

eShel Calibration Unit flat lamp upgrade (hardware procedure)



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1 Introduction

This document describes how to upgrade the eShel Calibration Unit with new Flat lamp.

The initial Flat lamp was made of several LEDs to cover all the visible domain. This flat was used during spectra reduction to find the echelle spectrum geometry and to correct from the grating blaze function. Experiences showed that it was best to separate those processing steps and use a tungsten lamp for the blaze correction. LEDs are still used to find the geometry.

The hardware upgrade consists in replacing the LEDs only electronic with a Tungsten + LED electronic. This implies some mechanical changes. All required parts are available in the upgrade kit reference SE0112A.

The upgrade should take roughly 30 min.

In the initial design, we controlled all LEDs with only one channel (front face button or remote control) : we used only three buttons on the front face of the ThAr unit (Mirror, Flat, Thorium). In the new design, LEDs and Tungsten are controlled separately. Then, we'll now use the four of them : Mirror, LEDs, ThAr, Tungsten. Flat should be acquired with both LEDs and Tungsten lamps ON.

ISIS 3.1 release and AudeLA/eShel releases since september 2011 include changes to take this new Calibration Unit into account. Refer to the eShel main documentation for more information.

2 Upgrade kit content

The Upgrade Kit (SE0112A) contains following elements :

- Electronic module, with Tungsten lamp
- Ring 0,3" long
- Tie rap
- electric sheath
- One wire (red, ~50mm long)
- Tungsten lamp (spare)
- Front face sticker

3 Tools required

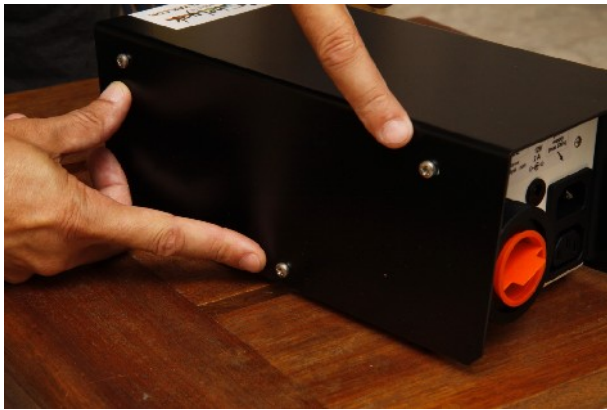
- Screwdriver Philips 2 (opening the box)
- Flat screwdriver (unconnect wires, and remove locking ring)
- Plier to untighten the flat module.

4 Safety requirements

The Calibration Unit has a relay with 110/240V for the Thorium-Argon high voltage power supply. Before proceeding with the upgrade, you must **absolutely unplug all cables** from the Calibration Unit to prevent any damage or injury.

5 Open the Calibration Unit

To open the Calibration Unit, you must remove the cover. It is attached by 6 screws (3 on each side)

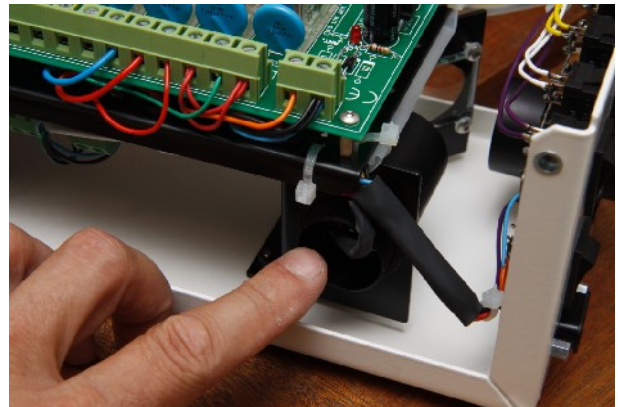
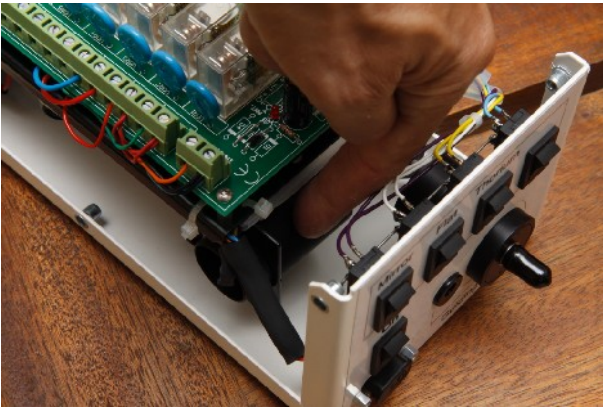


Then, slide vertically the cover : you have now access to the interior.



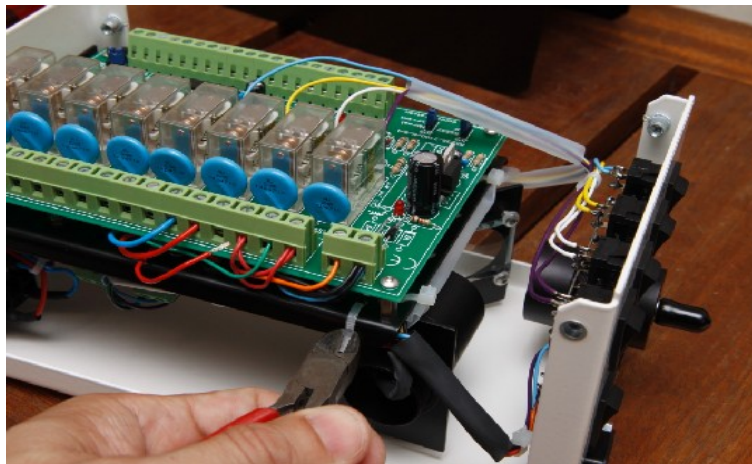
6 Remove the old flat module

The Flat module is shown in the pictures below :

