

SERVICEMAN'S LOG

Who mangled Duck's USB ports?

Nothing comes even close to computers when ranking gear that's stuffed by consumers. As a result, I usually try to avoid fixing them but niece Duck's computer was different.

I have a niece who, at the tender age of three, was nicknamed "Duck". Well, Duck stuck and now at the even more tender age of 16, she's still lumbered with that stupid name.

Recently, Duck's computer failed and who better to fix it than this little black duck? The complaint was that the computer was dead. Not even the power supply was starting up.

When the box arrived, I hooked it up and pressed the power switch. Nothing happened – it was as dead as a dodo.

This was going to be easy. After all, as everyone knows, if you press the power switch and nothing happens, it's just got to be the power supply. Yeah, right!

When I removed the side panel, I immediately spotted two obviously faulty electrolytic capacitors between the processor and the memory sockets. Both had bulging tops which were covered in a brown crust due to leaking electrolyte. Then I spotted two more identical capacitors with bulging tops and leaking electrolyte in another section of the motherboard.

So it was beginning to appear that it was a motherboard fault that was preventing the power supply from starting up. That's because, on an ATX machine, the power switch is connected to two pins on the motherboard and it's the motherboard that then starts the power supply (via the main connector) when the power switch is pressed.

The question was, was it just the capacitors that were faulty or had

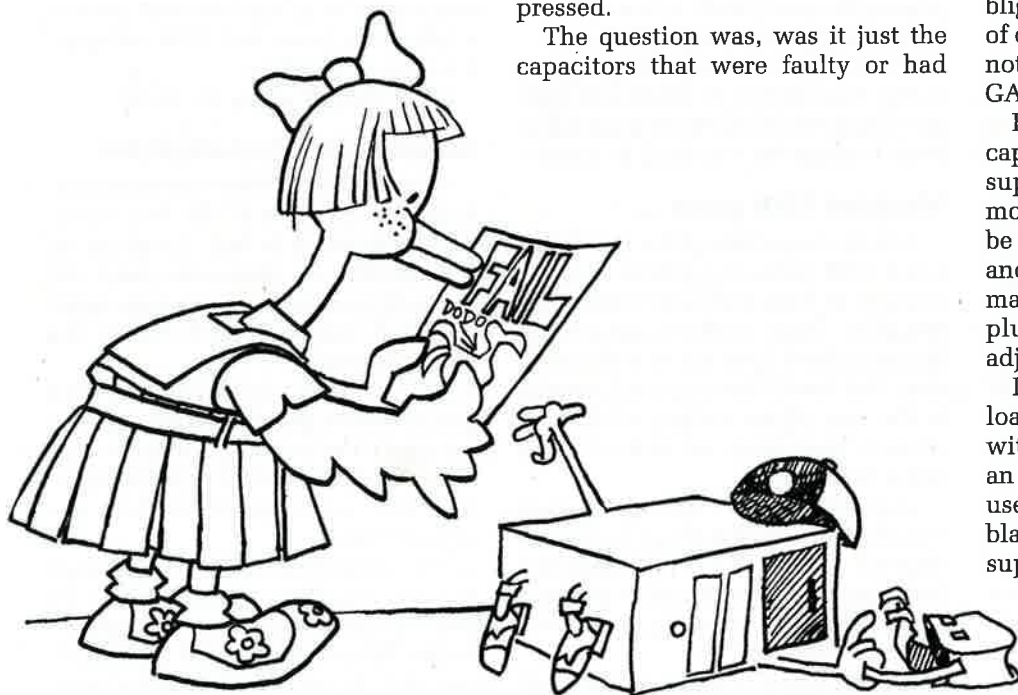
something else on the motherboard failed as well? There was only one way to find out and that was to replace them. If it worked, it worked. If it didn't, then the motherboard would be a "bin job".

I removed the motherboard and took a closer look at the leaking capacitors. They were all 3300µF 6.3V types branded "GSC". A quick Google of "GSC 3300µF" showed that these blighters have caused problems on lots of other motherboards over the years, not just on this 6-year-old Gigabyte GA-7VKML.

Before replacing the motherboard capacitors, I decided to test the power supply. When not hooked up to a motherboard, most ATX supplies can be started simply by applying power and shorting the green wire on the main connector plug (ie, the one that plugs into the motherboard) to an adjacent black wire (ground).

