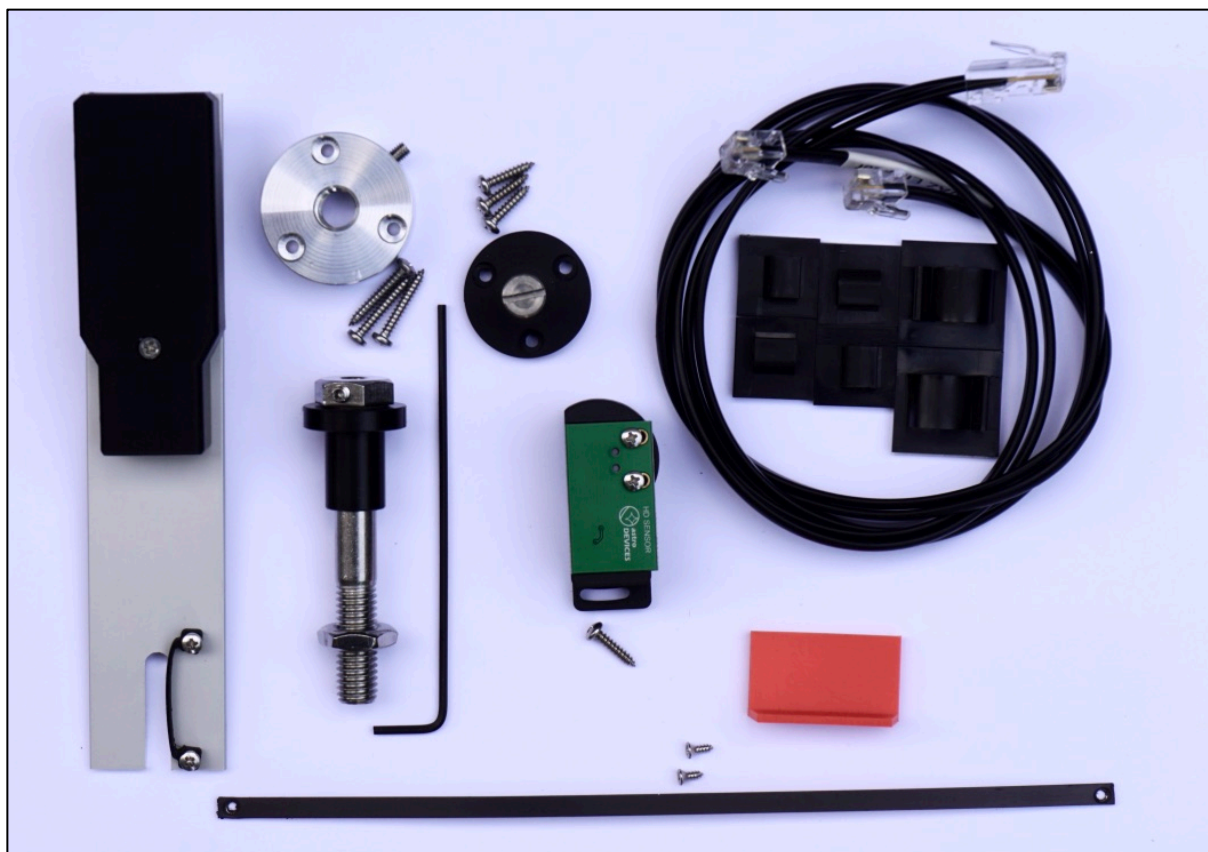


# SkyWatcher: Encoders Installation (with capacitive encoder for the AZ)

This kit is suitable for SkyWatcher classic 6"-16" and Collapsible up to 16".

Please unpack all parts from the encoder kit. Make sure that your kit contains the following parts:



Additional parts for 10":



