Latching switch

A tutorial by

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This is a short description of one way of making the basics of a Latching Korry switch.

This type of Korry is used in many modern aircraft and all around in the cockpit. Some are latching, some are not. Here we will look at the latching 1" type, but the mechanics is general and can be used where needed.

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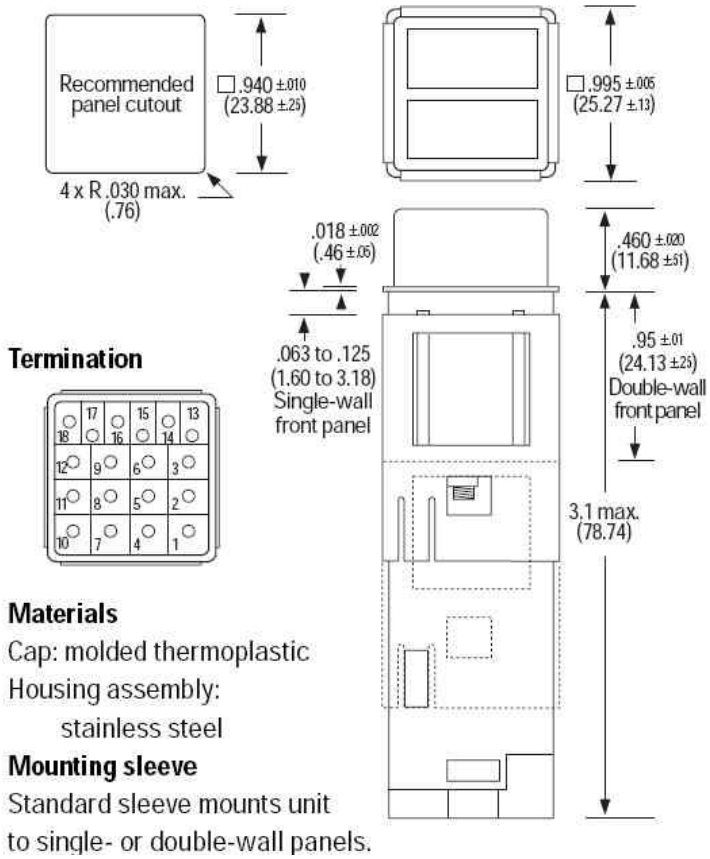
The physical form of the switch is like shown in the picture (actually not latching) and the drawing. Information from ***http://www.korry.com***



Preparation

The major problem was to find a **latching** switch with a travel distance at approximate 8 - 10mm. I could not find such a standard switch – at least at the right price. The original has a extremely high cost (>$X00). You can of course find some on Ebay, but still expensive at the numbers we are talking about. It's more than 70 switches in a 767 cockpit and with the low budget I'm following a homemade switch had to be made.

So what about this:

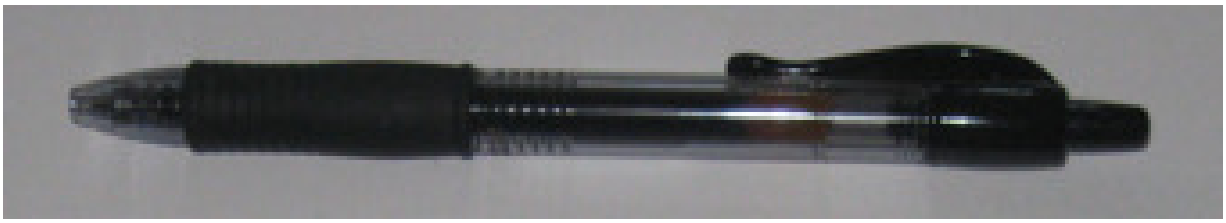
- ***A ballpoint***
- Microswitch (or some other switch of course)
    - Remember – don't throw away old PC mice without rip out the three Microswitches and maybe the encoder.
- LED's
- A PCB
- Some acrylic / Lexan
- 3mm stuff / nuts & bolts
- MDF or Delrin (Button)
- Drill, tools for thread making and if you like a CNC, but not necessary.

Making

The most important item is the ballpoint mechanics. The rest is attached to this in one way or another. The method may vary depended of what you have available.
Here I will show my solution which I hope give you some ideas.
I have a CNC unit which makes parts easier to produce, but it is not necessary in this case.
You should be able to put this together by some ordinary tools.

Ballpoint

Find a ballpoint and give it a try. You'll feel that this is something pretty close to a switch mechanism. The one I'm using for this prototype is "PILOT G-2" with a total stroke of 9,5mm and approximate 8 mm distance between the two rest positions.



