Below you will find all the details to allow you to build your own Astrowl Box© and enjoy an ultra-portable Electronically Assisted Astronomy.

The most complicated part is the realization of the case in 3D printing. Not everyone has a 3D printer, but it is relatively easy to find sites online that will make this box for you from the files (STL) that you will find in the *3D directory*.

1- **<u>The equipment to buy:</u>**

- Print (or have printed via online site) the plastic case of the Astrowl Box© using the STL files present in the *3D* directory.

- A Raspberry Pi5 board, at least with 4GB of RAM (no Pi4 or before),

- A mini SD memory card (minimum 32GB, but don't hesitate to take more to have room for images). You will also need a mini SD to USB adapter to be able to connect the memory card to a computer and proceed with the installation of the program.

- A 4'' touch screen with HDMI adapter.
  It is this model, which you can also find on other platforms:
  https://www.aliexpress.us/item/3256803353079215.html?spm=a2g0o.order_list.order_list_main.17.703f1802x1YY1q&gatewayAdapt=glo2usa4itemAdapt

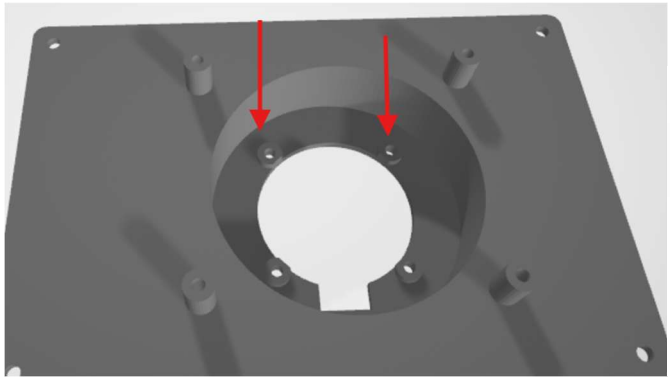
- A Raspberry camera module: Official HQ camera - C to CS mount. Upon receipt, you will have to unscrew the lower part circled in red to be able to install it in the case. There is a

small blue window in front of the sensor which is an IR filter. You can remove it or keep it depending on your future use.
This is the one, also available on many other sites: https://www.kubii.com/fr/cameras-capteurs/2950-camera-hq-officielle-5056561800127.html

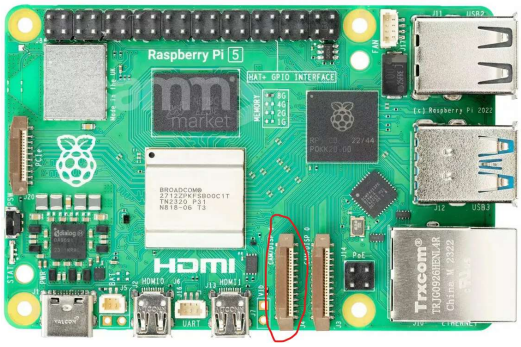
2- Assembling the Box

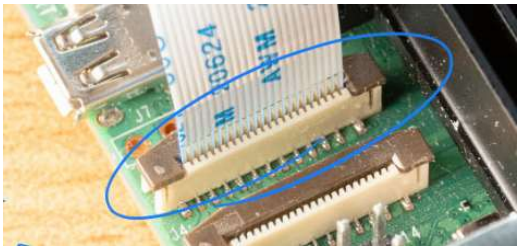
When you have all the previously listed hardware and the plastic case of the Box (3D printed by you or via an online site), follow the steps below to assemble the Box. You will also need the screws that fit well to fix the various elements on the plastic case (4 screws M3x40mm to close the box and 8xM2 to install the sensor and the Rpi5 card on the box)

- Start by installing the HQ sensor inside the round part of the case and first connect the cable (22-pin FPC), normally supplied to the sensor (be careful to respect the direction). The sensor is fixed via the 4 holes at each angle with 4xM2 screws.



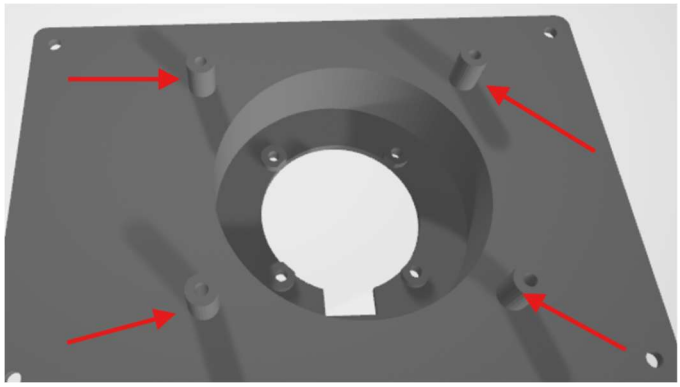
- Also connect the other end of the cable to the Raspberry Pi5 on the CAM/Disp 1 port (circled in red in the photo below). Also respect the direction of connection of the cable (see image below: the silver connectors of the cable must be oriented towards the ethernet socket).