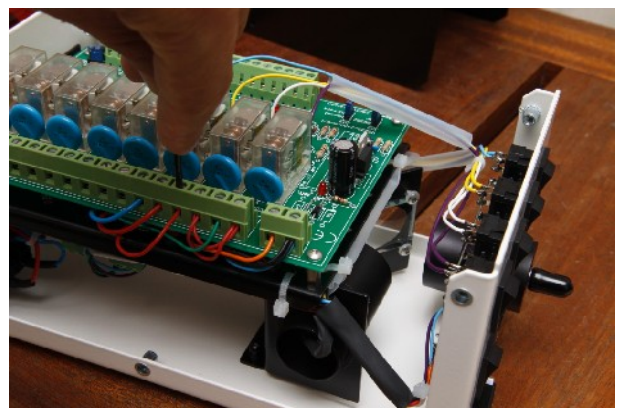
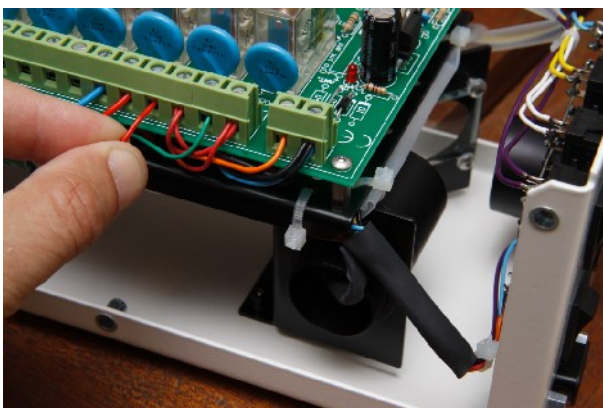


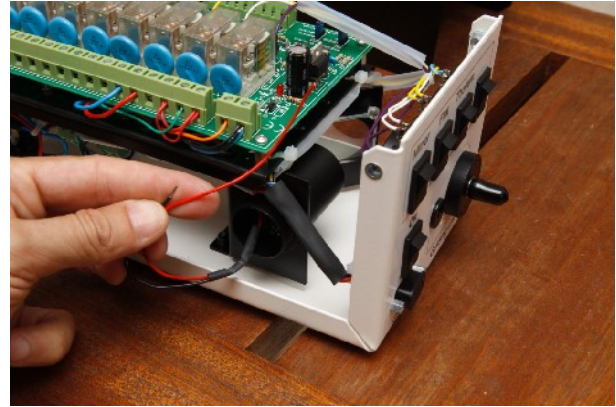
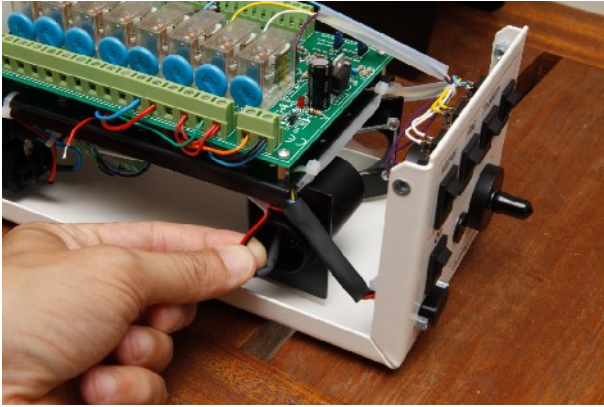
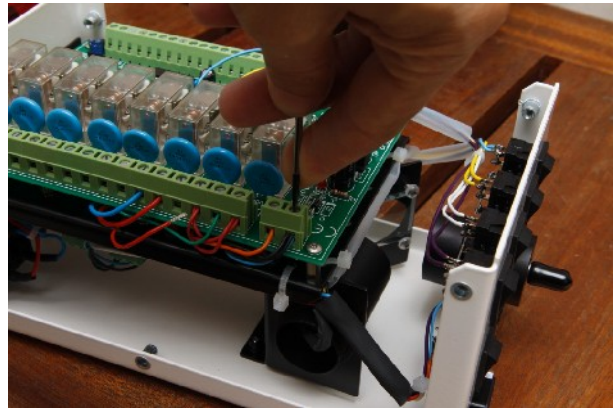
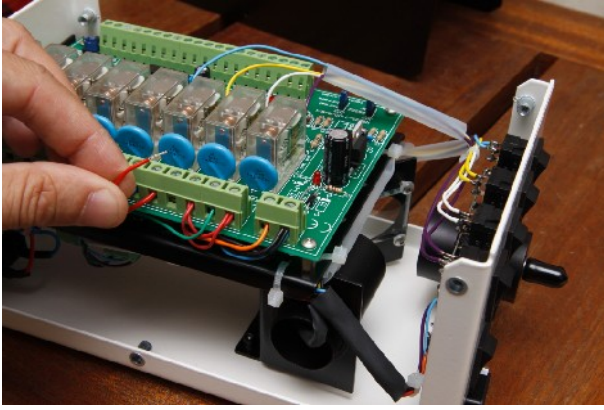
6.1 Disconnect the old flat module electronic