From this item we need the top part of the ballpoint and the spring – rest you can throw a way.

- Rip off the clip & outer plastic from the top of the pen and cut the barrel to a length of approximate 40mm from the top.
- Drill a 3.2 mm hole through the mechanism where it's needed (Pushpin & bar slide/turret).

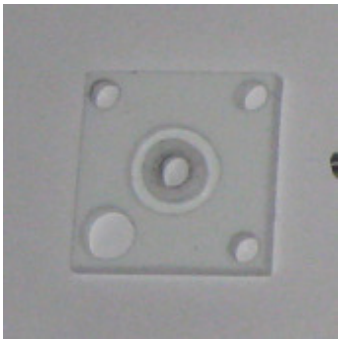
3mm pin

Through the construction I have a 3mm pin/rod, which is threaded at the top end. (The picture showing threads in both end, but that is not necessary).

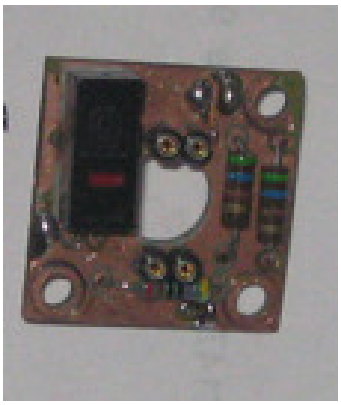
At approximate the middle of this pin I've made a narrow slot to give support for a ring/washer. Put the pin in a drill press and use a file or a hacksaw to make this slot. The ring is easy to make – use a single threaded wire. Turn it around in this slot in a way that the ends of the wire meet perfectly. Then solder the ends, file and/or sand the junction and you are

finished. This ring ends up inside the hole in the bar slide / turret which usually is 4-5mm – if not you have to drill a hole big enough to have room for this ring. The purpose of this ring is to lock the pushbutton and the bar slide together. You know if you hold the ballpoint upside down, the pushbutton will slide down and this behaviour is unwanted for our Korry button.

Support



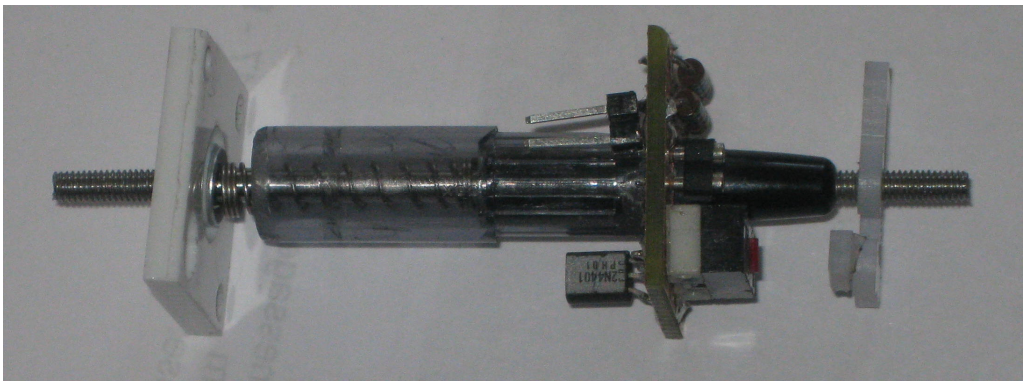
The “switch” needs something to hold everything together. Make 22x22mm acrylic support at the bottom like this:
Four mounting holes (3mm) at the corners and a central 3,2mm hole for the pin.
With the CNC I made a circular slot for the ballpoint barrel. I don’t know if that is necessary but it helps to stabilize the construction.



At the top, I have put a PCB (could be another acrylic) – again 22x22mm. Drill a center hole with the same diameter as the top of the ballpoint barrel (8mm) and three 3mm holes in three corners to take care of three 50 x 3 mm bolts. The fourth corner hole I’m not able to use due the Microswitch.
The PCB is in my case carrying all electronics, but this could be a piece of acrylic where you glue the switch & Led’s in place. I’ve also added some stuff for brightness control on the same PCB. You could also make the electronic switch arrangement and connectors at the bottom support plate, but the LED’s need to be at the top.

