Z-100 LifeLine
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March 2022

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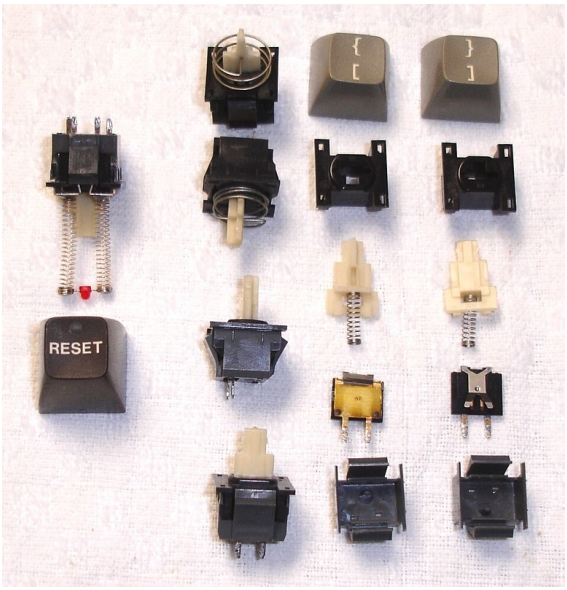
This article was first published in issue #33, June 1994



Z-100
Keyboard Key Repair

by Steven W. Vagts
Editor, "Z-100 LifeLine"

Keyboard Key Repair

One of the most common and frustrating problems encountered with the Z-100 series computer is with the keyboard. It seems that all of them eventually have a key that no longer functions, or gives multiple characters when pressed. Cleaning is also a challenge and can cause problems if not done very carefully.

Fortunately, there is an inexpensive fix for malfunctioning keys that has a 90% or better success rate. The fix is easy, but does require soldering skills, and a whole lot of patience. Also, set aside a few hours of uninterrupted work as this involves disassembly and reassembly of the computer. A fancy desoldering gun is not required, as a squeeze bulb or desoldering braid works nearly as well.

Tools (in addition to those needed to disassemble the computer):

- Vacuum cleaner
- Small, 1" or less, paint brush
- Ohmmeter
- Soldering gun (or iron) and solder
- Desoldering squeeze bulb, or desoldering braid
- Two metal paper clips
- Dental pick, if available
- Small jeweler's flat blade screwdriver
- Small needlenose pliers

Disassemble the computer in accordance with Chapter 1 of the Z-100 Users' Manual or as shown in the "Repair and Modification" page of our "*Z-100 LifeLine*" website. Stop when the keyboard can be removed from the computer.

Disconnect the two ribbon cables attaching the keyboard to the motherboard at the motherboard. They just pull straight up, but may require some gentle prying at each end. Remove the keyboard.

Though the keyboard need not be removed for cleaning, now is a good time to do that.

CAUTION: DO **NOT** spray the interior of the keys with any kind of cleaner or lubricant such as WD-40. The cleaner or lubricant will leave a film that will damage the key's delicate interior.

Using the paint brush to loosen stubborn dust and the vacuum cleaner, vacuum the top of the keyboard, concentrating on the area under the key caps. Using a terry cloth or hand towel, soak a small section with a strong cleaner. I find 409 is excellent. Carefully, rub the top and around each key individually. Do **NOT** spray the keyboard with any cleaner, as it may get into the key interiors.

Noting the location of the malfunctioning key or keys, select the solder lugs that belong to those keys. Place the keyboard, inverted, on a towel on the work table.

Remove the solder completely from these lugs using a desoldering gun, desoldering squeeze bulb, or desoldering braid, until the lugs move freely in their holes.

Invert the keyboard again (keys up) and remove the key caps of the malfunctioning keys. I find that an the 'U' shaped IC (Integrated Circuit) puller works best. But you can straighten the ends of two paper clips and form a 1/4" hook on one end of each using the needlenose pliers. Insert them under opposite sides of the malfunctioning key cap and remove the key cap by pulling straight up, gently.

Photo 1 shows the view of a keyboard with a few caps missing.

Photo 1.
Keys Missing Caps

As you can see from Photo 1, the keys are mounted with a wing bracket top and bottom. To the sides are broad plastic catch levers that can be slid toward the key center with a flat blade screwdriver. The key will then lift straight up. The trick is sliding both levers toward the center at the same time, while lifting the key!

Figure 1, shows all this graphically. Study the revealed key switch. Figure 1(c) gives top and side views. On each side of the switch, and as shown by the arrows, is the catch lever that retracts toward the center post. With the small jeweler's screwdriver, press one of these levers toward the center post. Release it and it snaps back into place. The object is to retract these levers while pulling the switch gently from its socket - no easy stunt.

Pressing the solder lugs up from the bottom while pinching the levers together toward the switch's center post will usually work. An alternative method against a stubborn switch is to pry up on one wing of the switch by wedging a dental pick under it from the top, while pressing the lever of the switch on the same side to the center. Then do the same from the other side. Unless the key is on an edge, all work will have to be done from the top.