Cut the tie rap :



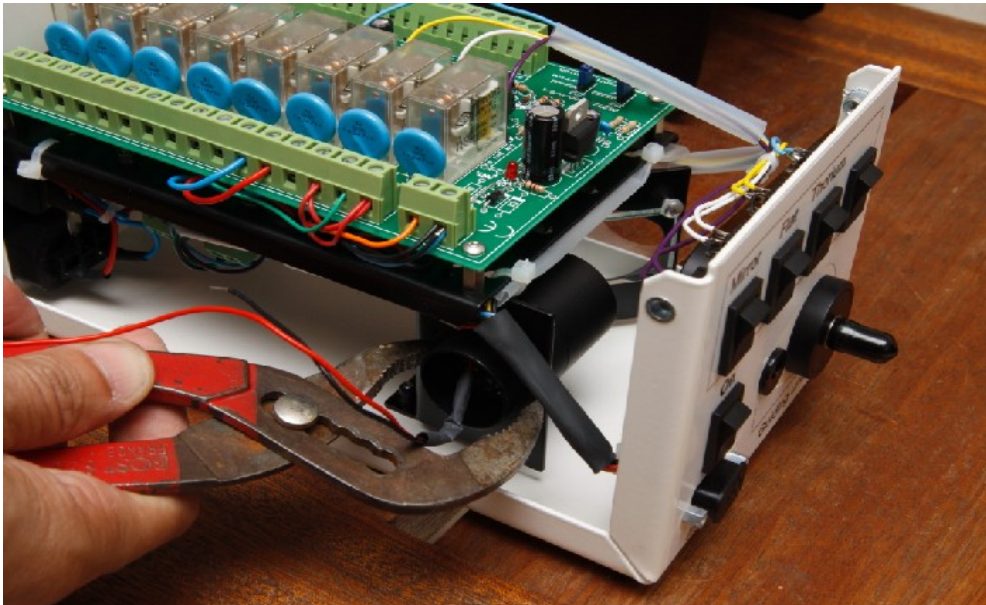
Unconnect the 2 wires of the Flat Module



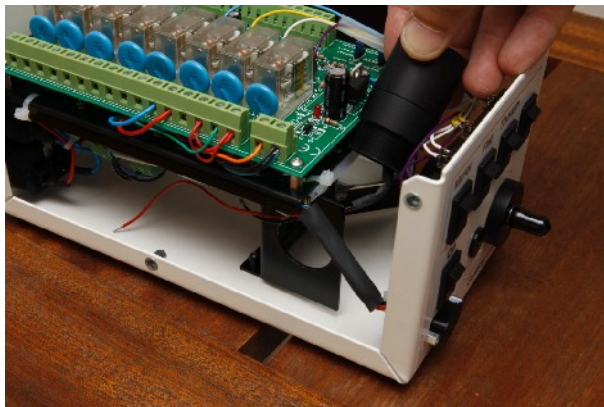
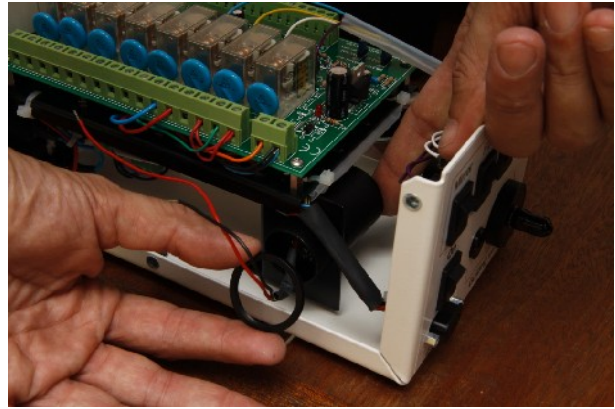
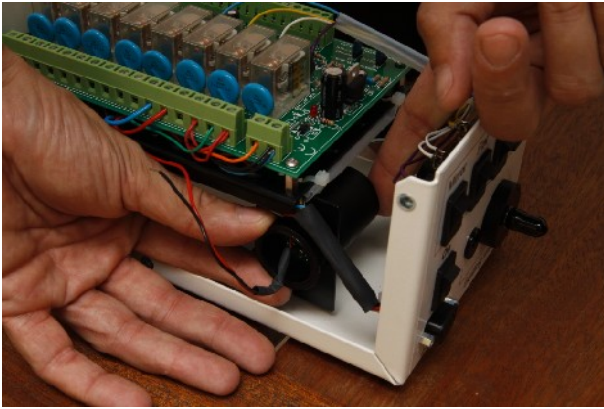


6.2 Remove the mechanical part of the old flat module

Unscrew the retaining ring:



Remove the Flat Module from the ThAr unit:



7 Replacing the Flat electronic

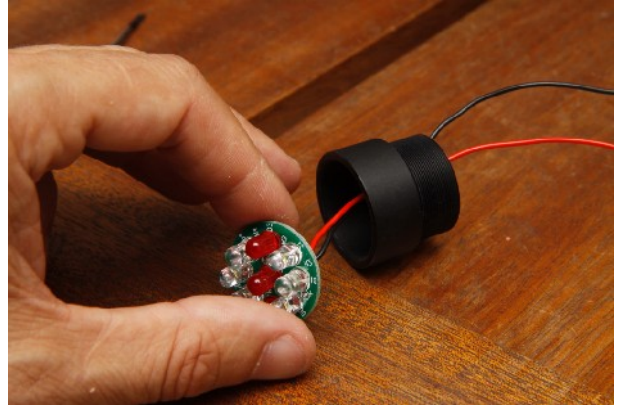
Disassemble the Flat module:



Unscrew the retaining ring of the electronics. You must do several turns, using the slits made in the ring:



Remove the electronics, adding the new 0.3" ring:



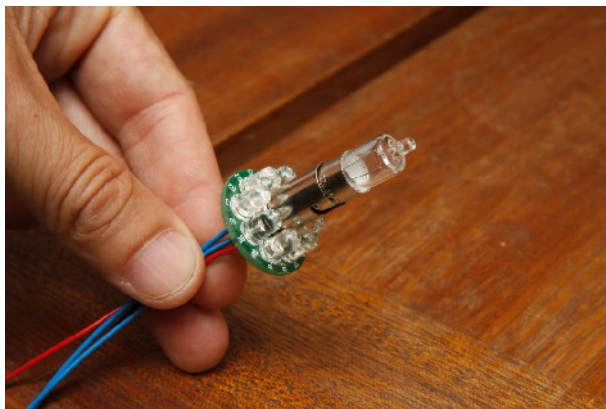
Re-assemble the Flat module, without any electronics in it :



Mount the external threaded ring on the assembly :



Here is the new LEDs + Tungsten lamps electronics – ensure it is complete with Tungsten lamp which can be easily removed/replaced:



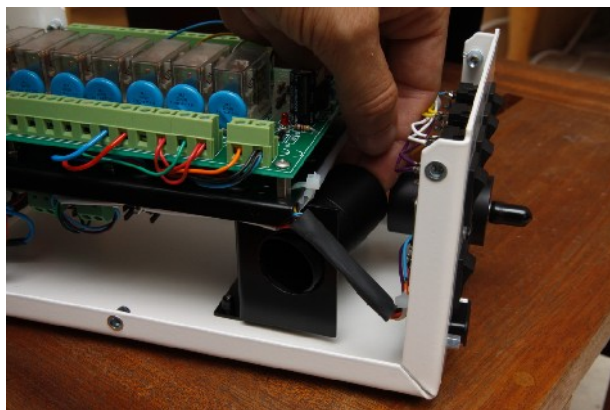
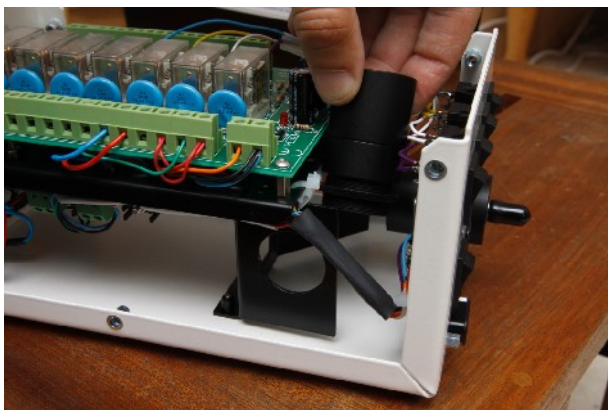
Mount the electronics in the new ring (provided in the kit) :



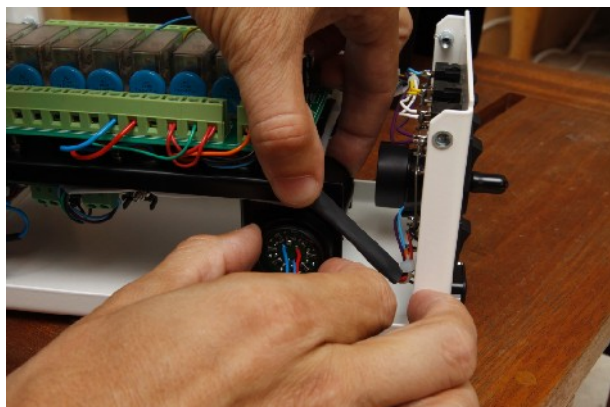
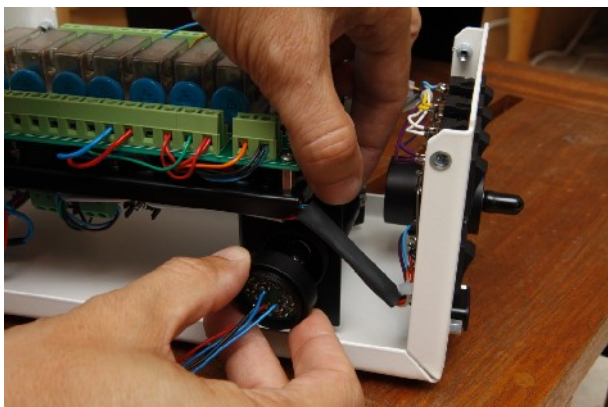
Mount and tighten the retaining ring :