## Encoder resolutions:

**Azimuth: 8192 steps**

**Altitude: 6"-10" - 842,700 steps, 12" - 943,000, 14"-16" - 1,308,000 steps**

**Current consumption: Azimuth - 10 mA, Altitude - 20 mA**

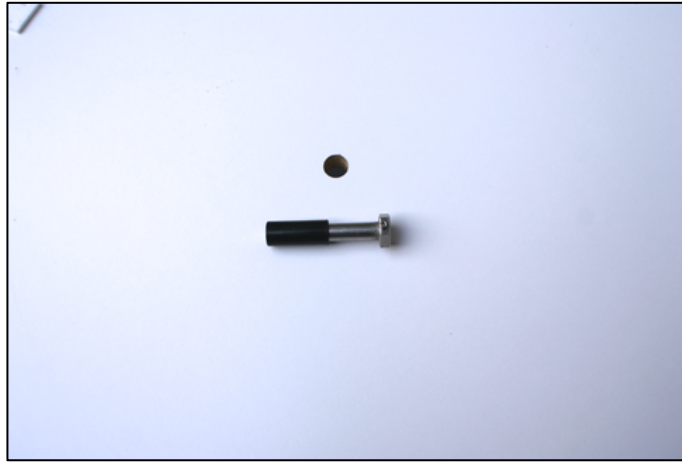
## Azimuth encoder installation

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- The azimuth pivot bolt needs to be replaced with the supplied azimuth pivot bolt. Unscrew the existing azimuth pivot bolt and remove the rocker box (put away the bolt and the nut but keep the plastic bushing):



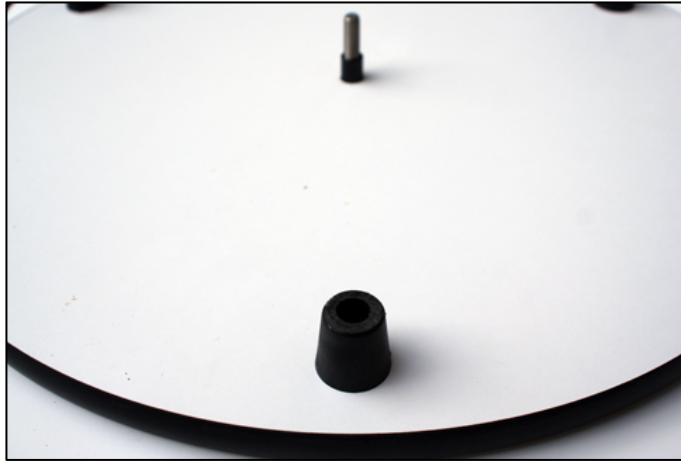
- Locate the new azimuth pivot bolt, insert it into the plastic bushing:



- Insert the bolt with the bushing into the hole in the ground board:



- Turn the ground board upside down while holding the bolt in place:

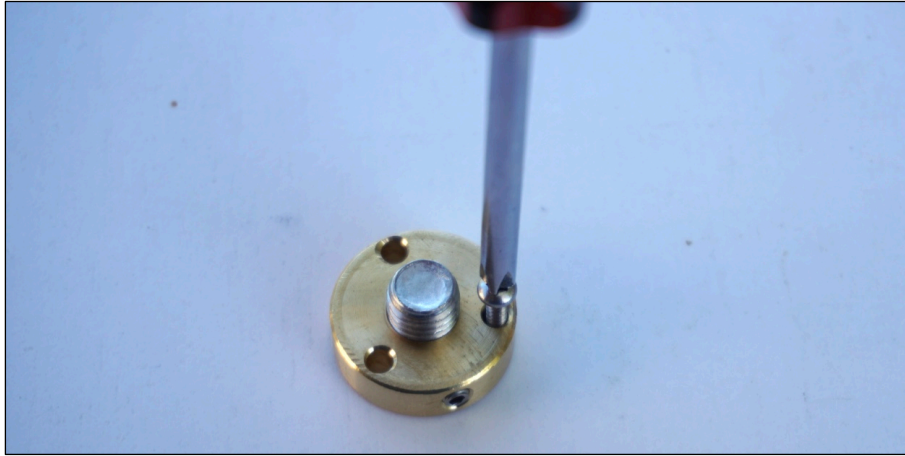


- Locate a square aluminium mounting plate
- Screw the mounting plate onto the bolt with the surface with concentric circles finish facing the ground board