Mounting

Like the picture is showing. The pin is running through the whole construction. Put on the two washers and the spring at the bottom end – then the bar slide and the pushpin. Mount the top support (PCB) on the top part of the barrel. Stick in the ready pin into the barrel and put on two nuts or in my case a lexan spring and a locking nut at the top. Then tighten the nut/lexan until the play in the pushpin is almost zero. You have to keep a little room in this locking to get the bar slide to rotate to the next slot when pushing the button. Then mount the bottom support and 2 or 3 50mm x 3mm bolts and tighten everything together. Now you can test the latching action and fine tune the construction.



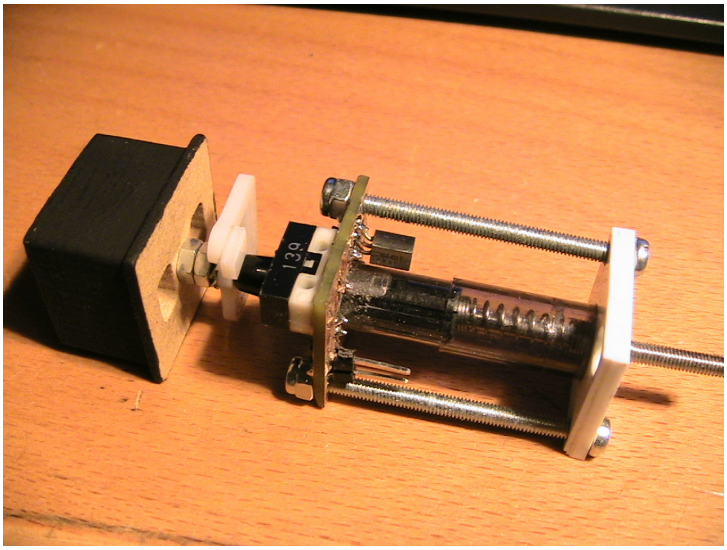
Lexan spring

Due to my use of the PCB with the Microswitch I had to get some action towards this switch when pushing the pin. So some sort of a spring touching the switch in a flexible way had to be made.

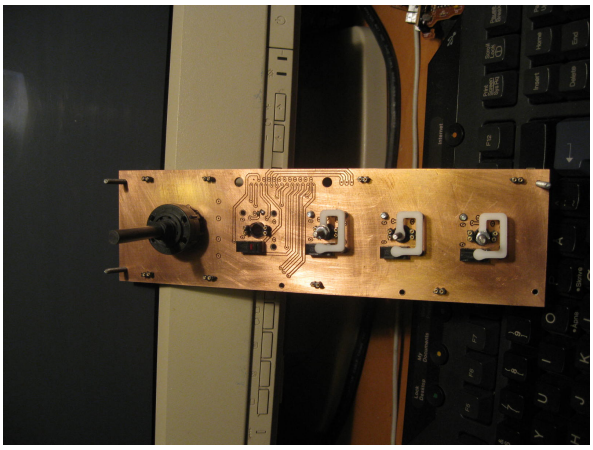
Here is a top view of the Lexan spring. This may be difficult to make without a CNC, but Lexan is a very durable material and difficult to break. So use of normal tools should work or you could find some other material (thin metal sheet). Remember to make room for eventually LED's which in my case need to pass through the spring area and up into the button.
The "spring effect" is controlled by the length/depth/width of the Lexan arm. I use a 2mm Lexan with a 3mm width of the arm and found that to give a suitable spring action. The nice thing about this spring is that the switch gives me a true state – not momentary. When pushed in the switch is kept closed and the opposite when released.

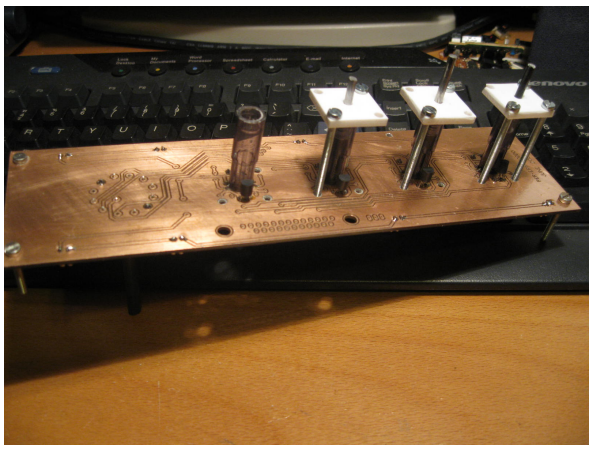
Final

So mounting everything together it should be something like this:



More “serious” example– the Instrument Source Select Panel in my B767-300 MIP (Captain side)





Hope you find this short tutorial useful and you got some ideas how to accomplish something similar. It’s not difficult to make and gives you a latching hardware usable all over the cockpit.

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