Yamaha SY99 Keyboard Repair Procedure

Author

Derek Cook, December 2012

Purpose of Document

This document shows you how to remove the keyboard of a Yamaha SY99 to repair/replace keys.

Yamaha have used the same keyboard type in their professional synths since at least the days of the DX7, so whilst the dismantling instructions will be different for each synth, the work on the keyboard itself will be generic across many different Yamaha synths. I have performed key repairs on my
- EX5 (broken keys during over exuberance on rock finale glissandos),
- SY77 (broken key when my cat knocked my AN1x onto it!)
- SY99 (the Bb 4 key was sticking down)

And, as mentioned, all of the keyboards have been the same. The same spare keys that I have (purchased for the EX5) fit all of them.

You can get replacement keys from your local Yamaha service department. You need to of course specify the keys you want. Although I actually brought a complete set when I broke my first key on the basis that it would be handy to have spares to hand.

Disclaimer

Whilst I have taken care in preparing this guide, and whilst the repair worked fine on my SY99, I cannot be held responsible for any damage that you could do to your machine or injury to yourself and/or others as a result of you following these notes; either on your own account or by any error or omission in this guide. You do this upgrade entirely at your own risk!

Pre-Requisites

First of all, make sure that you're comfortable with the concept of dismantling your beloved SY99.

Keyboards are usually dismantled from the "bottom up", and you need to remove several circuit boards to get to the screws holding the back of the keyboard after undoing what seems like hundreds of screws, unplugging many cables. And of course disassembly is the easy part; you need to get it all back together again (hopefully with no screws left over) and in working order!

You will need the following tools to do this job:
- Posidrive and Jewelers' screwdrivers;
- An anti-static wrist strap is recommended;

You need to ensure that you take anti-static precautions whilst the synth is open. If you don't have an anti-static wrist strap, then ensure that you regularly earth yourself on a metal object, such as a radiator to prevent the build up of any static charge.

Electric Shock Hazard Warning

Be very aware that in opening the keyboard, and if it is powered whilst it is open, there will be exposed mains voltages on the power supply board and thus a risk of electric shock. This repair should not require the keyboard to powered on whilst it is disassembled. If you do power the synth on with the covers removed, then provided you keep your hands well away from the power supply board, then the odds of you getting an electric shock will be very small.

If you are in any doubt regarding your ability to work safely with a potential exposed mains voltage hazard, then keep the synth unplugged from the mains and do not power it on whilst doing this repair.

I'm mentioning this as I performed this repair on my SY99 whilst doing other work on the SY99 that required the synth to be powered whilst open.

Procedure

Step 1 – Backup your Data

As you are doing a lot of internal disassembly, as a precaution you should ensure that all of your important user data (Voices, Waves, etc.) is backed up to floppy disk, or via MIDI to computer.

Step 2 – Find a Good Work Area

You'll be working on this for a while, so find somewhere comfortable and where there's plenty of light. My kitchen was the best place for this in my house. Note the towels under the keyboard to protect the fascia.

References in this document to "top" and "bottom", "left" and "right", refer to you looking at the keyboard in this orientation of the base upwards and the back panel towards you.

Whilst on the subject of avoiding scratches, the next step is very important!