- Pre-drill holes and fix the mounting plate with the screws provided





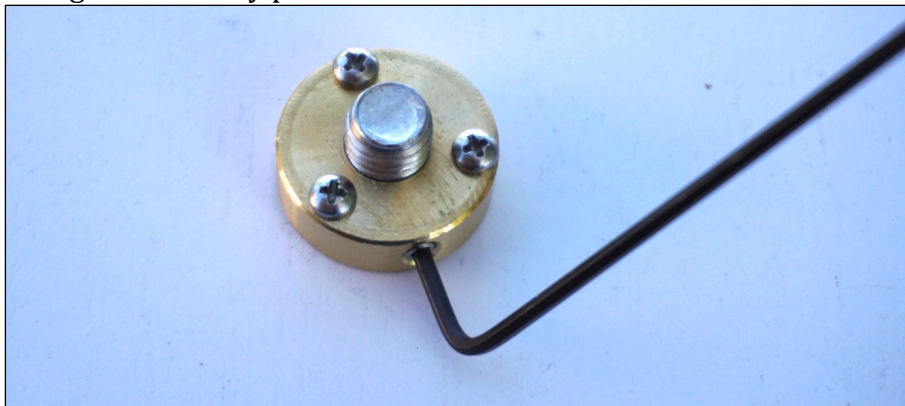
- Unscrew the bolt, turn the ground around, insert the plastic bushing and a white plastic washer



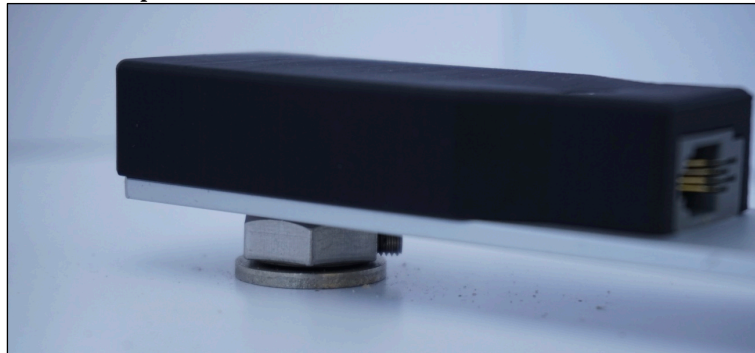
- Carefully put the rocker box on top of the ground board, insert the bolt with a metal washer and screw it tightly (but make sure that the rocker box can rotate):



- Put the rocker box with the ground board on its side and fix the pivot bolt by tightening the set screw using the allen key provided:



- Position the rocker box with the ground board normally and insert the azimuth encoder's shaft into the hole in the pivot bolt:



- Insert the anchor bolt into the slot on the encoder's arm, mark its place with a pencil:



- Remove the encoder and fix the anchor bolt's foot with the screws provided:
- Put the encoder back on, tighten the set screw (on the pivot bolt to hold the encoder shaft), connect the encoder cable:



### Altitude Encoder Installation (6"-8", 12"-16")



For the installation of the altitude encoder on 10" version only refer to the next section of this document.

The following parts are required to install the altitude encoder:



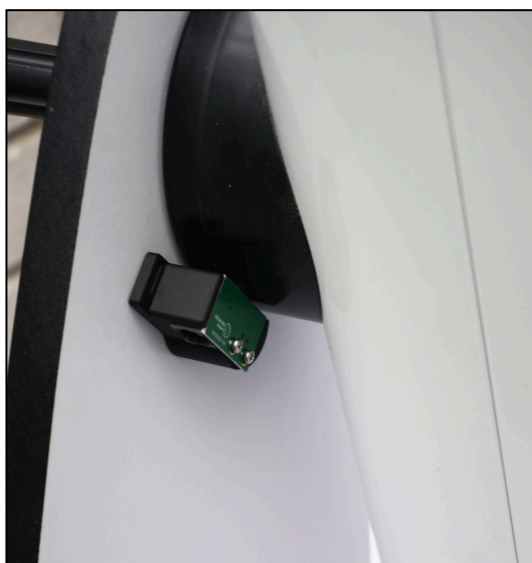
The altitude encoder can be installed on either altitude bearing. However the encoder reader will be easier to install on the left side wall of the rocker box – left side wall shown in the photo below.



The encoder reader is installed on the front bearing cylinder (the same side where the wall connecting two side walls of the rocker box is). Start with removing the OTA from the rocker box. Then clean the front half of the left altitude bearing with an alcohol wipe:



Then put the OTA back in. Lower the telescope down and slide the reader over the front bearing cylinder:



Now you will need either a pencil or a safety pin to put a marking on the altitude bearing. You need to mark where the magnetic tape will be installed.