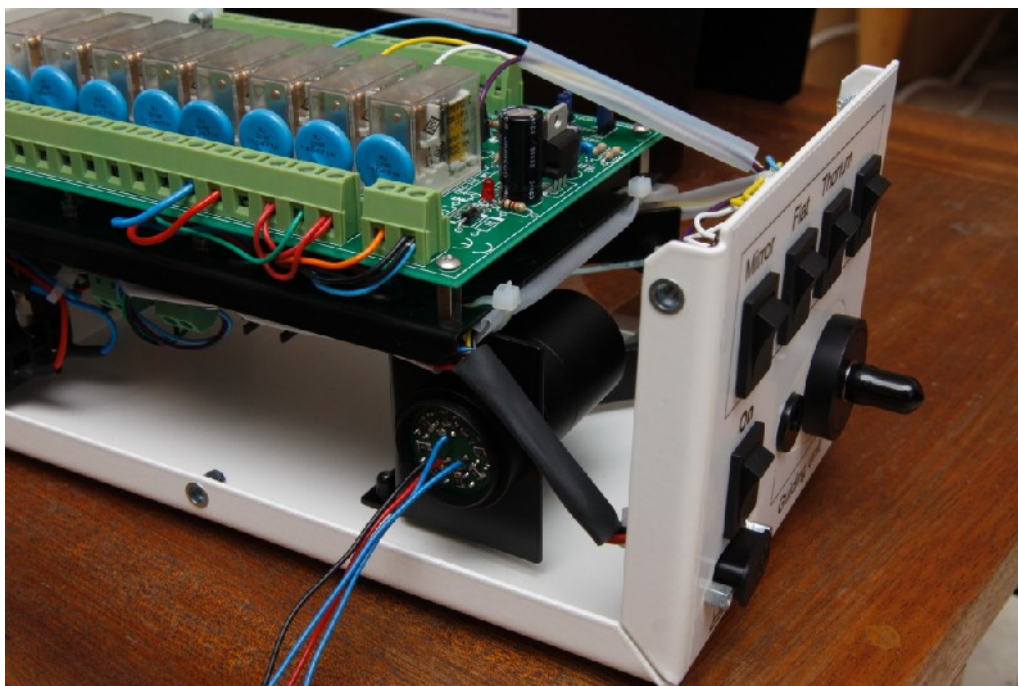
Install the new Flat module in your Calibration Unit



On the opposite side, mount the electronic board :



Tighten securely the module.



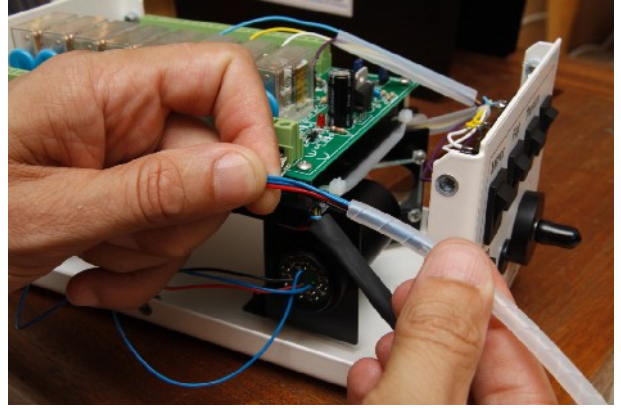
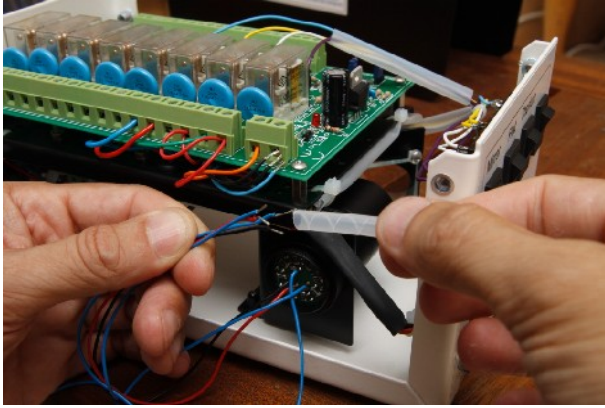
The mechanical part of the upgrade is finished. We can now connect the module to the electronics.

8 Connect the new flat module

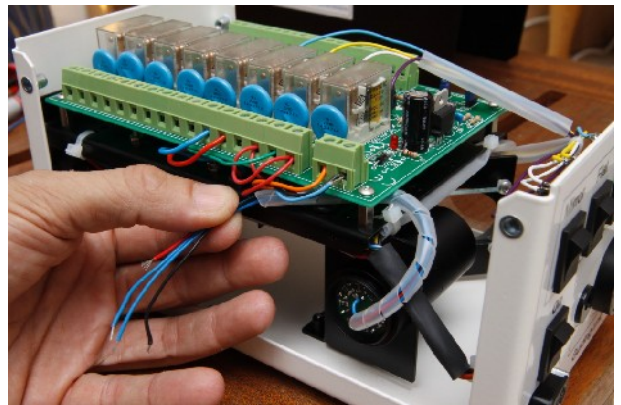
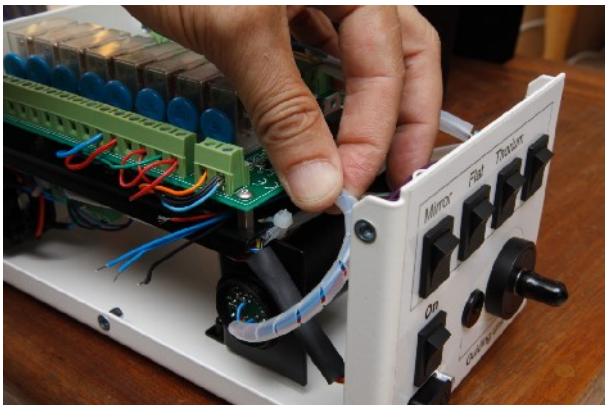
The new Flat module includes 4 wires :

- 2 blue wires for the tungsten lamp
- 1 red (+12V) + 1 black (GND) for LEDs.