Step 3 – Remove Cat from Work Area

An [EX5Tech](#) pre-requisite in the guides we write, and a very important step if you wish to avoid being "scrammed"! And of course, cat hair is terrible for static, and it gets everywhere[1]!
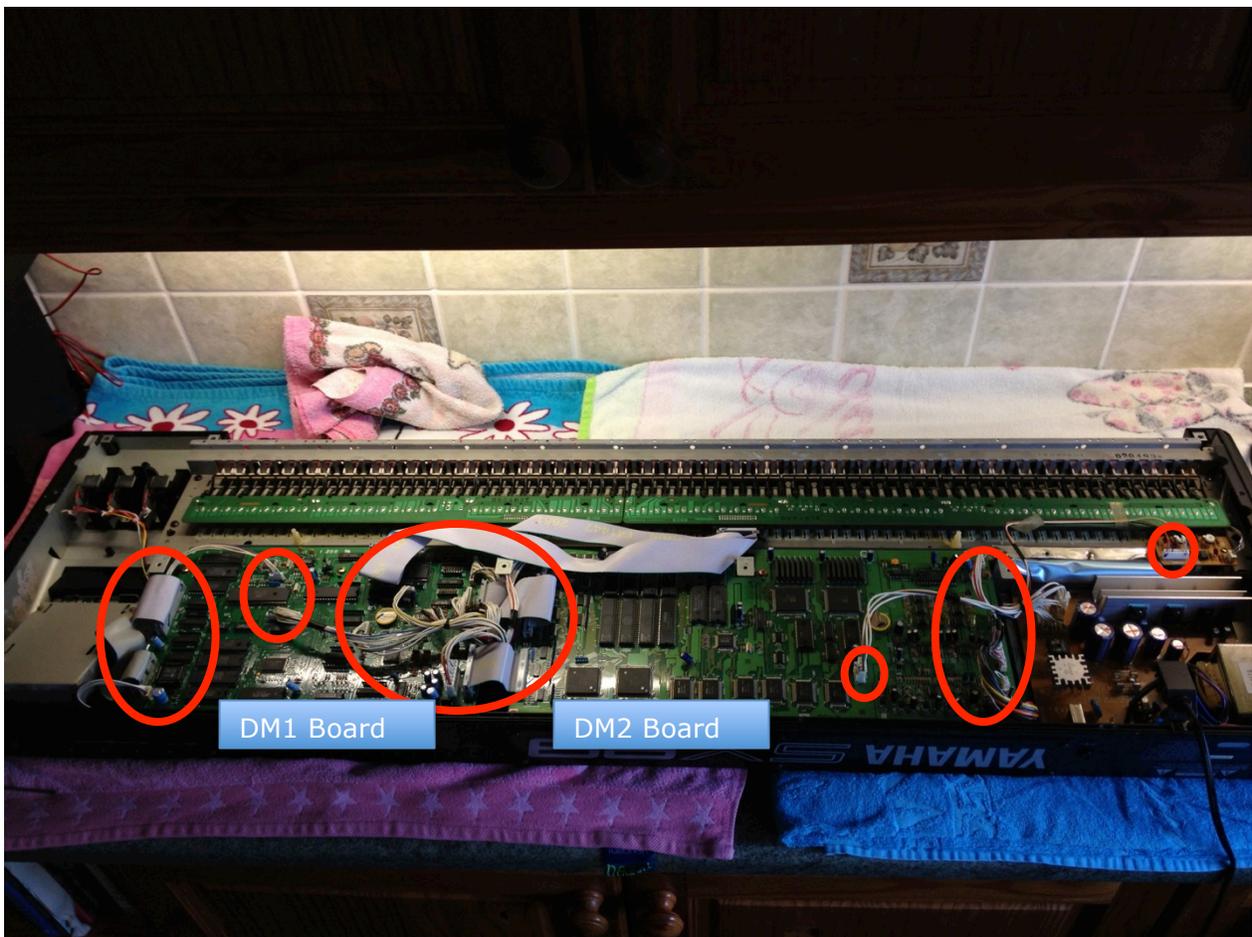

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[1] Synth Trivia: If you're in the market for an OSCAR monosynth, look out for one where the innards contain cigarette ash and cat hair; as these were supposedly hand built by chain smoking, cat loving Chris Huggett, the main man behind the Oxford Synthesiser Company.

Step 4 – Remove Bottom Plate

The first big step is to undo all the screws on the bottom plate (including the four rubber feet). The plastic end cheeks can be left in place.
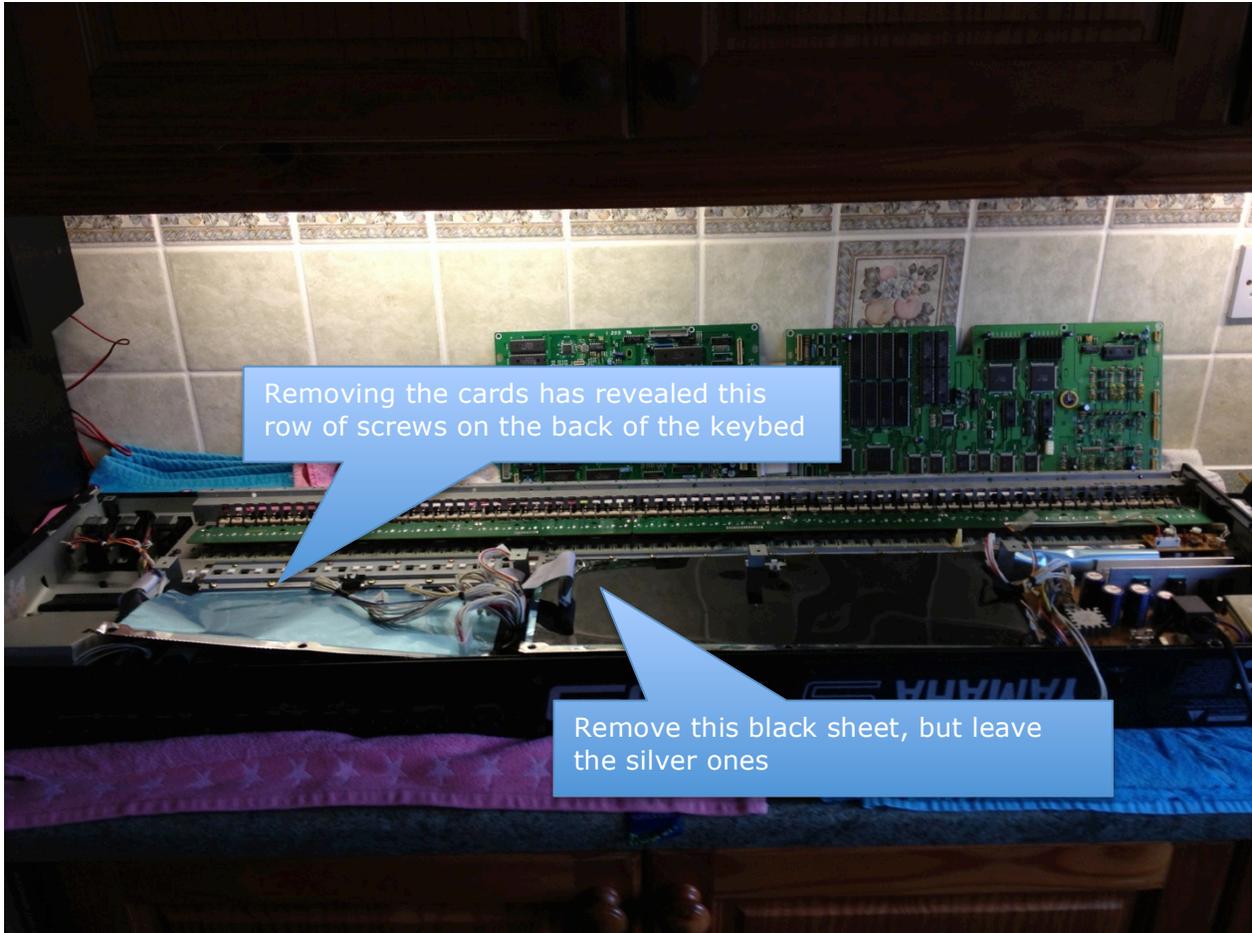
As there are only a few different types of screws, I didn't worry about making diagrams as to where they came from, but I kept the external screws in one bowl, and the internal screws in another to make it easier to sort them out later.

