Making Foam Pads
for an Apple LISA Keyboard

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8/11/08

1. Introduction

This document contains instructions for how to make foam pads to replace the original foam pads in an Apple LISA computer keyboard. The pads described have successfully replaced the degraded pads in my LISA keyboard.

Each key of the LISA keyboard is padded with a piece of foam. The original foam used in the keyboards is of a sort that degrades over time. When a foam pad degrades enough, the key no longer functions properly.

References to LISA keyboard repair can be found on-line. The references include some details on how to build replacement foam pads for the keys. However, in the course of repairing my keyboard using the instructions found on-line, I developed a method to construct replacement foam pads that has not yet been reported.

Since I am limiting this document to the manufacture of replacement pads only, I suggest you read the following on-line references in order to learn how to disassemble the keyboard, remove the foam pads, clean the plastic discs, reassemble the keyboard, etc.

1) The LisaFaq on repairing a Lisa keyboard (tells how to open keyboard, etc.):
http://lisafaq.sunder.net/single.html#lisafaq-hw-kb_repair

2) Repairing a Sol-20 keyboard (includes method for cutting foam to correct thickness): http://www.solivant.com/sol20kbd/

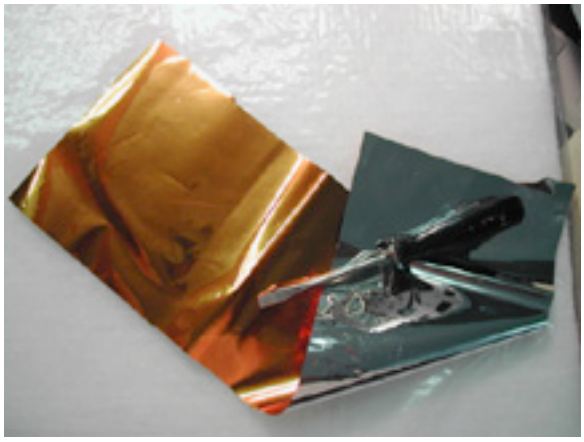
2. Foam Pad Construction

The foam pad construction presented here differs from that presented elsewhere in two major ways. First, I used foam sandwiched between two layers of double-sided tape. Second, I used .002” metalized plastic film (Mylar) with the non-conductive side making contact with the keyboard printed circuit board. The use of double sided tape eliminates the need for glue suggested in some references and the use of metalized plastic film eliminates the need to construct replacement film with aluminum foil and tape

The replacement pads are made from a 4 layer composite of metalized plastic film (Mylar), thin double-sided tape (Scotch Poster Tape) and 0.2” thick closed cell foam as shown below:

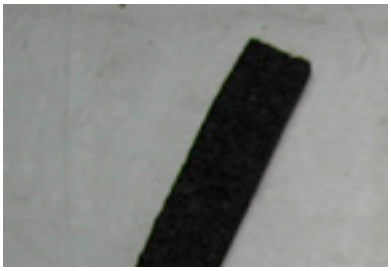
Materials:

Metalized plastic film (Mylar)



Thin, double-sided tape (Scotch Poster Tape, removable double-stick tape, ¾" wide)

0.2" thick closed cell foam



Sources for materials:

Metalized plastic film (Mylar) –

I used leftover material from a previous job. The original manufacturer is unknown. Comparable material could be Dura Lar Roll .002" 27"x12' Silver;
https://www.shopatron.com/product/part_number=R02DS2712/527.0.20226.5342.0.0.0 $17 for 27" x 12'
or other .002" metalized plastic film.

Double-sided tape -

I purchased Scotch Poster Tape, removable double-stick tape, ¾" wide from my local "Michaels Stores, Inc." craft store.

0.2" thick closed cell foam -

I used leftover soundproofing foam (closed cell vinyl-nitrile noise control foam) from http://www.soundproofing.org/sales/prices.html. There are probably better sources for the foam, especially if the vendors supply 3/16" thick foam which would probably be thick enough to work. A good start would be to search McMaster-Carr (http://www.mcmaster.com/), keywords "foam sheet". If foam of the proper thickness with adhesive backing is available, then one layer of double-sided tape could be eliminated. I used closed cell foam only and don't know how it compares to open cell foam for keyboard foam pad replacement.

Tools:

Foam cutter

I had to cut the foam to 0.2" thickness to get it right. It was a tricky procedure with my closed-cell foam. I used the double-blade procedure described in http://www.solivant.com/sol20kbd/ to get the right thickness from my 2” thick closed cell foam. This is the tool I made:

Two box-cutter blades were held with a c-clamp so that they sandwiched an ~.2” shim. The resulting foam was of inconsistent thickness. I recommend avoiding this procedure by purchasing 3/16” foam.