It's also a good idea to connect a load, as some supplies won't start without one. In this case, I connected an old floppy drive to the supply and used a paper clip to short the green and black wires on the plug. The power supply fan immediately burst into life and I was able to confirm that the +5V and +12V rails were present on the disk drive connectors.

Having cleared the power supply, I went back to the motherboard. Removing capacitors from



RECENTLY, DUCK'S COMPUTER FAILED...

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USING A HOT IRON WITH A FINE-POINTED TIP, I "WRIGGLED" EACH CAPACITOR OUT OF ITS MOUNTING HOLES

a multilayer board is never easy, as care has to be taken not to damage the tiny pads or any adjacent tracks. However, by using a hot iron with a fine-pointed tip, I was eventually able to "wriggle" each capacitor out of its mounting holes. I then used a needle which I heated with the soldering iron to clear the holes of solder before installing four new 3300 μ F 10V (105°) low-ESR capacitors into the vacant positions.

That done, I sat the motherboard on a cardboard box, plugged in the power supply and briefly shorted the motherboard's power switch pins. The power supply immediately started, so it looked like the problem was solved. All that remained now was to re-install the motherboard in the case, plug in all the cables and batten down the hatches – or so I thought.

Well I did that but when I attempted to restart the computer for a final test, it was as dead as a dodo again. What was going on? I'd fixed the faulty capacitors but there was obviously another fault lurking in the works somewhere.

I decided to see if I could make the problem go away by disconnecting each item in turn. It didn't take long

to nail the culprit. Disconnecting the supply connectors to the disk drives made no difference but when I disconnected the front-panel USB connector cable from the motherboard and pressed the power switch, the machine immediately switched on!

In fact, after reconnecting power to the disk drives, it booted straight into Windows and behaved normally. Duck's computer was back in action!

Mangled USB ports

A close inspection of the two front-panel USB sockets revealed that the contacts in both had been thoroughly mangled. These contacts usually lie flat on a plastic base but in both cases, they had been lifted up and pushed to the rear of the socket, so that all contacts were bent and shorted to the metal housing.

That also meant that the power supply contacts in both sockets were shorted to earth. The motherboard had been detecting this short and as a result, had been refusing to start the power supply.

In the end, the cure was simple – just leave the USB cable disconnected and seal the two faulty front-panel USB

connectors. Replacing them wasn't an option, as they are moulded into a fitting which also includes the front-panel audio output and microphone sockets.

It's not uncommon

Apparently, damage to USB sockets is not uncommon. In fact, when I mentioned it to a colleague, he immediately showed me a notebook computer with a damaged USB socket that had all its metal contacts sitting in mid-air (see photo). Another colleague had also encountered several computers with similar damage to USB sockets

It's probably due to the plug being forced upwards (or downwards) as some heavy-handed person "yanks" it out of the socket. When that happens, the plug acts as a lever and bends the plastic base inside the socket as it is removed. The base subsequently springs back into place but the metal contact strips don't and are left stranded in mid-air.

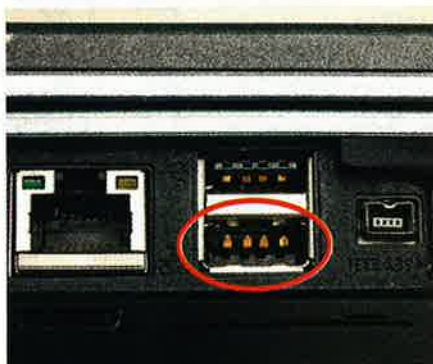
The next time someone attempts to plug in a USB cable, it won't fit because the ends of these metal contacts now butt against the plastic base inside the plug. Any attempt to force the plug in only mangles the contacts further.

In Duck's machine, someone must have applied considerable force to the USB connector because the contacts had all been bent to the rear of both sockets. Apparently, there are strong suspicions as to just who this person might have been but DNA samples have yet to be taken.

Duck should wring his neck!



These are the four 3300 μ F electrolytic capacitors removed from the Gigabyte GA-7VKML motherboard (all carried a “GSC” brand). Note the bulging tops and the leaking electrolyte.



This view shows a mangled USB port (circled) on a colleague’s notebook computer. Note how the pins are all sitting in mid-air.