With the bottom cover removed you can see that there are two main boards, DM1 and DM2, with quite a few connectors going between them. All of these connectors need to be removed. Fortunately, all of them have different numbers of pins, and thus their associated plugs cannot be connected in the wrong place. So I didn't worry about labeling the leads with the numbers of the Printed Circuit Board (PCB) connectors that they go to. Don't forget the Aftertouch connector on the keyboard, as well as the ribbon cable from DM1 to the two connectors on the keyboard.

Step 5 – Remove Main Boards

Remove all the identified connectors and unscrew and remove the boards. Each board is held by six screws, three at the front and three at the back.
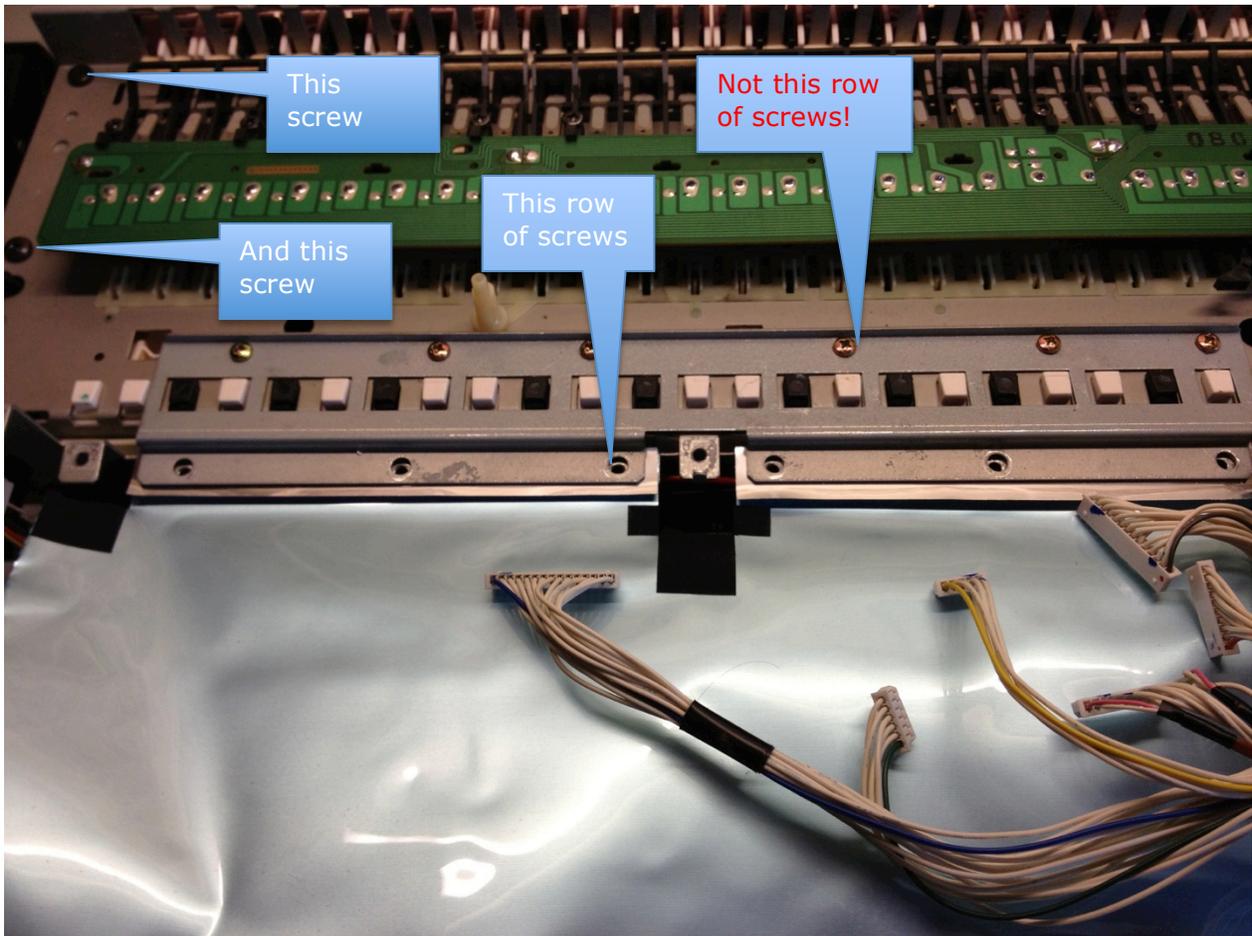

