fingernail scissors I cut out new washers for all of the keys. Some sort of hollow punch for the inner hole would have done a much neater job, but I didn't want to wait for one. Here are some of the new washers:



8) Some of the reed switches no longer worked and needed replacing. I bought three different parts with different sensitivities from Digikey, and tested them against the original switches. The part that I ended up deciding was the closest was "ORD 228VL/20-30 AT". Digi-key part number 374-1274-ND. This switch is a little longer than the original one, so I placed it a little further from the pcb to try to match the key position where the switch first closed.
9) When pressing the key caps back onto the actuators, look at the end of the actuator that goes into the slot in the key cap. You will see that it has a small round raised bump on one side. If you look at the slot in the key cap, you can tell on which side this bump was placed previously. I suggest placing the actuator so that the bump matches its previous position. Each black plastic holder has a small plastic tab that fits into a hole in the keyboard pcb. Some of these tabs have nuts on them, but many do not. The tab always faces the top of the keyboard. I suspect that all of the black key holders are identical, but I kept them together with their key caps just to be safe. I did not keep the actuators or the springs together with their original keys. I placed the actuators in the small vice (as before) when pressing the key caps back onto them, as this took a lot more force than I wanted to apply to 50-year old plastic parts. I added a very small amount of silicone grease to the slots that the actuators ride in, to make the key travel a little smoother.

The keys are still not as smooth as modern keyboards, but maybe that's how they always were. Also, there is no "snap" action as many modern keyboards have.

10) Final testing of all keys revealed that three of the four cursor keys were not working. I checked the pcb traces and everything looked good, so I installed new reed switches. Checked them before reassembling with a test magnet. Unfortunately, they still did not work with everything back together, so the magnets for these keys must be too weak to activate them. I installed a slightly more sensitive reed switch (ORD 228VL/15-20 AT) in these three positions, and that fixed two of them. So I installed an even more sensitive switch (ORD 324/10-15 AT) for the right arrow key and that got it going as well. Clearly these magnets are weaker.