

SkyWatcher StarGate 18" & 20": Encoders Installation

Please make sure that you have all the parts included in the kit:



Azimuth Encoder resolution: 655360 steps

Altitude Encoder resolution: 815000 steps

Current consumption: 20 mA each

This instruction booklet shows the installation procedure for each encoder.

Tools and materials required:

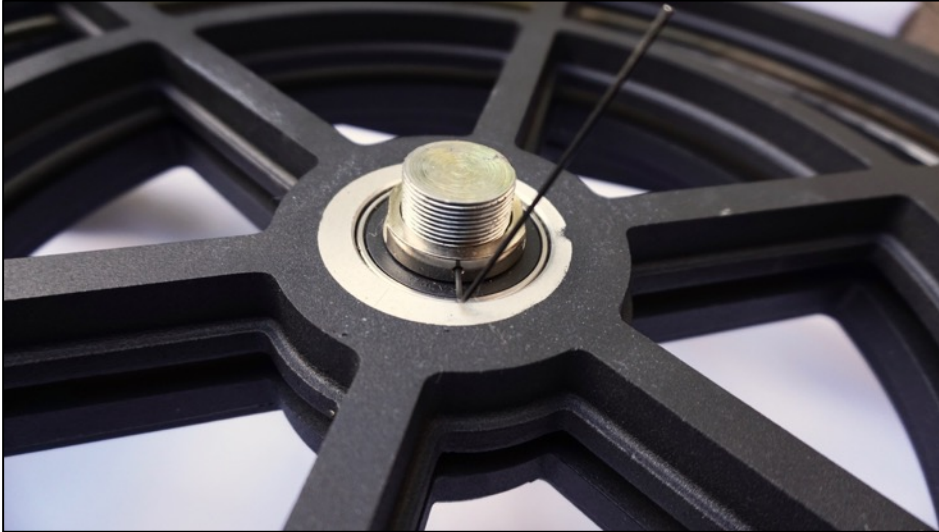
- Allen key 1.5mm(supplied), 4mm & 5mm (not supplied)
- Philips head screw driver (not supplied)
- Silicone glue
- Epoxy glue
- Rubber hammer



Do not subject encoder disks to magnetic fields as it may affect the magnetization of the magnetic multi-pole rings.

Azimuth encoder installation

1. We start with unwinding the lock nut at the bottom of the azimuth pivot bolt. Please flip the ground board and loosen the set screw using the supplied Allen key:



and unwind the lock nut:



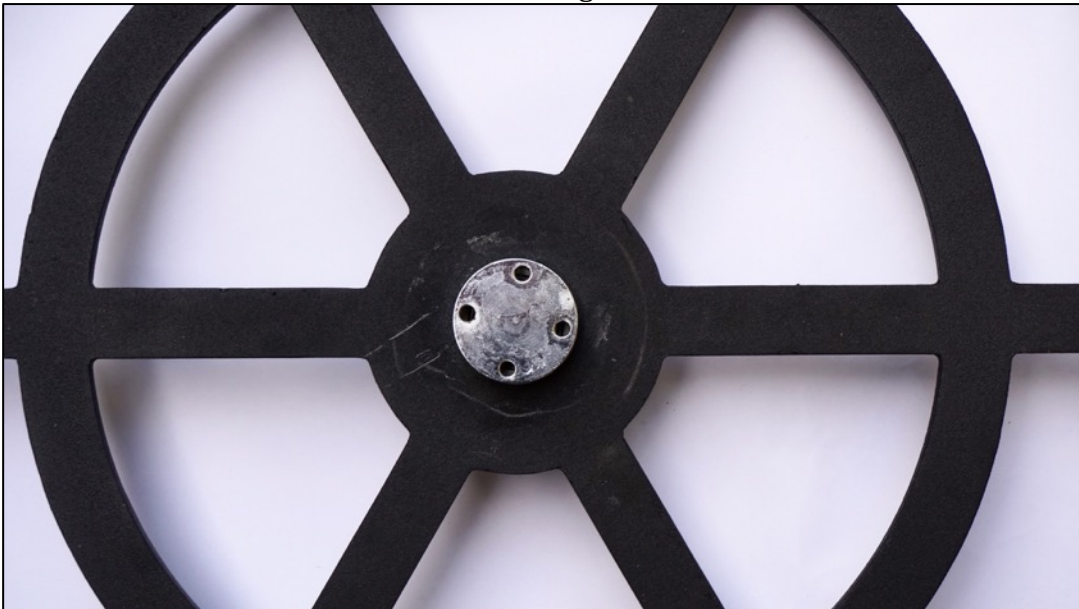
2. Now flip the ground board with the virtual rocker box around. Please remove four screws holding the pivot bolt using 5mm Allen key:





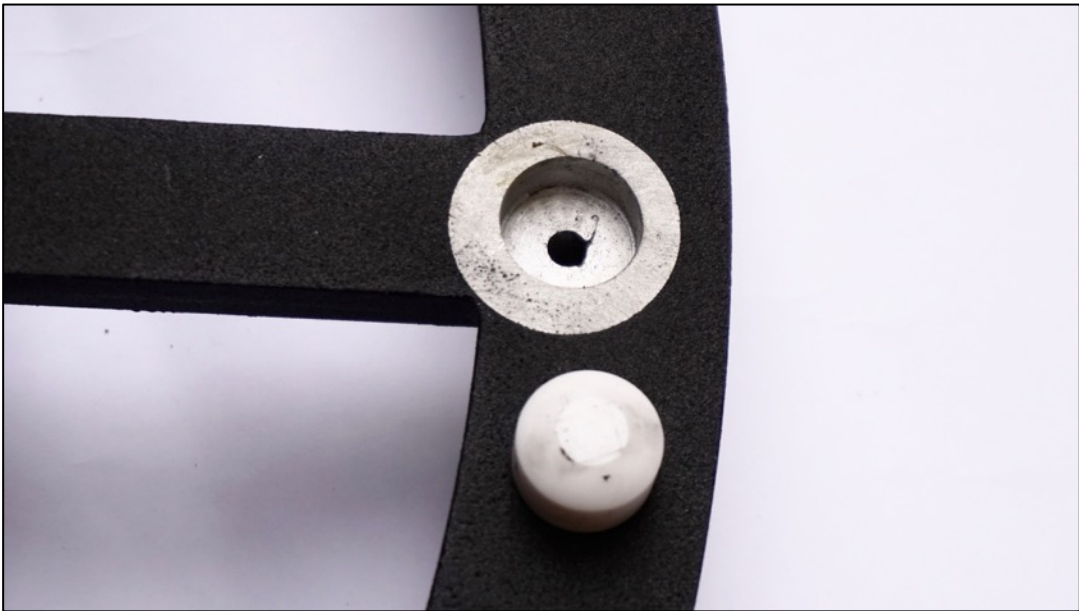
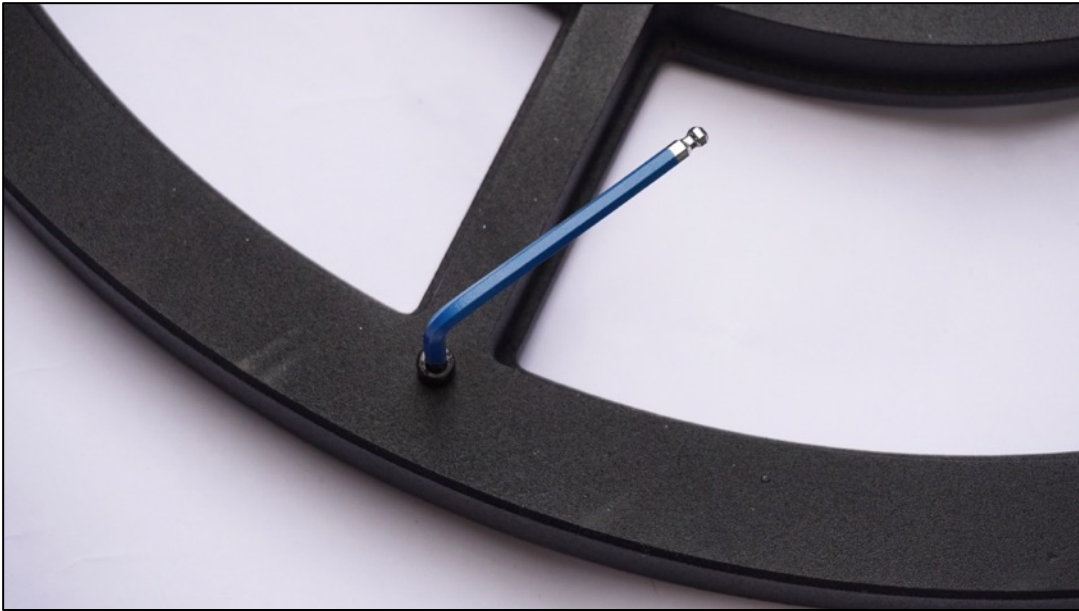
Note: you will need three of the screws later.

3. Remove the virtual rocker box from the ground board:



4. Now we need to raise the Teflon cylinders higher in order to increase the spacing between the ground board and the virtual rocker box. Flip the ground board and remove the screws holding the Teflon cylinders using a 4mm Allen key:





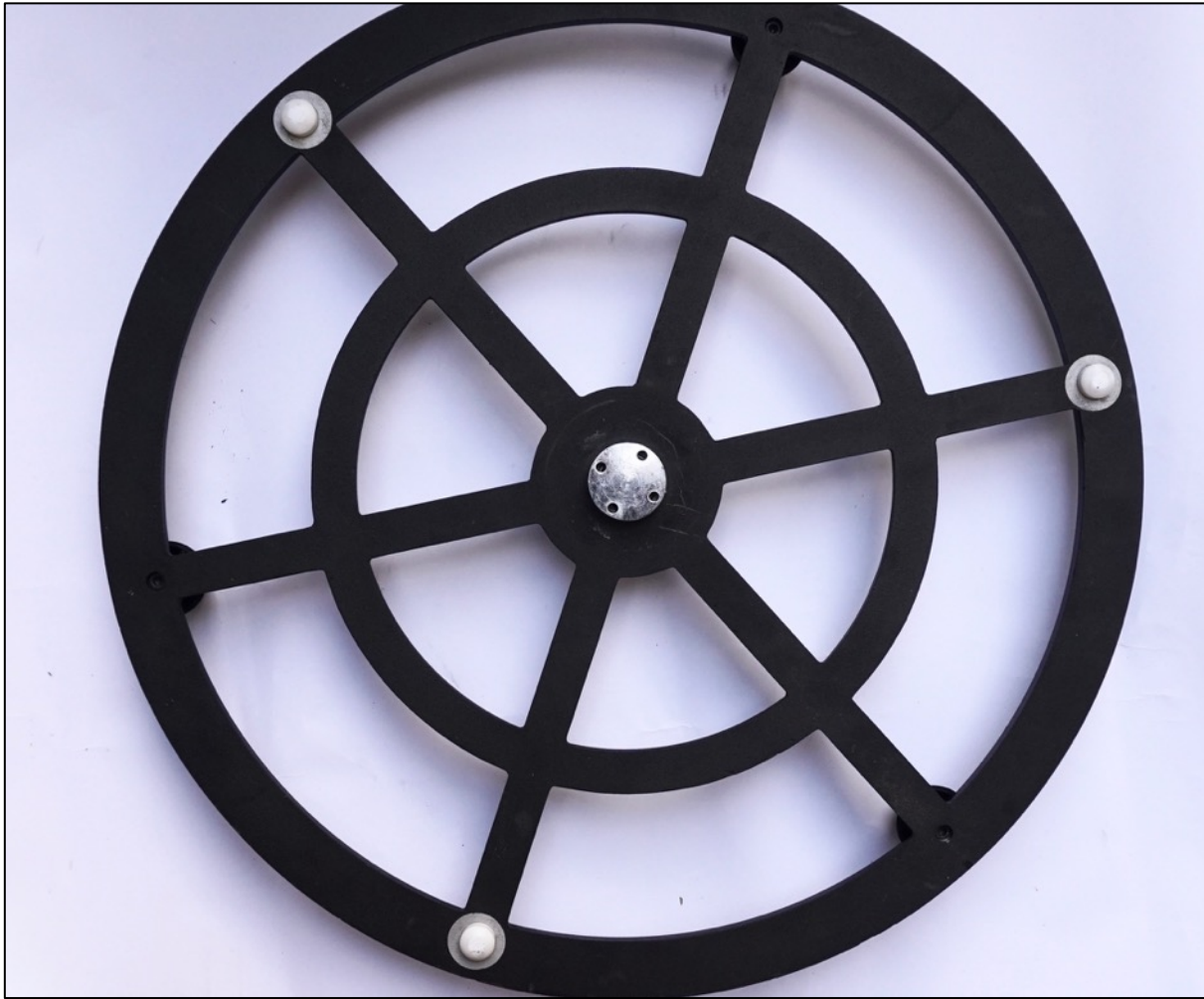
5. Now you will need a spacer and an M5 screw from the kit:



Insert the spacer, then the Teflon cylinder and fix it with the screw.
Note: please do not tighten the screw too much or the thread may get damaged.



Repeat the procedure for the other two Teflon cylinders.

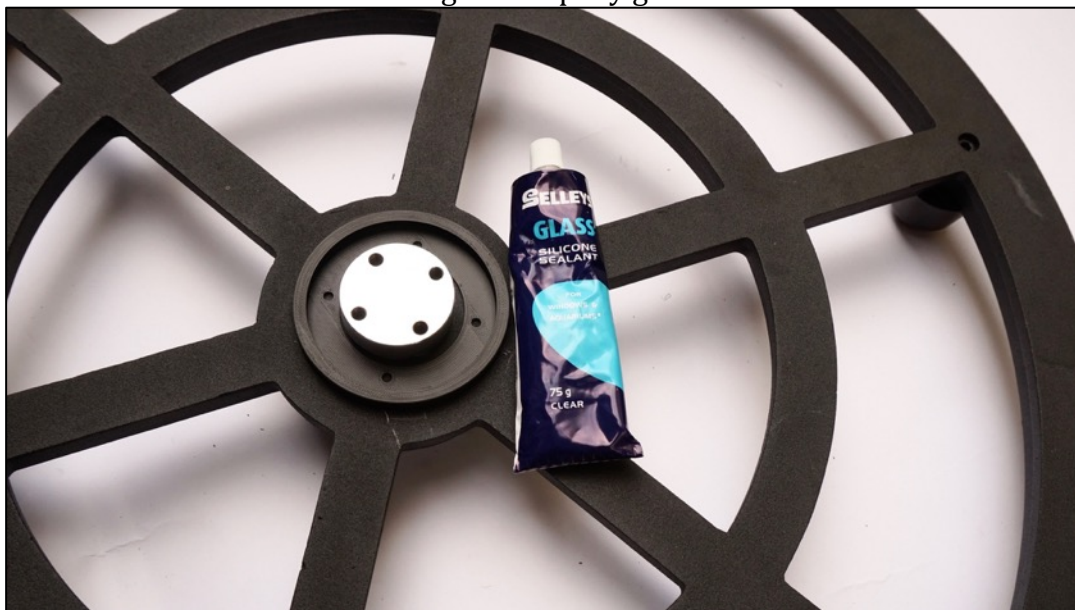


Installing the magnetic encoder ring

You will need the following parts from the kit: ring mounting adapter, magnetic ring and alignment tool:



You will also need either silicone glue or epoxy glue:



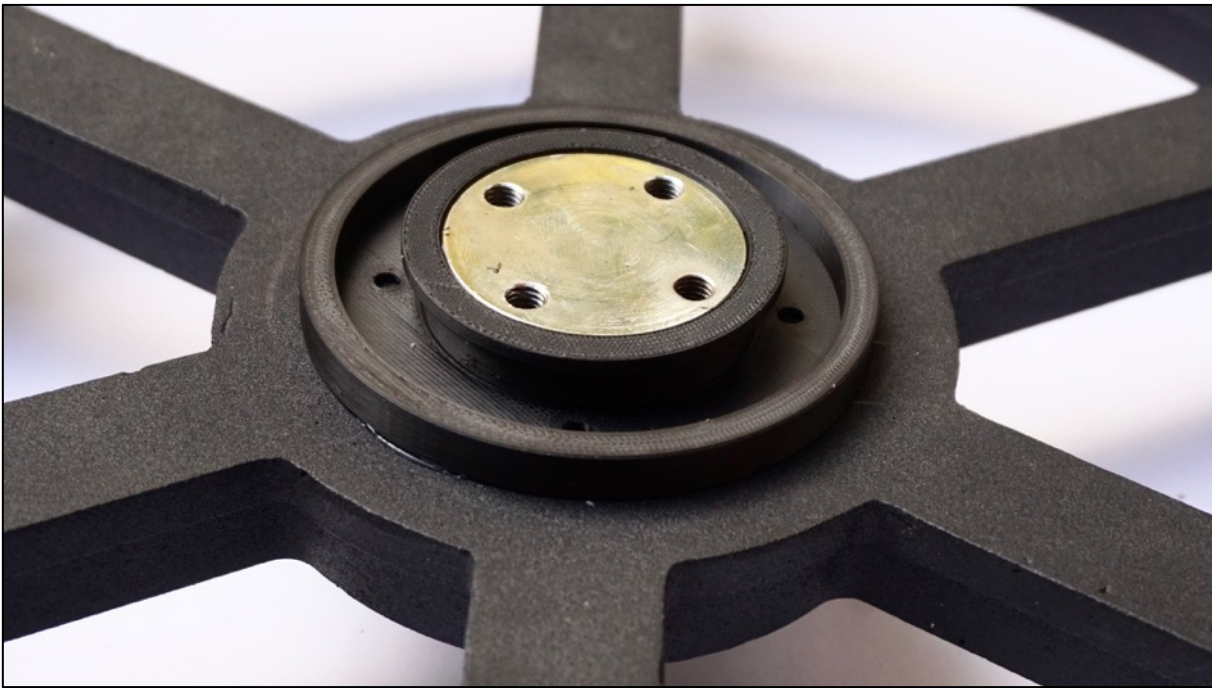
Put a small amount of glue on the back of the ring mounting adapter:



And put the adapter on the ground board (you may need to clean the surface with isopropyl alcohol or similar before this):



Slide the alignment tool over the pivot bolt:

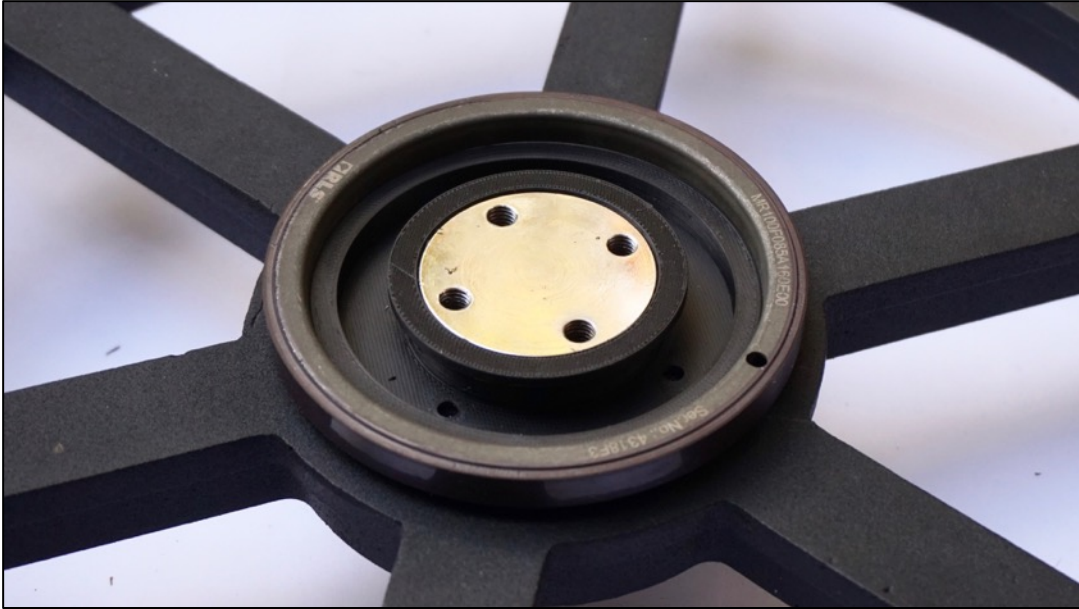


Please rotate the adapter back and forward a bit to distribute the glue uniformly.

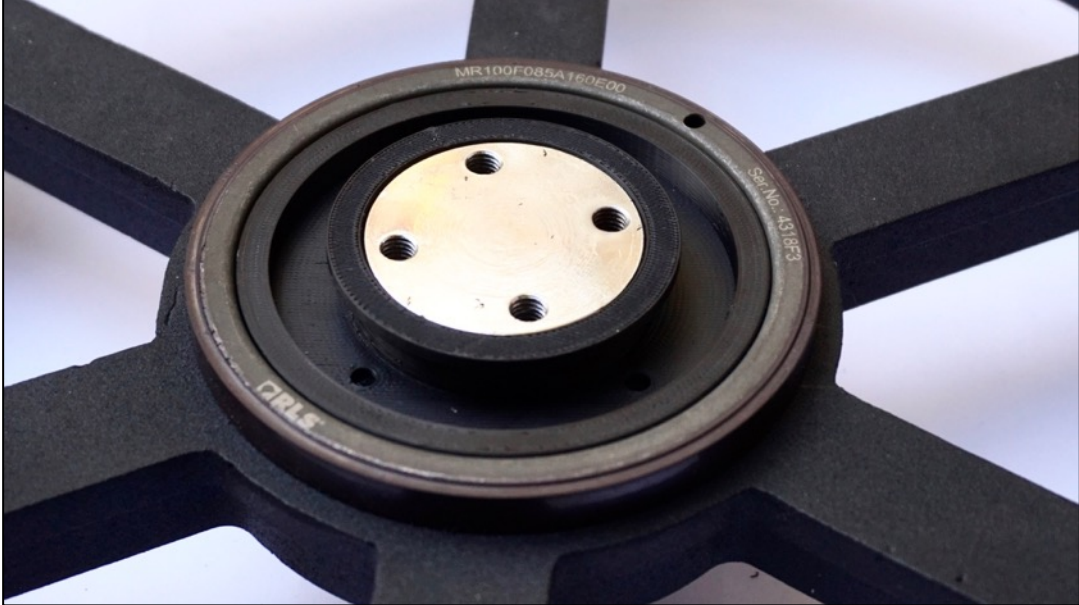
Then push the alignment tool all the way in - this is an absolutely critical step - this will make sure the magnetic ring is positioned with the pivot bolt in its centre.

Wait until the glue is set – in case of using the silicone glue you may need to wait for 24 hours.

Now the magnetic ring should be installed like it is shown in the photo:



Press uniformly on all sides on top of the ring until it is sitting on the ground board:



You may need a rubber hammer for the next step. The pivot bolt needs to be pushed in so it can reach the mounting holes in the virtual rocker box. Flip the ground board and use the hummer if required:



Push the pivot bolt with the hummer:



Now flip the ground board again and put the virtual rocker box back carefully aligning mounting holes with the threaded holes in the pivot bolt:



Now put the three screws only into the holes shown in the next photo (the hole at the bottom left should not be used):