Removing the cards has revealed this row of screws on the back of the keybed

Remove this black sheet, but leave the silver ones

This is as far as you need to go in terms of removing circuit boards for this repair.
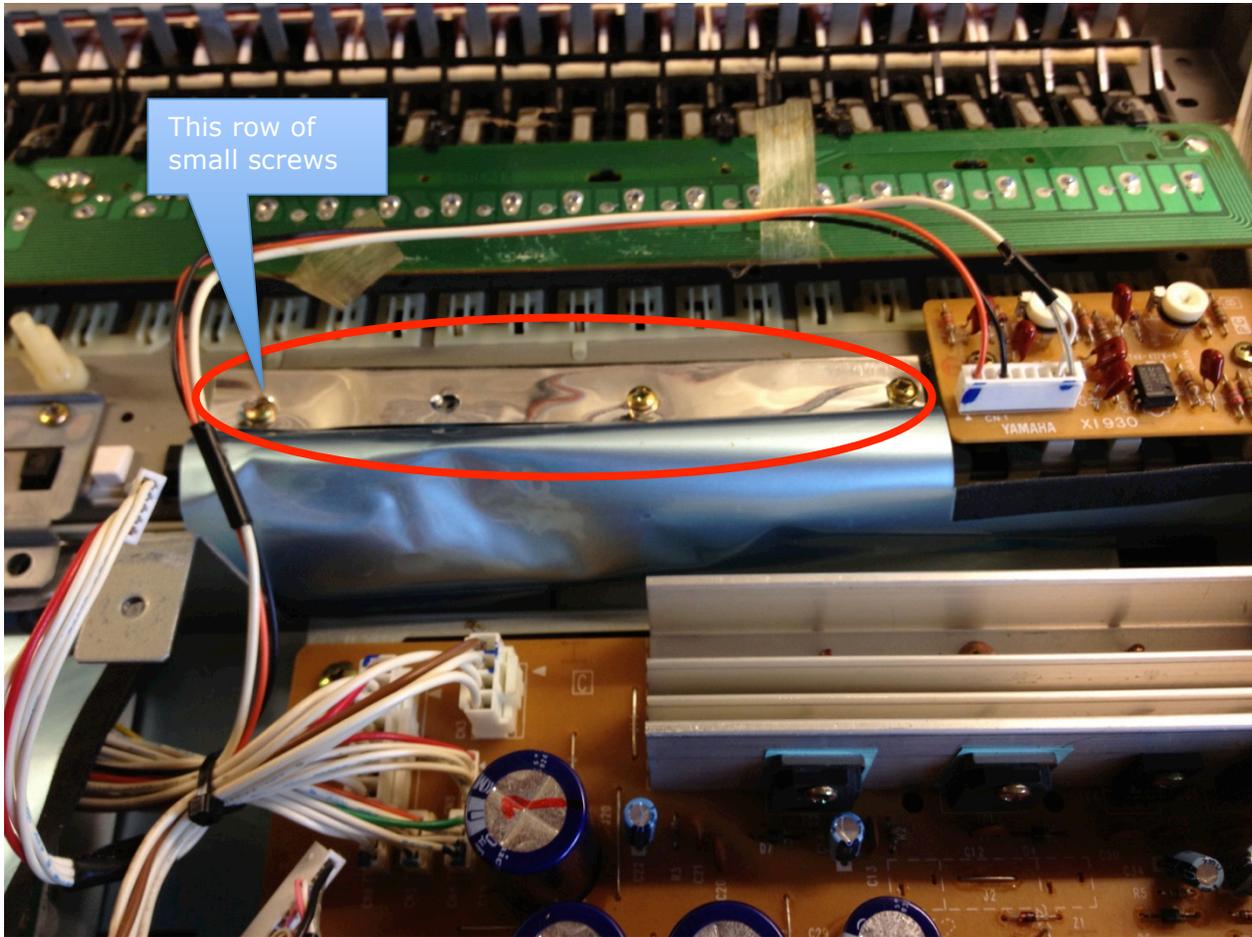
Step 6 – Remove the Keybed