Position the telescope vertically or even past 90° so the bottom of the OTA will touch the front wall of the rocker box:



Now mark the altitude bearing just past the body of the encoder reader with a pencil (it might be easier to use something like a safety pin to put a small scratch instead):

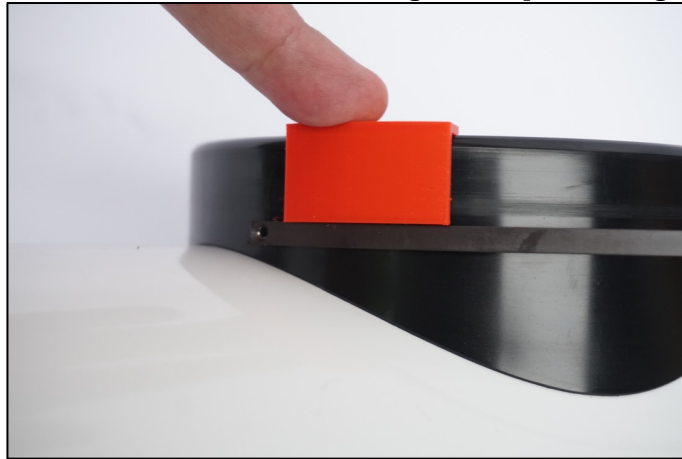


Now remove the OTA from the rocker box. Remove the protective paper from the back of the magnetic tape:

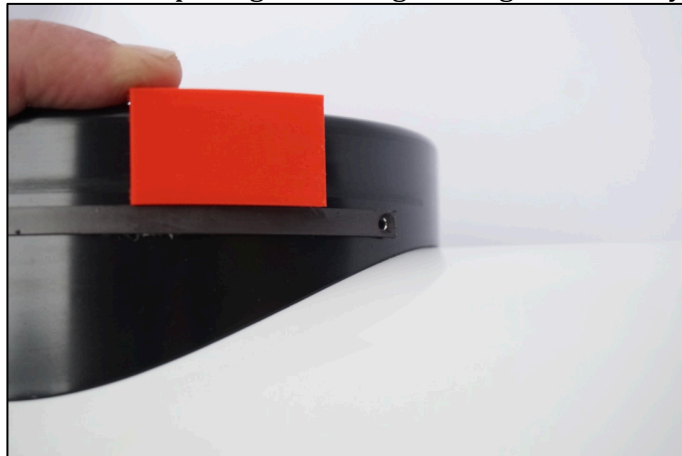




Use the spacing tool to control the distance of the tape from the edge of the bearing. Here the lower part of the OTA is on the left. Position the end of the magnetic tape starting from the marked position.



Use a soft cloth or a paper towel to put pressure on the tape so it adheres to the surface of the bearing without any gaps. Move the spacing tool along the edge all the way until the end of the tape:



Put the OTA back into the rocker box:



Move the OTA all the way down and make sure the end of the tape does not go beyond the reader's top edge.

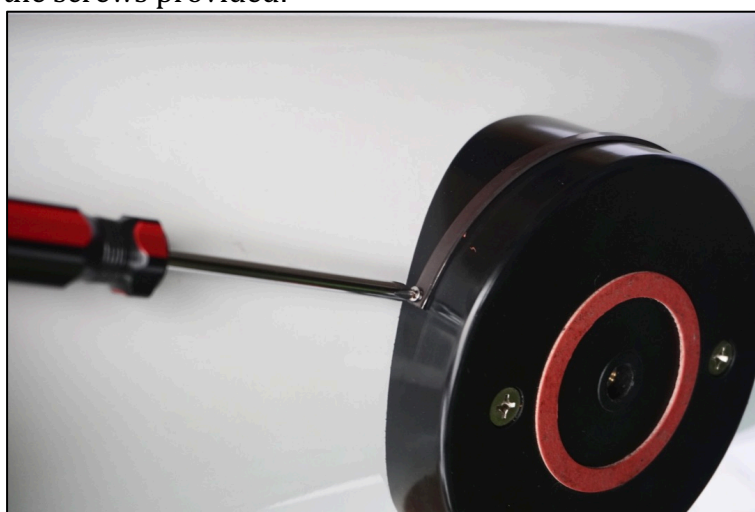
The photo below shows the required gap between the reader and the tape. The gap is controlled by rotating the reader around the bearing cylinder:



Now you need to drill a small hole in the bearing – use 1.5mm or 1/16" drill bit. Drill holes at both end of the tape.