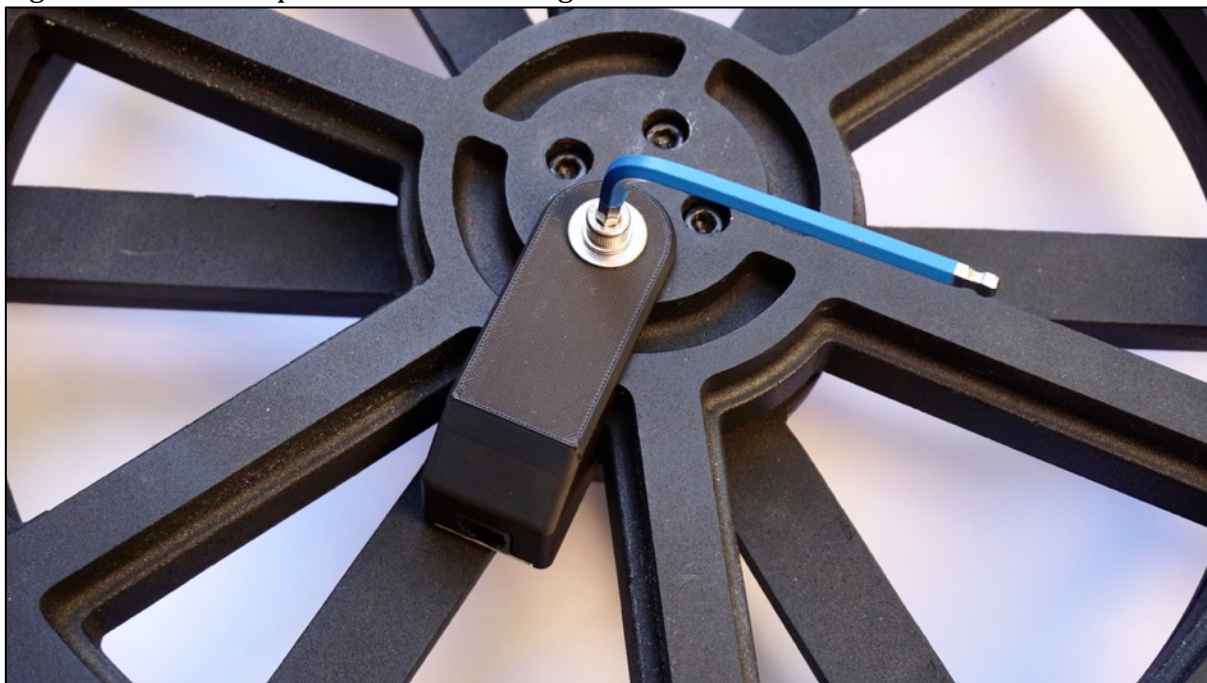
Tighten the screws:



Now you need to install the azimuth encoder sensor:



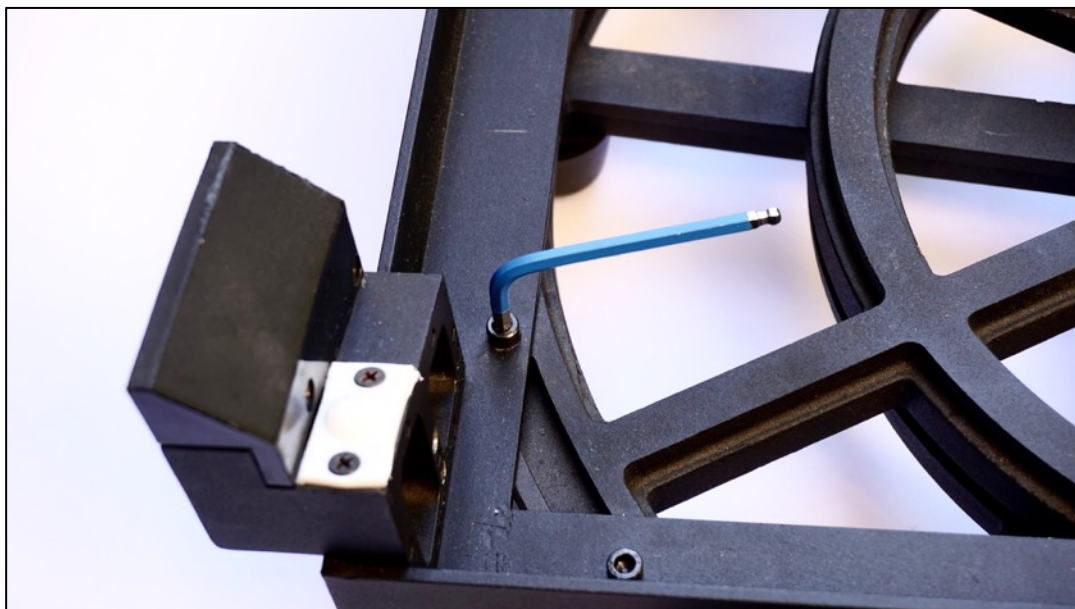
Tighten the screw – please do not over-tighten it:



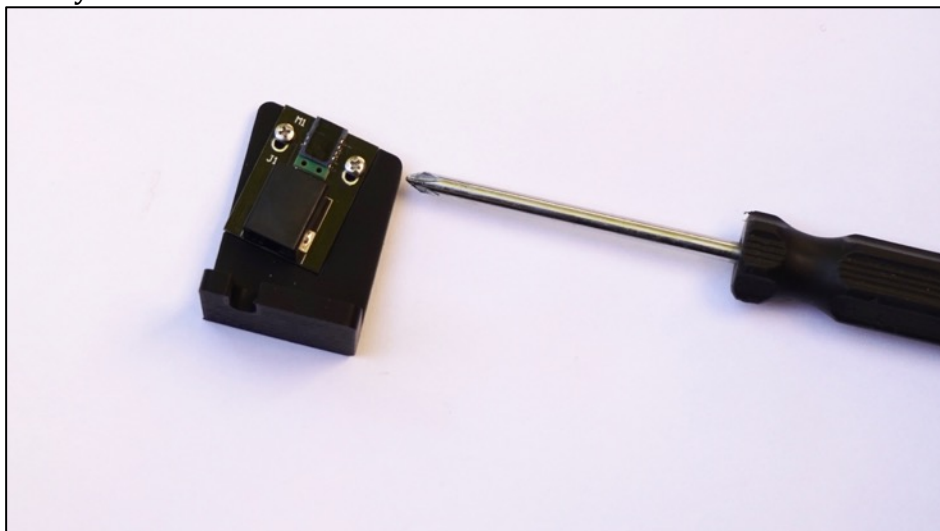
Azimuth encoder installation is done!