You need to remove the two end screws either side of the keybed (so, four in total). Note that these screws are different to all the other internal ones; they are black with a coarser self tapping thread.

Undo all the screws connecting the rear of the keybed to the metal bracket.

Note that that it is the row of larger screws, closer to you, that are removed, the smaller ones holding the flat metal strip to the keybed can be left alone. When doing these jobs part of the process is learning what not to take off!
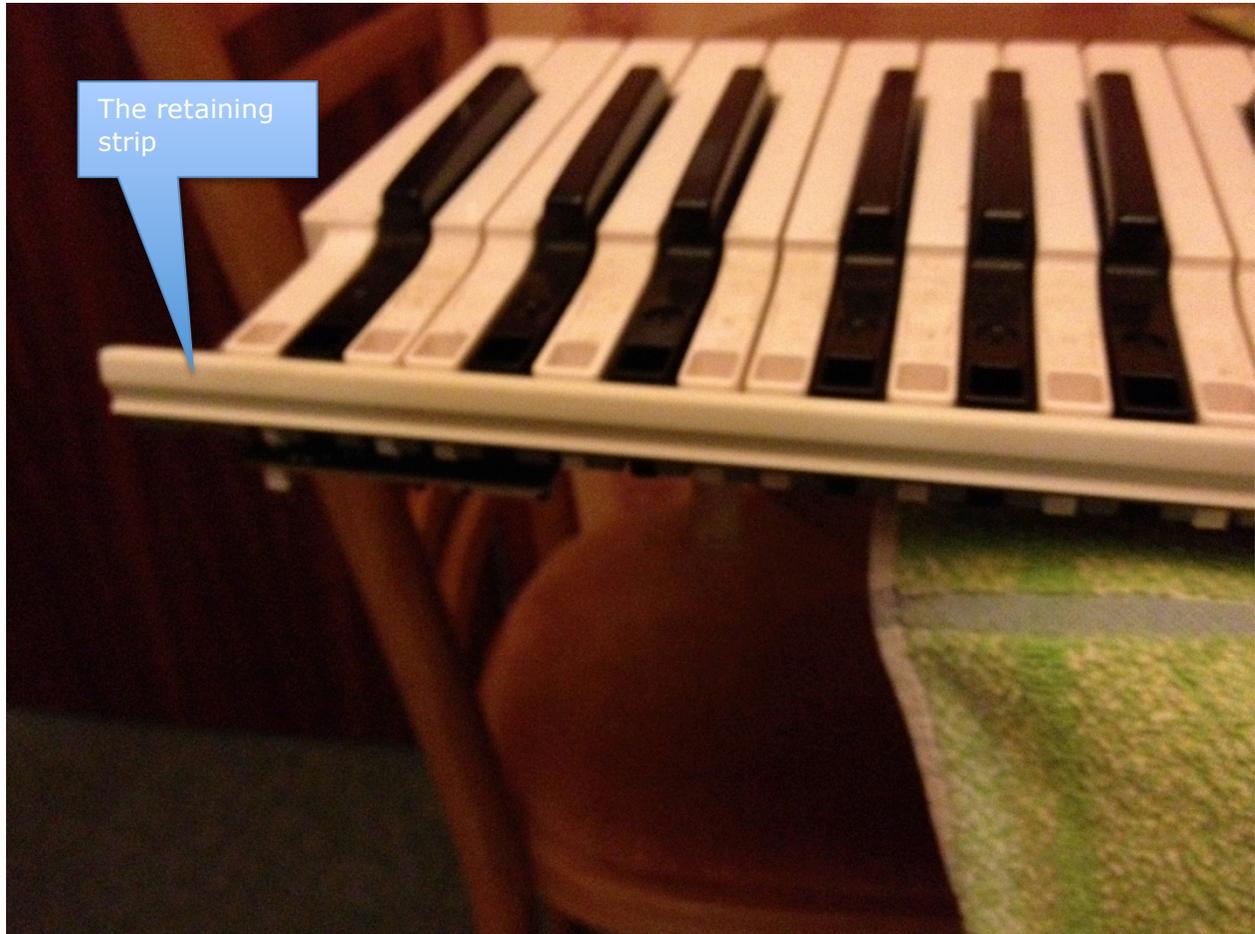

There are also some small screws on the screening by the PSU that need to be removed.