Then fix the end with the screws provided:

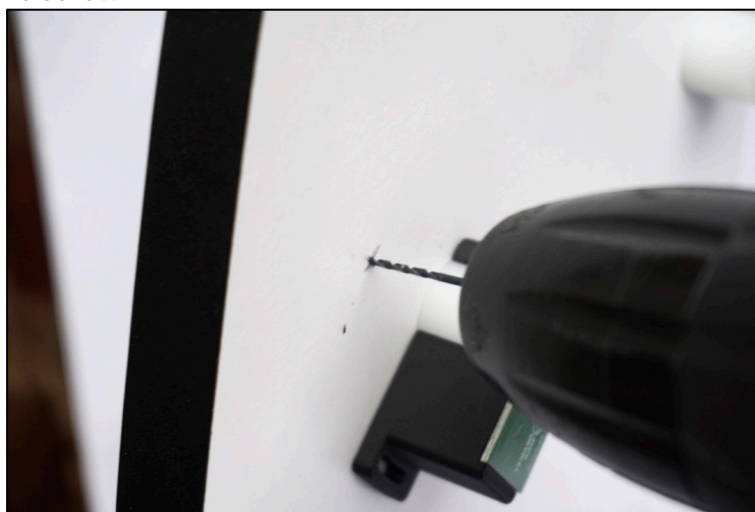


Now put the OTA back into the rocker box and make sure that the reader is positioned correctly and does not rub the surface of the magnetic tape.

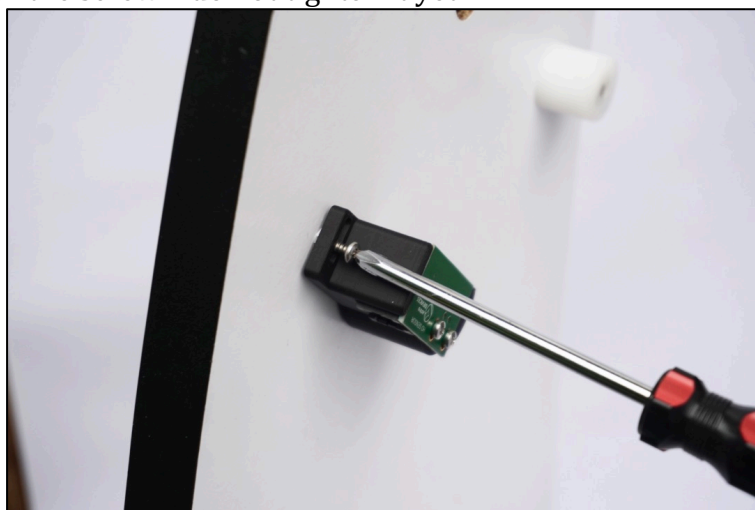
Use a pencil to mark the centre of the slot on the reader:



Drill a small hole for the screw:



And fix the reader with the screw – do not tighten it yet:



Put the OTA back into the rocker box and make sure the gap between the reader and the tape is ~0.8mm. Then tighten the screw:



Then carefully remove the OTA by making sure the reader is not moved.

### Altitude Encoder Installation (10" only)



For the installation of the altitude encoder on 6-8" and 12"-16" versions refer to the previous section of this document.

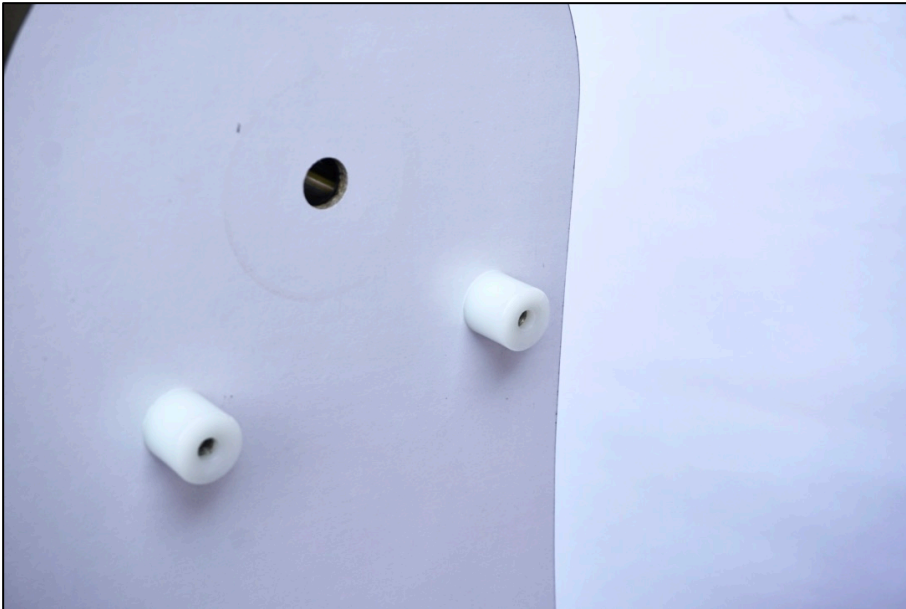
The following parts are required to install the altitude encoder:

The altitude encoder can be installed on either altitude bearing. However the encoder reader will be easier to install on the left side wall of the rocker box – left side wall shown in the photo below.

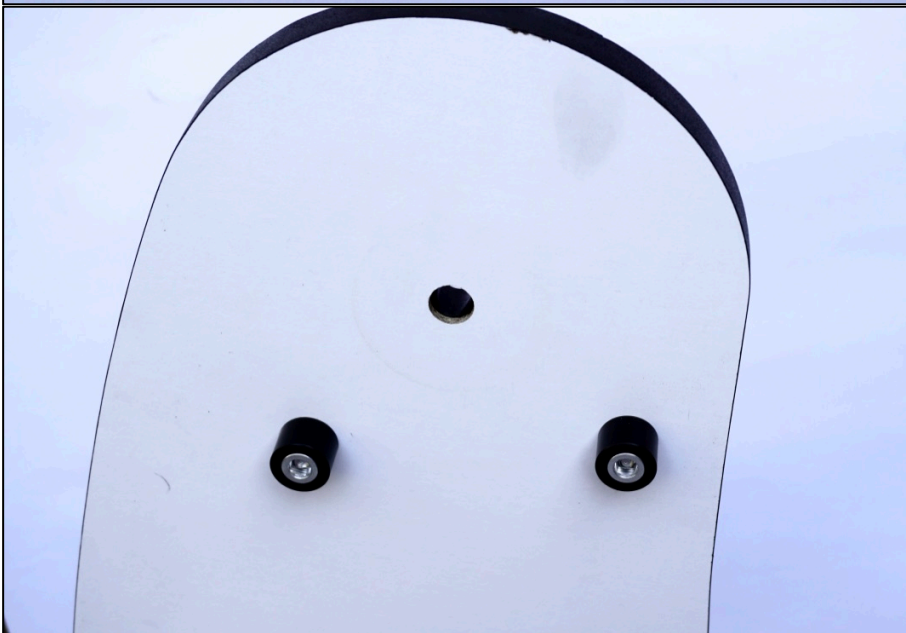


Remove the existing nylon bearings

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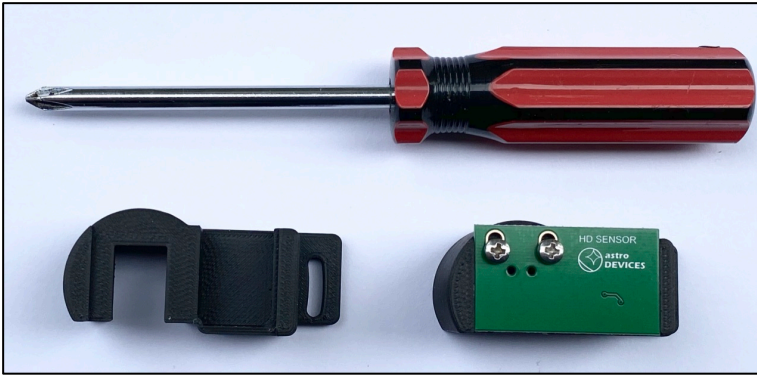


And install two bearings provided with the kit:



Prepare the encoder reader. You need the following parts:

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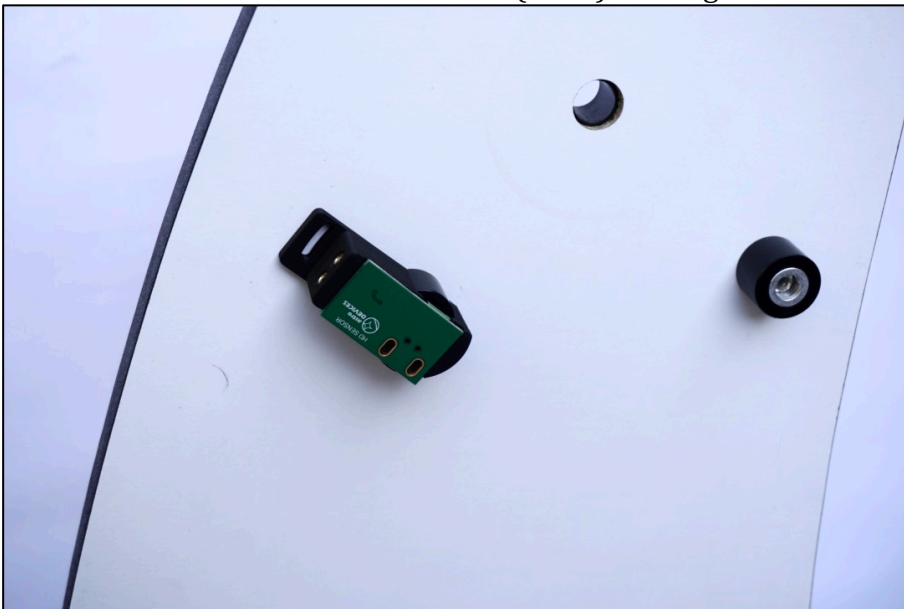
Remove the reader PCB and move the PCB to the other housing:



Put the screws into the housing and tighten them carefully (finger tight):



Slide the encoder reader over the left (front) bearing



Put the OTA on the right bearing with the left bearing facing up. This bearing will be on the same side as the encoder reader when the OTA is installed on the rocker box.



Clean the smaller part of the bearing with IPA:



You will now need the following parts:



The magnetic tape will be positioned at the bottom of the smaller part of the altitude bearing:





You will need to remove drill a hole using the provided drill bit approximately at the bottom most point of the bearing:



Remove the protective film from the back of the magnetic tape:



Now fix the tape to the bottom part of the altitude bearing with the provided screw:



Use a soft cloth to attach the tape firmly to the bearing:



Drill the second hole at the end of the tape and fix that end to the altitude bearing:



Now put the OTA back on the rocker box and make sure that the top of the reader PCB is a line tangent to the circle of the altitude bearing:



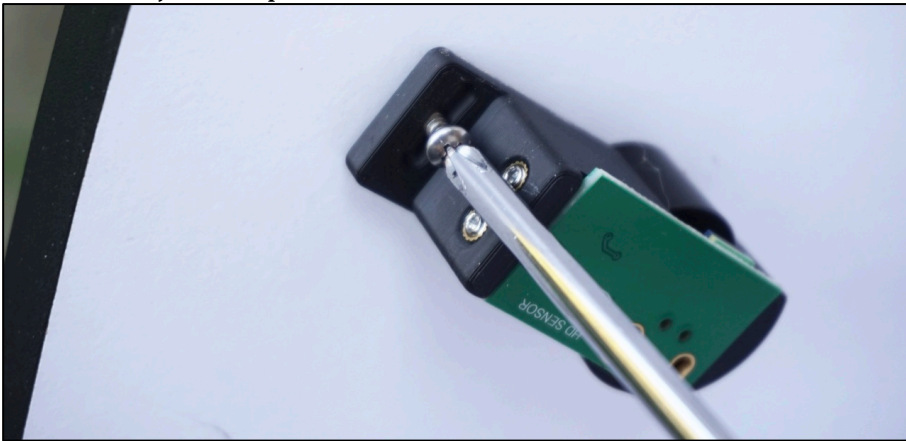
Remove the OTA again and use the pencil to mark the middle of the slot in the reader's housing:



Drill a hole around 6-9mm deep:



Fix the reader to the side wall making sure the housing does not move. You can always loosen the screw to adjust the position of the reader.



Put the OTA back on the rocker box and examine the gap between the encoder reader's top and the magnetic tape – it should not exceed 0.8mm (ideally it should be 0.4mm)



### Finished!

Now connect the encoder cable and plug it into the DSC. Please make sure to set the encoder steps in your DSC to the values specified on the front page of this manual.