Foam pad template

The template was a Harbor Freight Shipping 7/16" punch from their 9 piece hollow punch set. The punch is listed at their website:

http://www.harborfreight.com/cpi/ctaf/Displayitem.taf?itemnumber=3838

Hammer

I used a rubber mallet to punch out the keyboard replacement foam pieces.

Oak scrap backing

I used a piece of scrap oak board, about ¾" thick for the backing during the punching operation.

Box cutter knife, yardstick and wooden cutting board

I use a boxcutter knife and a yardstick over a wooden cutting board to cut the mylar and foam to the right width.

Procedure:

1) Cut foam to correct thickness (if needed).

2) Cut foam to width of double sided tape (3/4”)

3) Cut metallized film to slightly wider than double sided tape (~1”)

4) Apply double-sided tape to one surface of foam pad. Keep the protective covering on the unused side of the double-sided tape.

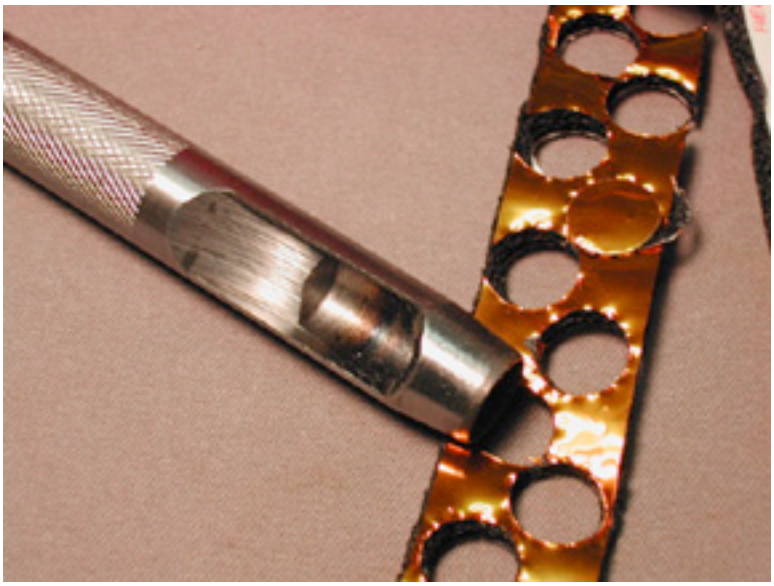
5) Apply another layer of double-sided tape to the opposite of foam pad. Keep the protective covering on the unused side of the double-sided tape. Now you should have a sandwich if foam between two surfaces of double sided tape.

6) Remove the protective covering from one layer of double sided tape for application of the metalized sheet.

7) Apply the metalized sheet with the (conductive surface sticking to tape, unconductive surface exposed to air). I’m not sure if it matters if the conductive surface is the ‘exposed to air side’ but I did it with the non’conductive surface exposed and the conductive surface taped. Works on keyboard this way perfectly. Keep the protective cover on the double-sided tape on the opposite side of the foam. The protective cover will keep the pads from sticking to each other as the template cuts out the foam pads.

8) Cut the excess metalized film with the boxcutter with the yardstick as a guide so that the ‘tape-foam-tape-metalized plastic’ composite is a uniform ¾” width. Preparation of the composite is now complete and it is ready for cutting into 7/16” diameter discs.

9) I used oak scrap board under the pad material and hammered with a plastic mallet. I hammered the punch into the material and just kept hammering until the punch became clogged with pads then pushed the pads through with a dowel. I tried to hold the punch vertically as possible to get a good shape pad. The following illustrates the pad material after cutting:



I punched with mylar side up as shown in the photo. I don't know if it matters.

1. Conclusion

Now that the replacement foam parts are prepared, simply follow directions in the two references given to remove the little clear plastic disks from the keyboard and clean the disks (I used 99% isopropyl and rubbed most residue off with rubber gloves). An improvement to the foam replacement pads would be to find a replacement for the little plastic disks that I salvaged from the degraded original parts. It might take some experimenting to find the appropriate plastic to replace the disks.

I let the plastic disks dry and removed the protective cover from the double-sided tape on the just manufactured pads and stuck the pad to the plastic disk. Finally, I inserted the foam pad assembly into the keys as described in the references.

The LISA keyboard works perfectly now that the foam has been replaced. The foam pad described here is actually my second attempt at 're-padding' the keys. The first attempt was with a combination of adhesive backed insulating foam (Frost King brand from Home Depot) and thick double-sided foam tape. The resulting pads were a

combination of too stiff and not resilient enough that resulted in a horrible ‘feel’ when typing. The procedure I give here results in pads with a very good feel. I do not how durable the pads are (e.g.; I don’t know how long the tape will keep things together) but I am confident the foam used will last longer than the foam used in the original keyboard.

Replacement of the foam pads in progress on my first attempt to replace the pads. Note that the pads shown proved to be too thick and not resilient enough for a good keyboard feel. The procedure given in this document will produce pads with a good feel.