This row of small screws

With all the screws undone, gently lift the keyboard out, moving it away from you towards the front and up a little, taking care to ensure that you don't foul anything. Pay particular attention to the Aftertouch ribbon connector to your right, which goes round to the front of the keybed, as it's easy to catch it on the case.
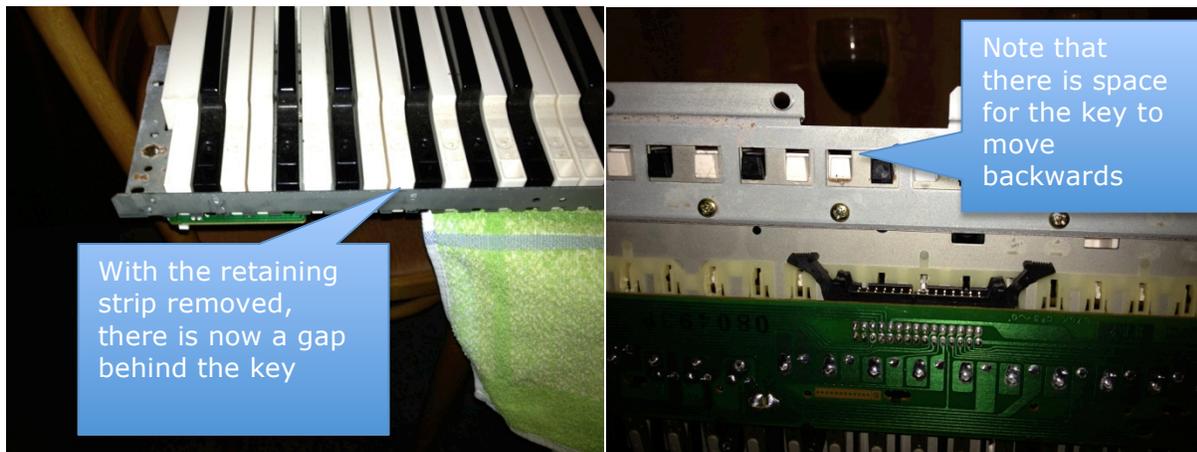
Step 7 – Remove the Retaining Strip

At the rear of the keybed, there is a white plastic strip that runs the length of the keybed. The purpose of this strip is to lock all of the keys in place, so it now needs to be removed. It's only a push fit, so gently prise it away from the metal that it sits over.

The retaining strip

Step 8 – Remove the Key

Before removing a key, let's just take a look top side and bottom side…

With the retaining strip removed, there is now a gap behind the key

Note that there is space for the key to move backwards

So, to remove a key, you now simply push it backwards and it will spring upwards on its own. If you are removing a black key, you will need to remove the white keys either side of it as well.
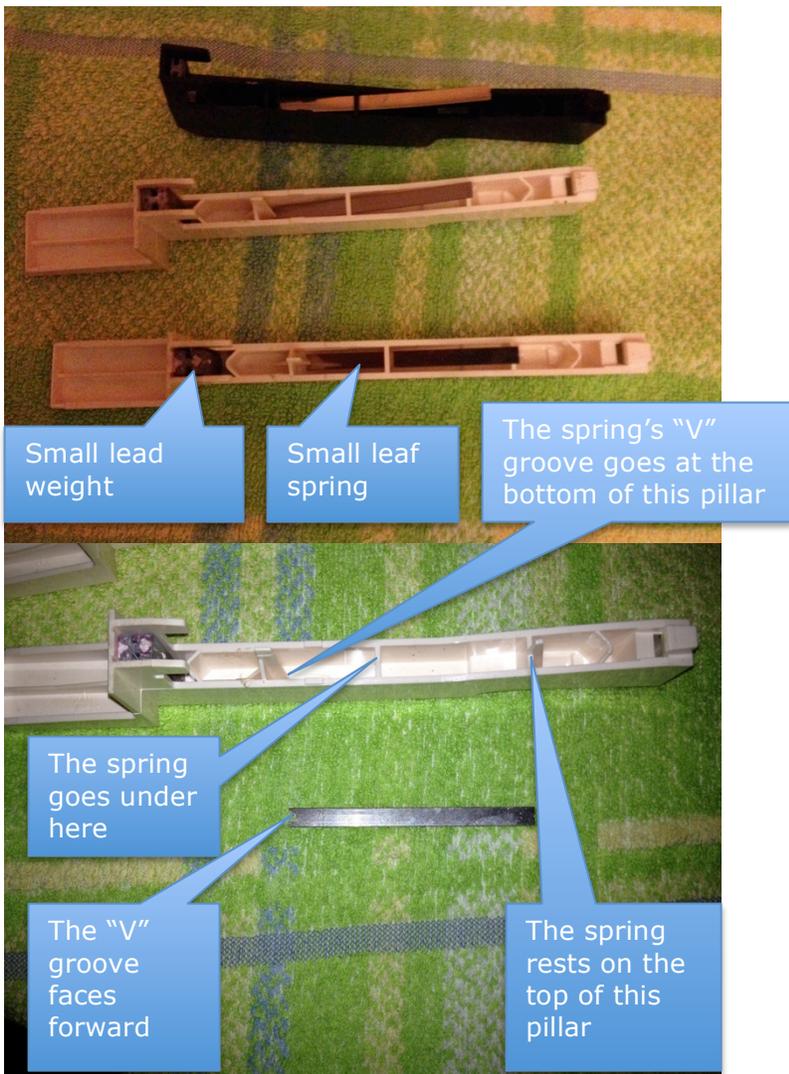
When you push a key back, it will pop up