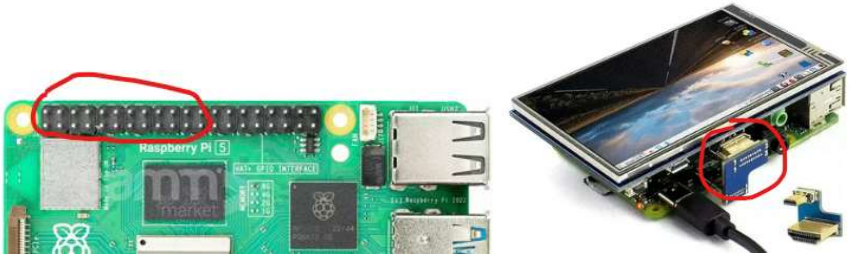


I also advise you to buy heat sinks to stick on the different components of the raspberry pi5:

- Fix with 4 M2 screws, the raspberry Pi5 board on the 4 studs of the plastic case that are around the round slot in which you put the sensor. The Pi5 board should be attached with the side displayed above towards you (not facing the sensor) and the sockets (USB and Ethernet) on the side of the Pi5 should be facing the shorter side of the Astrowl© case.



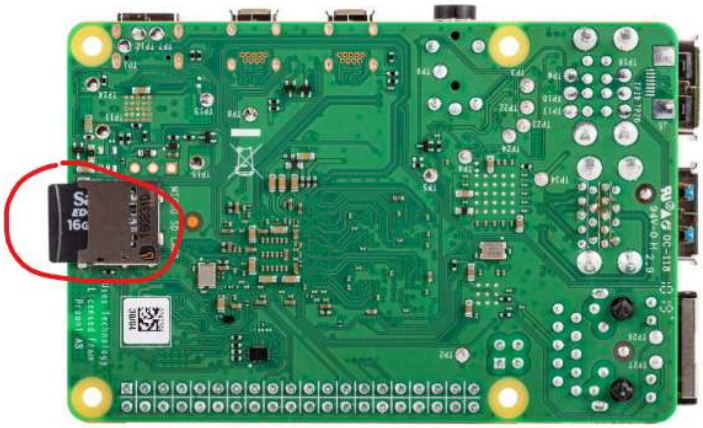
- Install the 4'' monitor by inserting it into the pins of the Rpi5 card (use the pins circled in red below) and connect the HDMI adapter between the display and the Rpi5 (as circled in red below). If you have installed the display correctly, the sockets fall well in front of their connector. If not, make sure that you have inserted the screen into the correct pins.



- You will now have to install the AstrowlBox program on the mini SD card before inserting it into the case. Download to your computer the *xxxx.img* file which is in the *Program* directory of the link I provided you.
  You then need to connect the mini SD card to your computer using an adapter. There are many (USB or others as below):

With software like Win32DiskImager (which is free or its equivalent on Mac), install the *xxxx.img* file on the mini SD card.

Once the installation is complete, you can insert the mini SD card into the Rpi5. There is a port for this purpose, located under the Rpi5 card (see photo below). Access to this port, once the Rpi5 card is installed on the Astrowl© case, is not always easy, but with tweezers it works very well.



- Before closing the Astrowl Box©, you can test that everything is working properly by connecting the Rpi5 to a suitable power supply (5 Volts). If everything is in order, the Astrowl© logo will be displayed on the screen after a few seconds, before the program launches.

- You can try connecting to the Astrowl Box© via your phone, computer, tablet by following the user manual of the Astrowl Box©.

- You can now close the case by inserting 4 screws in the right format in the 4 corners of the Astrowl Box©.

  The front of the Astrowl Box© is in Canon EOS-T and C-Mount formats. To insert the Astrowl Box© into the focuser of your telescope, you will need to buy an EOS to T2 ring and a T2 to 31.75mm (1.25'') or 51mm (2'') adapter (see photos below). From the EOS ring to T2, you also have access to a host of astronomical accessories.

I urge you to read the user manual which details everything you need to know about the Astrowl Box© : https://www.astrowlbox.com/download

And feel free to share the images you will make with the Astrowl Box© and your experience.