Slide the 4 wires in the sheath :

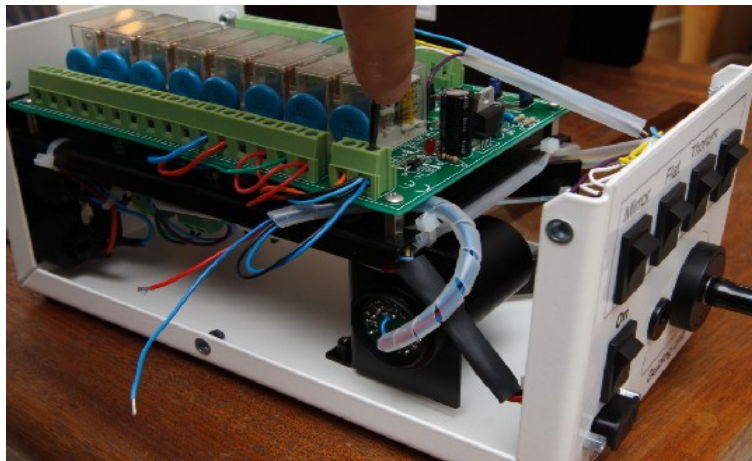


Install the wires like on the below pictures :

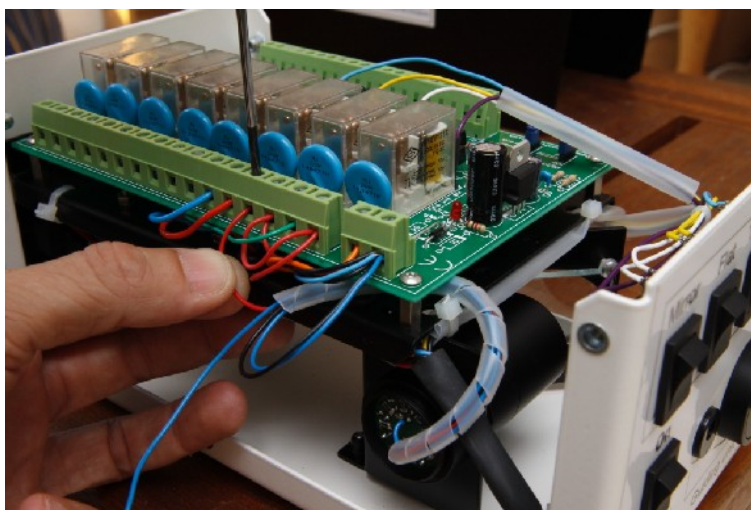


Refer to the schematic in appendix to make the connection.

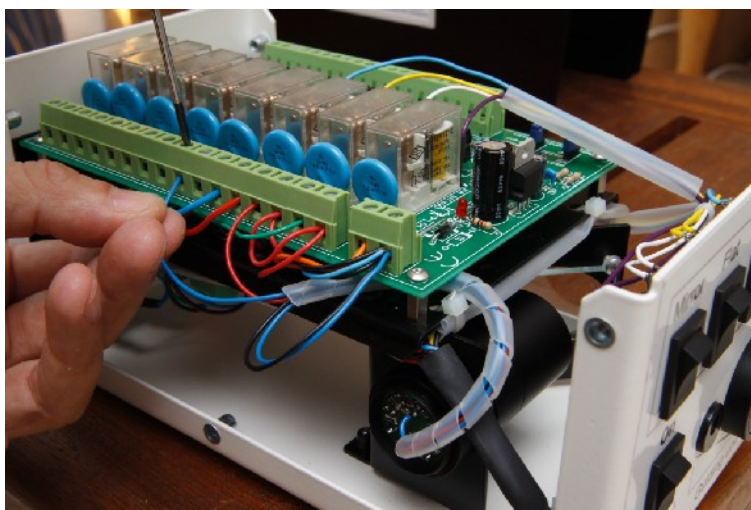
Connect one of the blue wire (Tungsten) and the black wire of the LEDs to the Ground pin :



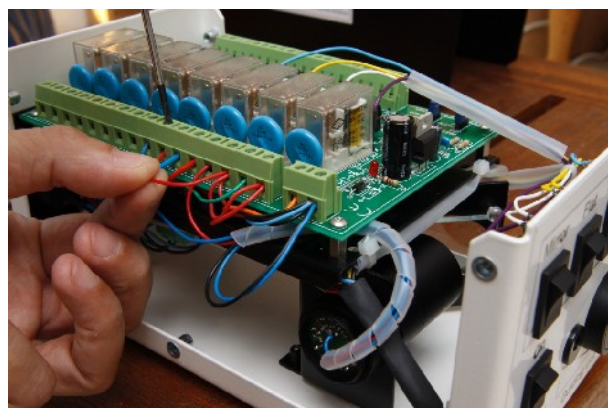
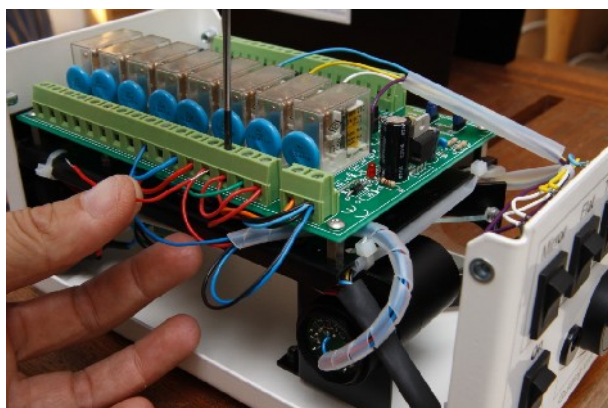
Connect the red wire (LED, +12V) to pin #2 of the control card (refer to PCB marking)