Once the key is loose, lift it up and pull it back towards the front, gently maneuvering it through the gaps at the front of the keybed.

Sometimes the spring within the key will fall out when you release a key. You will sometimes hear a metal on metal clatter, to indicate this event. If this happens, you'll obviously need to retrieve the spring.

Step 9 – Repair/Replace Key

Before going further, lets look at the keys in a little more detail.

Small lead weight

Small leaf spring

The spring's "V" groove goes at the bottom of this pillar

The spring goes under here

The "V" groove faces forward

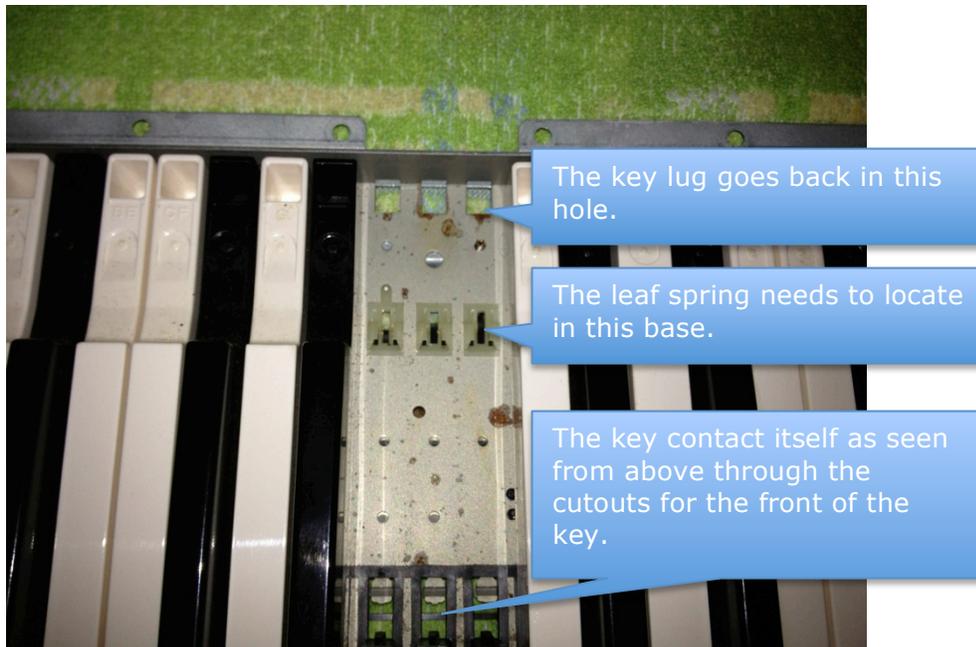The spring rests on the top of this pillar

As identified above, the most likely cause for a loose key is that the hook part of the lug at the back of the key has broken; this hook is what holds the key in place. Whilst with the retaining strip on the key cannot come out, it will be loose and will probably not travel/return properly when you strike it.

Springs can also come a little loose as well over time, resulting in a clackier keyboard. If they feel loose against the pillars, then they can be removed and gently bent so that there is tension on the spring when resting on the pillar.

In terms of key problems (not including the actual contacts in the frame), that's about all that can go wrong with them that I know of, other than the strange case of the sticky Bb key on my newly acquired SY99.

This appears to have been caused by the pillar on the front of the keybed (not the key) leaning to the side slightly, so the key was dragging on it. How this happened, I cannot imagine other than the previous owner putting to much side pressure on the key, or something struck the key. So I gently levered this pillar back into place to free the key up.

Before replacing a key, let's look at the keybed from the top in a little more detail.

The key lug goes back in this hole.

The leaf spring needs to locate in this base.

The key contact itself as seen from above through the cutouts for the front of the key.