Once removed, the tough part is over. The switch is encased by a plastic cover on all sides except the top, which is separate. See figure 2. Clean off any remaining solder from the solder lugs as this case must be removed over these lugs.

Two sides of the switch case mate and interlock with the top cover. They can be carefully pried away from the edge of the top cover, first one side, then the other, and the case then slid down the solder pins and removed.

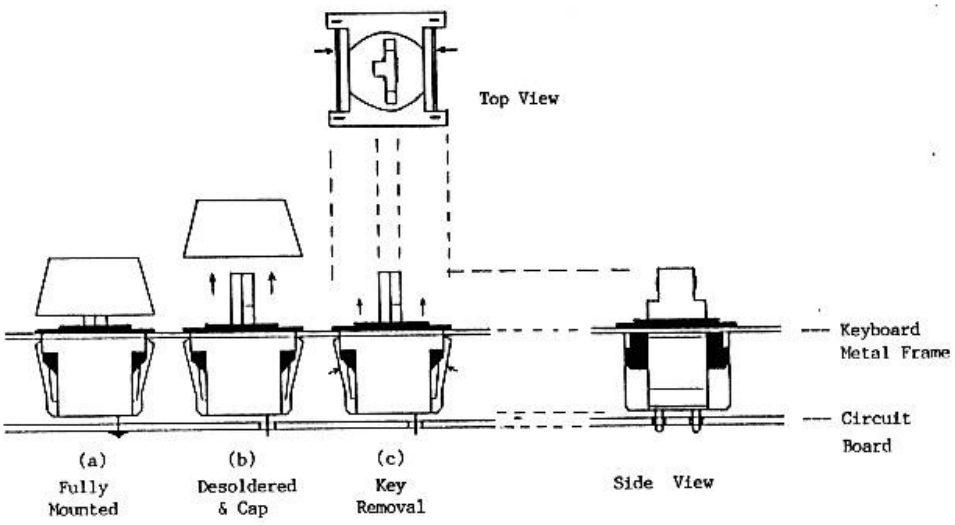


Figure 1.

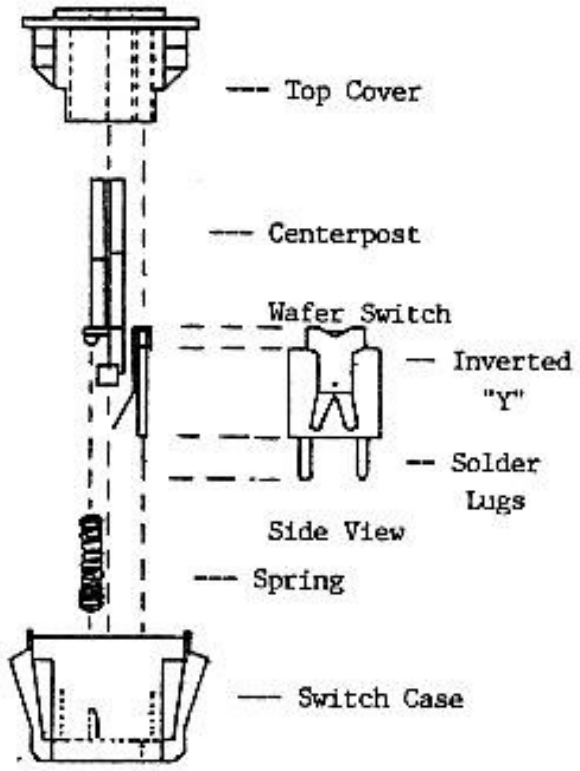


Figure 2.

As you can see from Figure 2, the remaining insides are simple - a spring, a center post slide and the wafer switch itself with the solder lugs attached. Examining the insides, the center post slides down when pressed, placing pressure against the metal inverted "Y" leaf spring that then presses against the body of the wafer switch.

In more than 90% of the cases, I have found that this inverted "Y" does not make firm enough pressure against the switch body to close the switch. To increase this pressure (unrelated to spring pressure) the bent angle of the inverted "Y" simply needs to be increased slightly.

Using a small pair of needlenose pliers, grasp the inverted "Y" at the free end side of the existing bend and increase the bend slightly. Bending too far will make the key feel stiff when pressed and, if exaggerated further, may even interfere with the spring, jamming the key.

It is easiest to assemble the key case from the top down, imagining an inverted Figure 2. Insert the white center post into the inverted top cover. Next insert the wafer switch itself, with the lugs sticking out and the inverted "Y" towards the center post. Pressing up on the center post should compress this inverted "Y" into the wafer switch. On the opposite side of the center post, insert the spring into the round recess. Finally, gently lower the key case over the solder lugs until the sides interlock with the edges of the top cover.

Before reinstalling the key into the keyboard, check the switch with an ohmmeter. Connect the leads of the ohmmeter across the solder lugs; the resistance should be infinity. Press the switch and the resistance should instantly drop to zero ohms. If it does not, recheck the assembly of the switch. The center post must compress the Y against the wafer switch.