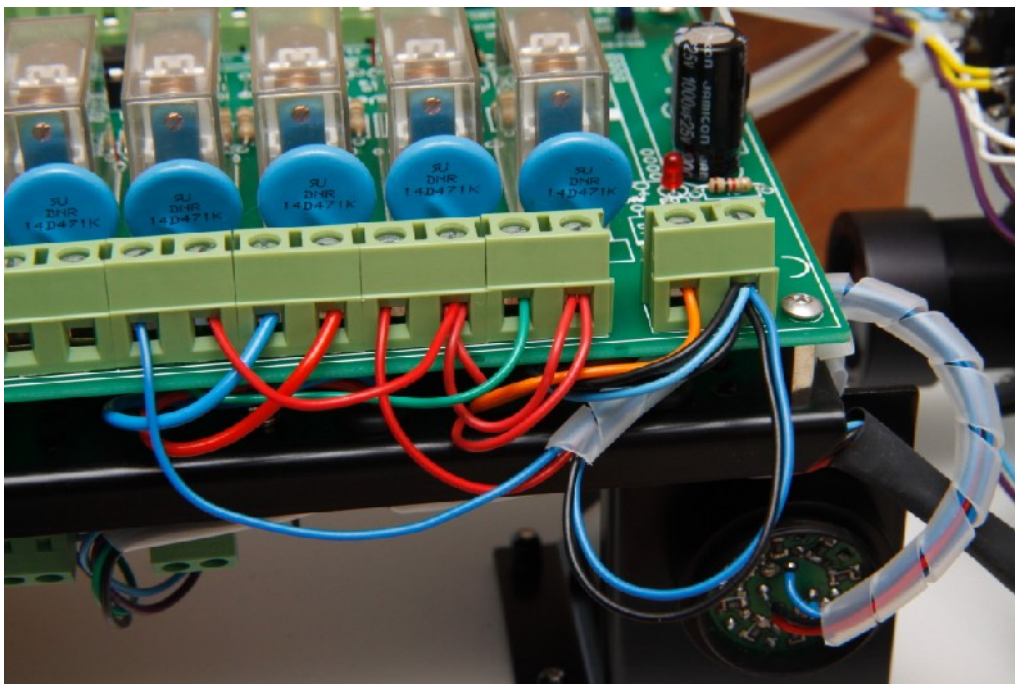
Connect the remaining blue wire (Tungsten, +12V) to pin #4 of the control card (refer to PCB marking)



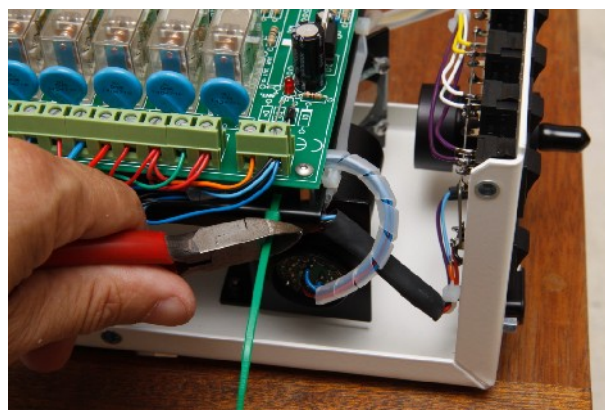
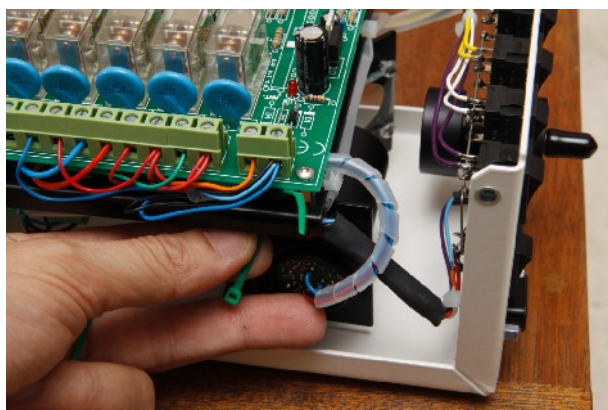
Add the complementary red wire (provided in the upgrade kit) as follow (between pin #NO2 and #NO4 on the PCB) :



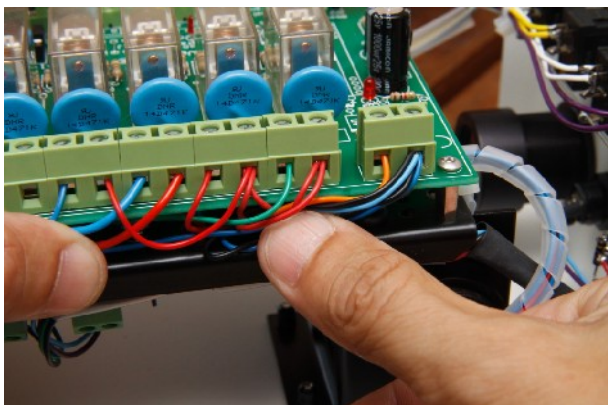
At the end, the connections must be like that :