If you have removed black and white keys, you'll need to insert the black keys first. As can be seen from this picture to get to my sticky Bb key I had remove the A and B keys either side of it, even though there was nothing wrong with them.

So, to insert a key, you need to
- Get the front part of the key back within the cutouts at the front;
- Get the spring so that it is sitting in the base (ensure that the spring is central on the pillar before aligning it with the base)
- Gently push the key backwards and downwards so that the hook of the lug gets correctly seated and the spring slides back into the base.
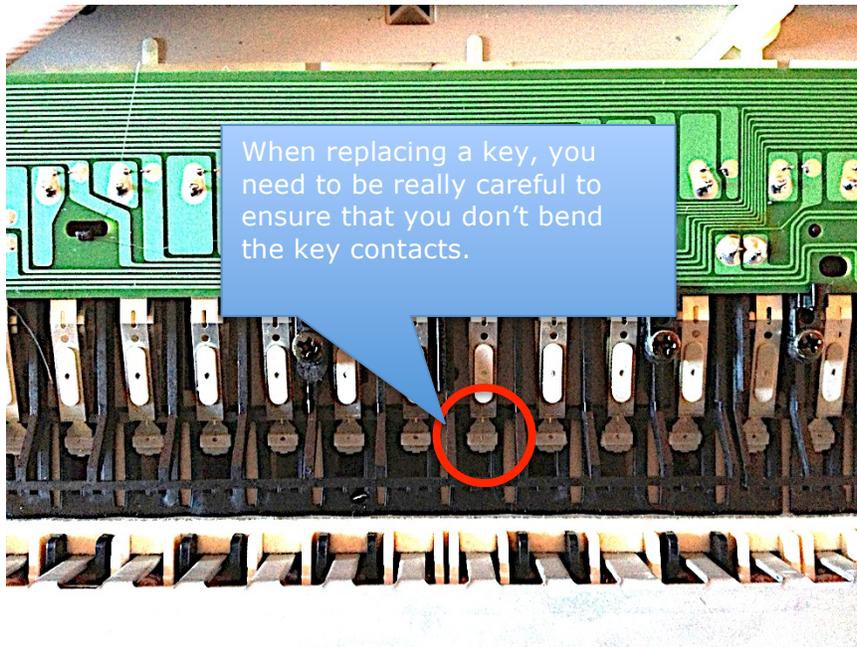
When inserting a key, you need to ensure that you don't trap or bend the key contact in the frame. This can happen if you push the front of the key down as well as the back, so the front pillar, which is normally over the key contact, is below the key contact whilst it is being pushed back, which will bend the key contact.

If you inadvertently do this, the action of the key won't feel right and of course it won't sound. So, always visually check the underside of the frame for any keys that you've replaced to ensure that you haven't done this; I've managed to accidentally do this once or twice despite being careful.

If you have accidently bent a key contact, it can be gently levered out with a small screwdriver, but you may find that the contacts now don't separate when the key is released, as the contact is still bent slightly, and with the key released there is not enough room to push the contact back into shape. So some gentle leverage with a screwdriver whilst the key is pressed is required to get the contact back into shape; with the key pressed you have enough room to push the contact back a little more.

For more information on contact problems and how to repair them, take a look at the following web resource.

http://www.bustedgear.com/repair_Yamaha_Korg_keyboard.html

Step 10 – Replace the Retaining Strip

Once all the keys are in place, put the retaining strip back on.

Step 11 – Reassemble Keyboard

So easy to say it, but assembly is "simply" the reverse of disassembly, taking care that all the connectors go back in the right place! So follow this guide in reverse!

Conclusion

By the end of this, hopefully you now have a repaired keyboard.

And hopefully, you had no screws left over!

Acknowledgements

The "Cat on Keyboard" shot is courtesy of my EX5Tech colleague, Jim Attfield. The observant of you will notice that the keyboard in this instance was not an SY99.

Links

EX5Tech as a good resource for the EX5, with sub forums for other Yamaha synths:

http://www.ex5tech.com

The Yamaha UK forums also provide a very good forum for all things Yamaha (and more), which is a good resource for the Yamaha SY series, and there has been a lot of activity recently about doing upgrades on the SY77, TG77 and SY99.

http://www.yamahaforums.co.uk/

Finally, a bit of blatant self promotion(!):

My website for my Java based x.factory librarians, available for the EX5, AN1x, FS1R, DX7/DX7II and Motif synthesizers and, of course, the SY77, TG77 and SY99!

http://www.xfactory-librarians.co.uk/

My Pink Floyd Tribute Band, Pure Floyd

http://www.purefloyd.co.uk/

My Celtic/Ambient/Progressive project, Carreg Ddu

http://www.carregddu.co.uk/

And my progressive/classic rock influenced project, Echoes

http://www.echoes-music.co.uk/