If the switch is still inoperative, another can be ordered from "*Z-100 LifeLine*", or other remaining Z-100 hobbyists.

The switch is reinstalled from the top of the keyboard by aligning the solder lugs with the solder holes on the circuit board and pressing down until it clicks into place. The lugs are offset so the switch can only be installed in one direction. The key cap is simply pressed on. Solder the solder lugs to the backboard and you are in business.

Before reassembly, press the keyboard cables onto their motherboard connectors, connect an external monitor to the backboard or, in the case of the Z-120 All-In-One, gently place the monitor assembly onto the computer's base frame, without the bottom cover installed, and connect the power cable to the vertical video driver board on the left side. Do not worry about the drives' data or power cables. You just want to try the keyboard.

CAUTION: During the following test, All-In-One users MUST KEEP CLEAR of the CRT power cables, the CRT second anode (the thick single cable going to the top of the CRT) and the high voltage transformer on the vertical video board. Voltages at these locations are DANGEROUS.

Turn on the computer and at the hand prompt, press {**T**} for **Test**. Perform the keyboard test to ensure all keys operate normally. If not, fix these keys as above and retest.

Finally, reassemble the computer per the Users' Manual.

There are a few **special** keys, but the basic construction is the same.

The {**CAPS LOCK**} key is much more complex than a normal key. It is constructed with an additional leaf spring and a wire clip that, in combination with the special center post, keeps the key depressed until another tap releases it. The spring just beneath the key cap provides the key tension. The top of the spring fits in a hole about 1/2 way up the center post. See Figure 3.

The {**RESET**} key is also more complicated because it has a light emitting diode (LED) installed. See Figure 4. If this key fails, removal is the same as above, except there are four solder lugs - including two for the LED. The metal bracket fits over the top cover. If the ohmmeter test confirms failure, it is probably best to just order a replacement.

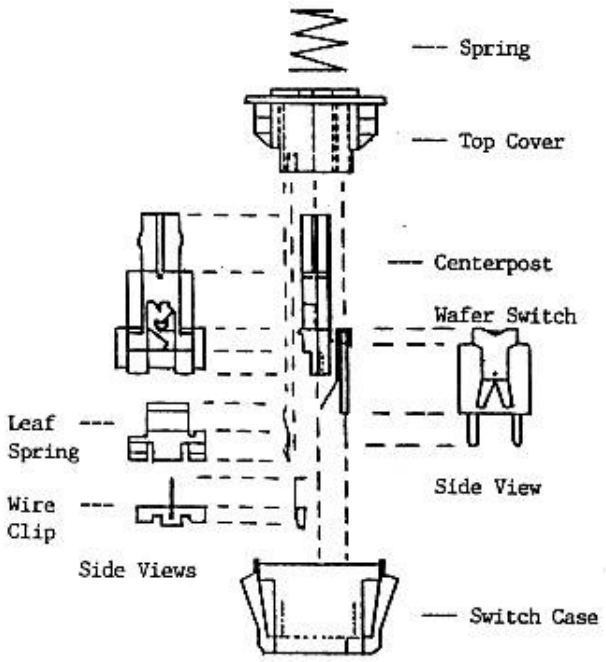


Figure 3.

I hope your keyboard now works well. I have had more than one where it had so many bad keys, I gave up and had to scrap the entire keyboard. I still have spare keys and keyboards at "*Z-100 LifeLine*".

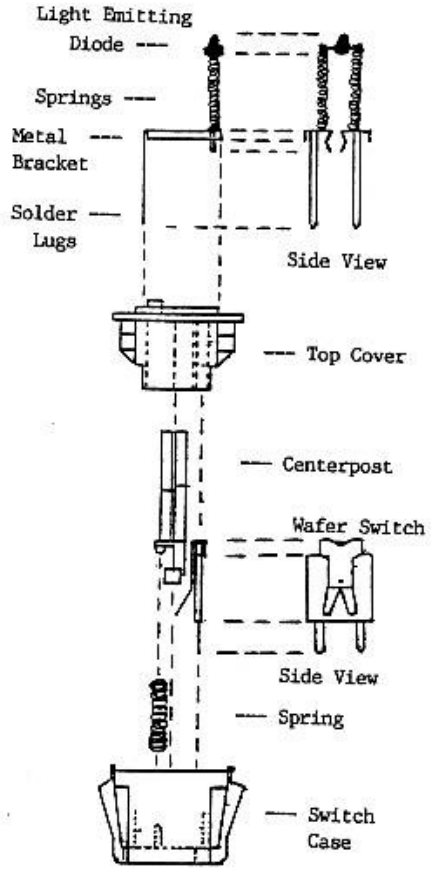


Figure 4.

If you have any questions or comments, please contact me at:

z100lifeline@swvagts.com

Cheers,

Steven Vagts