Altitude encoder installation

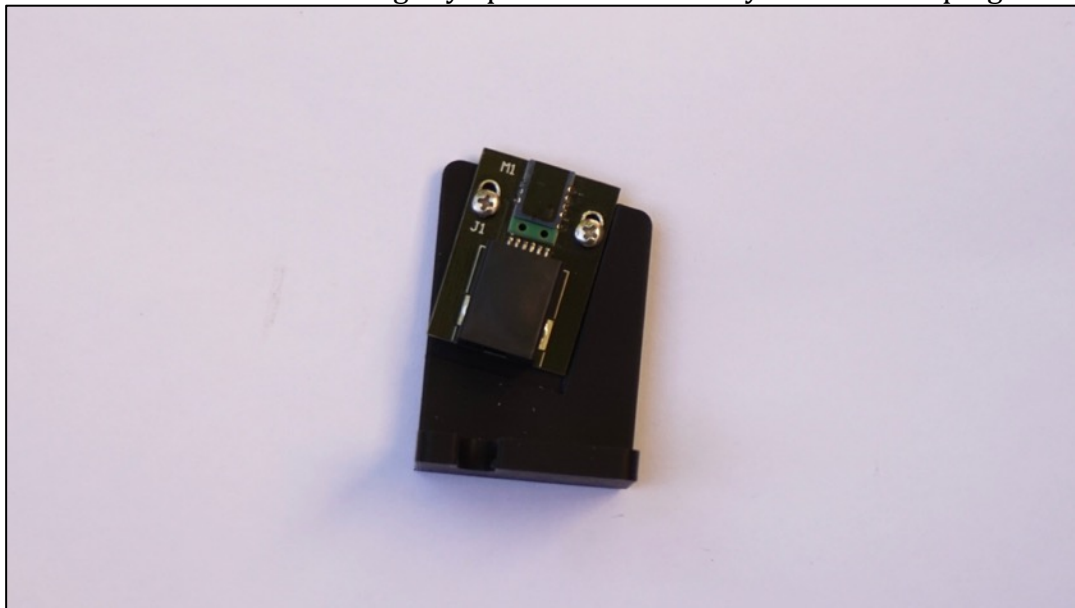
Start with removing the screw as shown below:



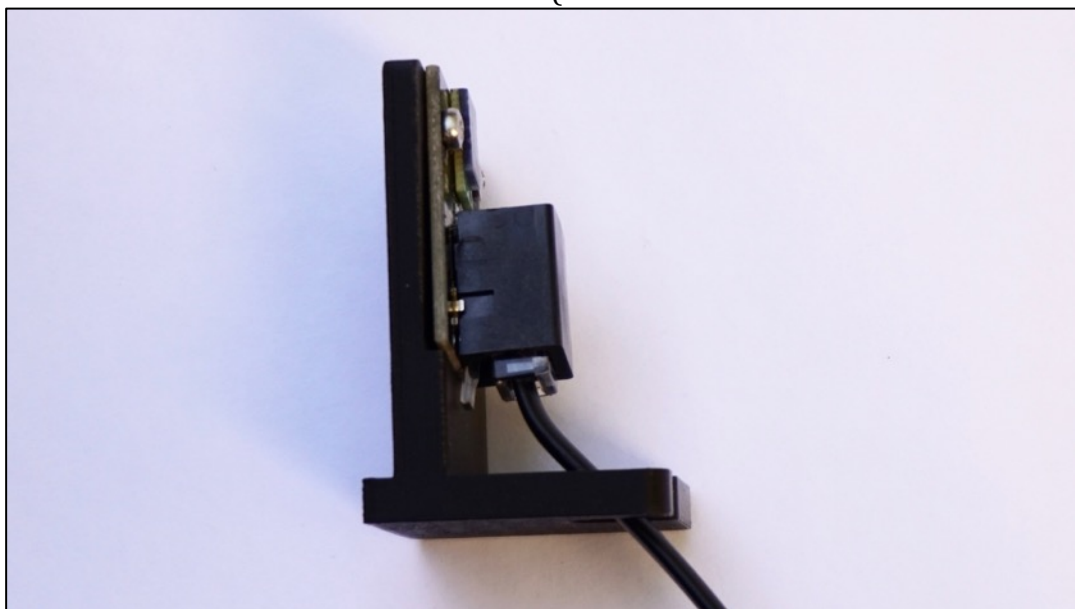
Next you need to loosen the screw on the altitude encoder sensor:



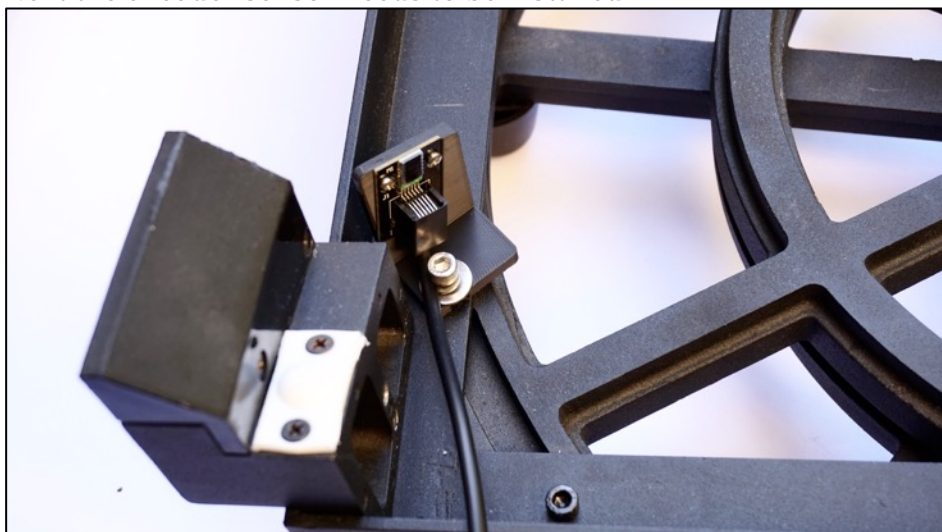
And move the sensor PCB slightly up – that is necessary to be able to plug the encoder cable in:

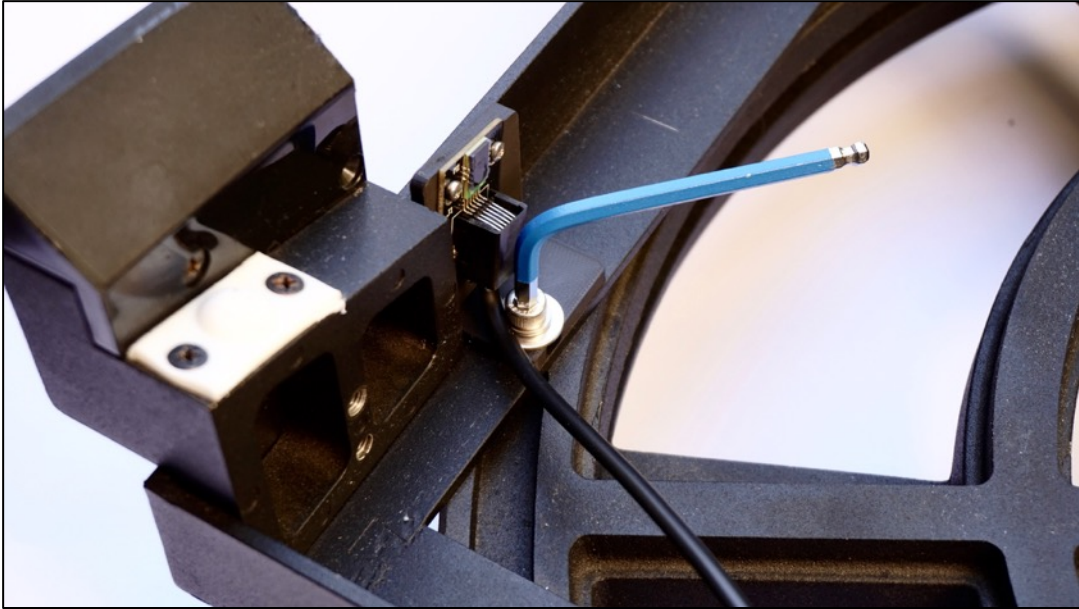


Now connect the altitude encoder cable (the altitude encoder lead is not labelled):



Next the encoder sensor needs to be installed:

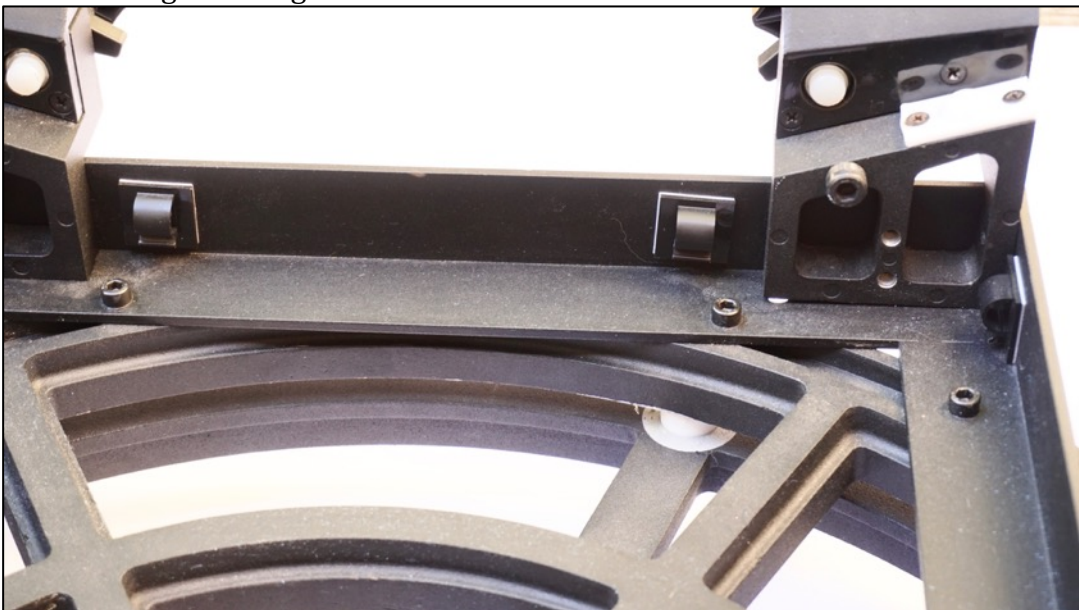




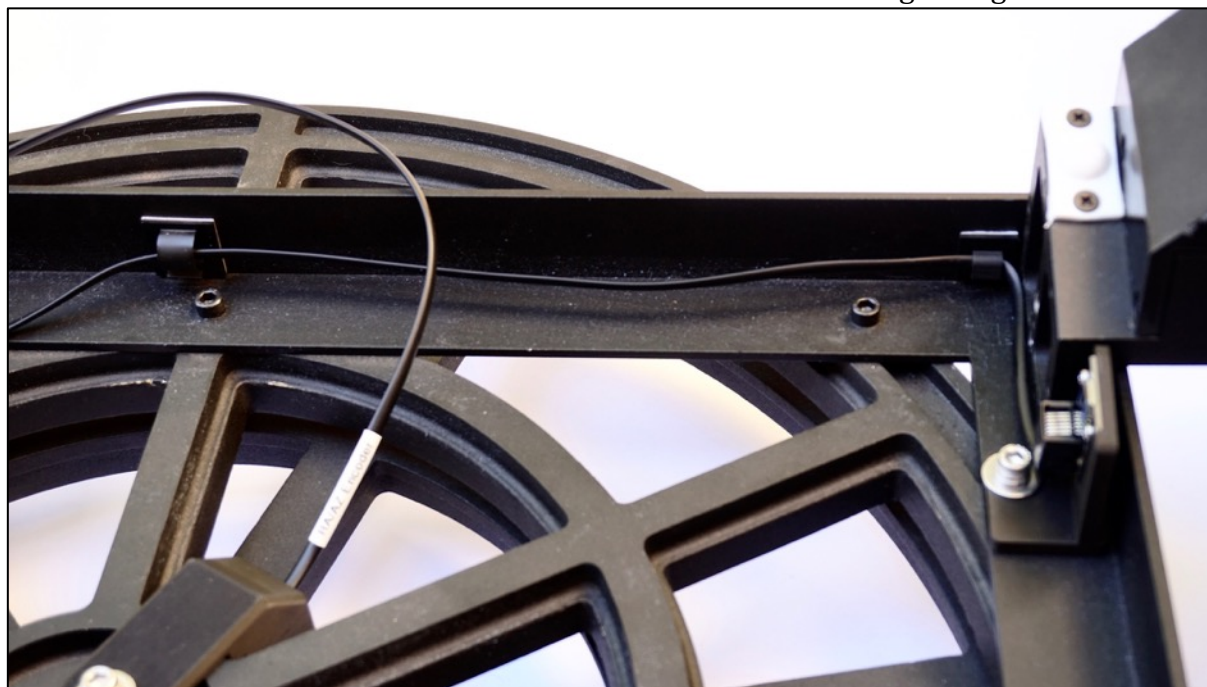
Next you need to install the cable guides – one small on the right and two small on the left:



And two larger cable guides:



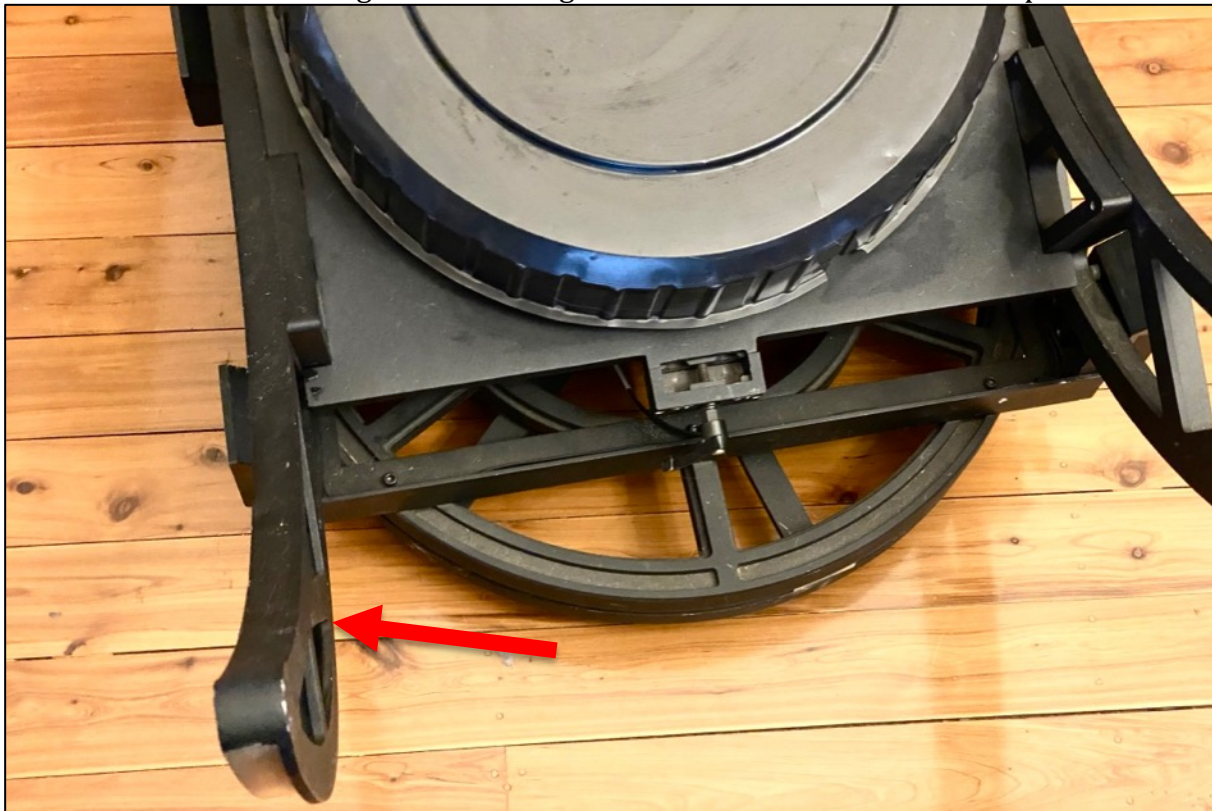
Now connect the azimuth encoder cable and feed the cables through the guides:





Now you need to install the magnetic encoder tape on the side bearing.

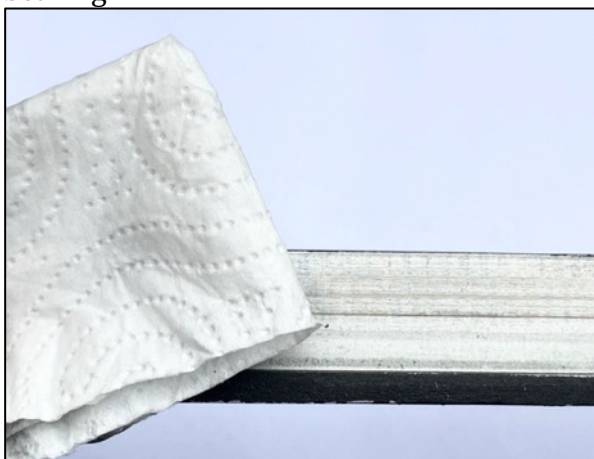
You need to remove the right side bearing – shown with a red arrow in the photo below.



You will need the following items for the installation:



Soak the paper towel with the isopropyl alcohol and clean the bare aluminium surface of the bearing:



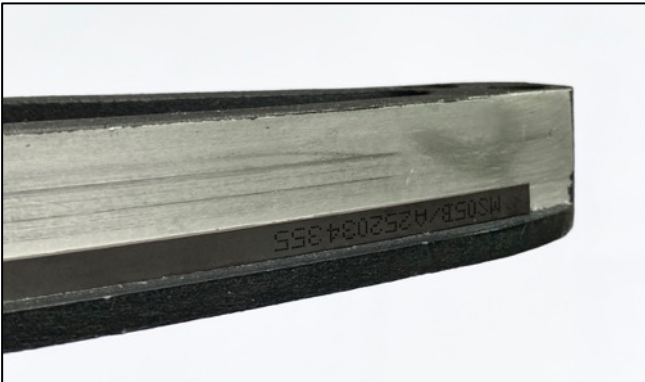
Peel the protective from the end of the tape:



Now position the exposed end of the tape as shown:



Use the soft cloth to put pressure on the tape and work your way until the end of the bearing – please apply plenty of pressure to avoid any air bubbles between the tape and the bearing:



Now set the azimuth encoder steps to 655360 and the altitude encoder steps to 815000.

Done!