Put a new tie rap (provided in the kit), to maintain the wires :



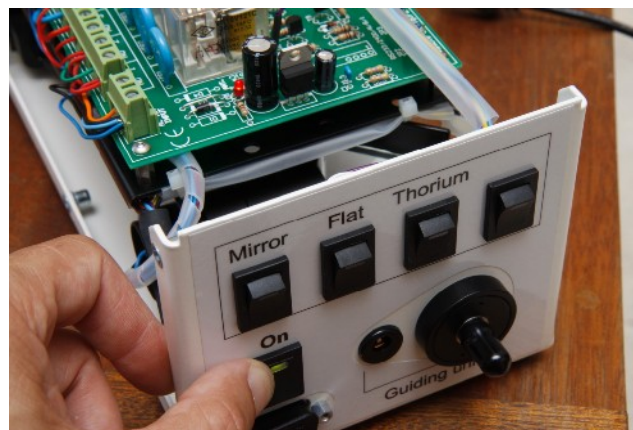
Push gently on the wires, to keep them away from the cover :



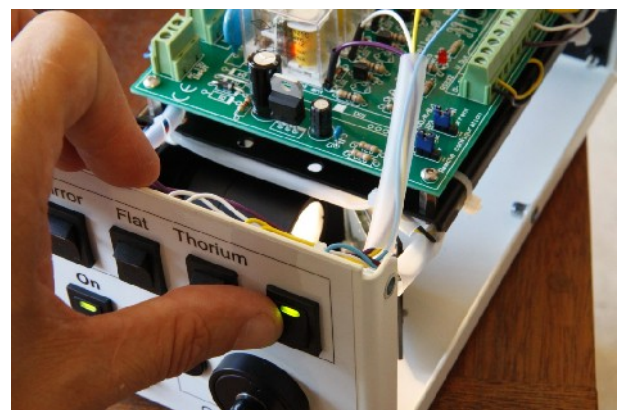
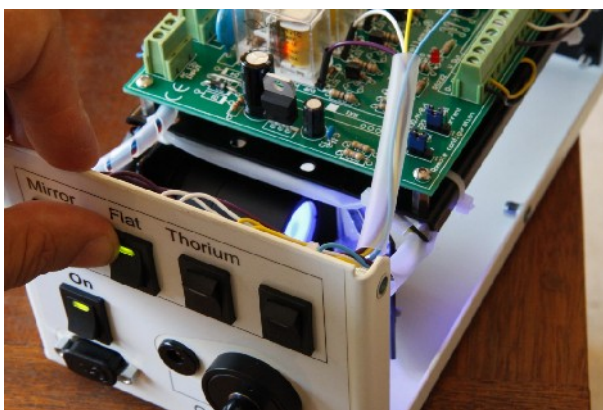
At this stage, you can supply the calibration unit with 12V (rear face connector).



Perform a quick test for the two new light sources. Switch ON the Calibration Unit :

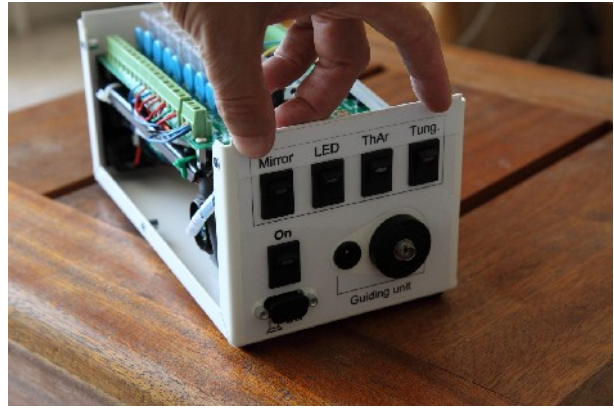
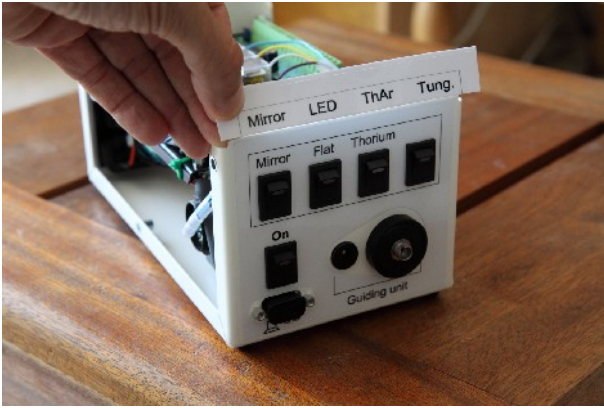


And switch on & off sequentially 2nd and 4th switches : you should see blue, then white light :



9 Front face sticker

The sticker must be placed on top of the four switches in the front, to replace old markings :



10 Close the Calibration Unit

Slide vertically the Calibration Unit cover, screw and tighten the 6 screws:



11 Final Test

Plug the power supply (12V) to the Calibration Unit.

Switch OFF all top switches (Mirror, LED, ThAr, Tungsten). Switch ON the Calibration Unit.

Switch ON the LEDs button. You must see blue light coming out the fiber connector.

Switch ON the LEDs button, and switch ON the Tungsten : You must see white light coming out the fiber connector.

Then reconnect all your cables on your Calibration Unit to use with your eShel spectrograph.

12 Appendix : Calibration Unit electronic schematics

Below is the schematic with the new flat lamp:

