

Magellan I Installation Instructions for the Starfinder Dobsonian Telescope

I. Encoder Installation

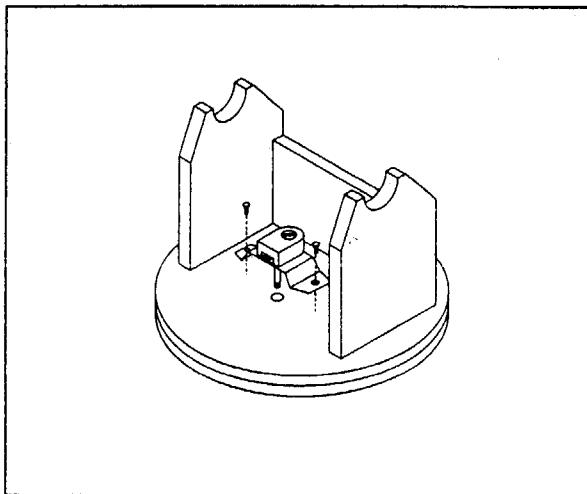
A. Components

When first opening the packing box, note carefully the following parts that have been included with the Magellan I installation kit:

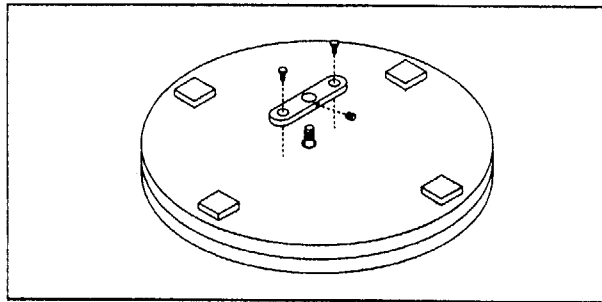
#4 x 1/2 Phillips Flathead	(2)
#4 x 1/2 Phillips Panhead	(2)
#10 Washer	(1)
10-24 x 1.5 Bolt	(1)
10-24 Wing-nut	(1)
1/8 Allen wrench	(1)
0.050 Allen wrench	(1)
Encoder split cable	(1)
Azimuth Encoder Assembly (Includes T-Nut)	(1)
Altitude Encoder Assembly	(1)
Hand Box Bracket	(1)
Hand Box	(1)

B. Azimuth Encoder

- 1.) Remove center stud from the base of the mount.
- 2.) Push the Azimuth Encoder Bracket Shaft into the center hole from the top.
- 3.) Rotate the Azimuth Encoder Bracket until the plug for the cable faces the open face of the cabinet.
- 4.) Lightly tap the #4 x 1/2 Pan Head screws into the bracket mounting holes, breaking through the surface material, and then screw down firmly. It may be useful to drill pilot holes for the screws.



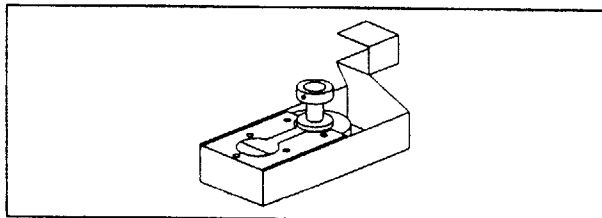
- 5.) On the underside, thread the T-Nut onto the exposed encoder shaft. Adjust the tightness so that the azimuth axis turns smoothly. It may be useful to use a flat blade screwdriver on the bolt to keep it from turning.
- 6.) Once adjusted, lightly tap the #4 x 1/2 Flat Head screws into the counter sunk holes of the T-Nut, breaking through the surface material, and then screw down firmly. It may be useful to drill pilot holes for the screws.
- 7.) Tighten the two set screws located on the sides of the T-Nut with the 0.050 Allen wrench to lock the encoder shaft into position.



C. Altitude Encoder

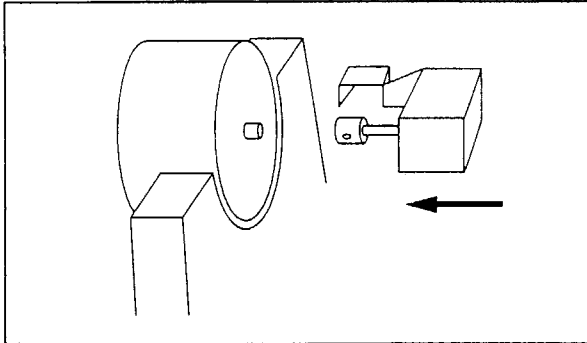
Note: On 6" Dobsonian Mounts, it is necessary to shift the encoder in the Altitude Encoder Bracket to the other set of mounting holes. If you have a 8-inch, 10-inch, 12.5-inch, or 16-inch Dobsonian, skip to step 5.

- 1.) Using a Phillips screwdriver, remove the three screws that secure the encoder.
- 2.) Slide the encoder out and turn it 180 degrees.
- 3.) Position the encoder such that its mounting holes line up with the holes near the edge of the mount plate. Allow the cable to curve around under the encoder to the plug.



- 4.) Using two of the three mount screws previously removed, fasten the encoder securely to the Altitude Encoder Bracket.

- 5.) Position the collar on the encoder shaft of the Altitude Encoder Bracket over the head of the bolt that extends from the center of the black altitude bearing (on the righthand panel, see front page).



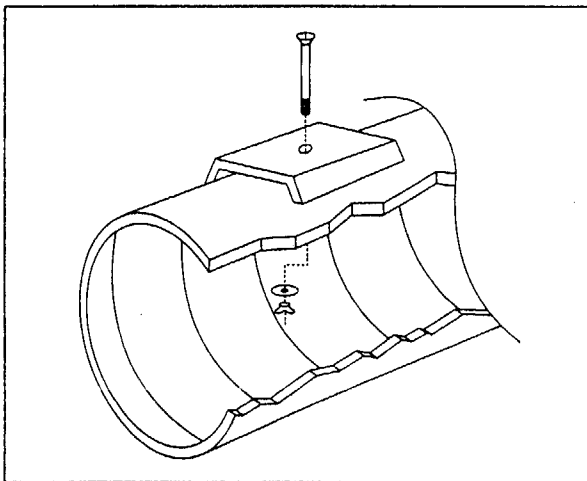
- 6.) Using the 0.050 Allen wrench, tighten the set screw of the collar onto the head of the bolt.
- 7.) Rotate the Altitude Bracket down such that the side panel of the mount slips into the slot. Tighten the thumb screw to secure the bracket into place.

D. Hand Box Bracket

- 1.) It is necessary to drill a 3/16" hole into the tube wall to mount the Hand Box Bracket.

The location of the hole is at the users discretion. However, it is recommended that the bracket be near the tube bearings to minimize imbalance. Remember also that the Wing-nut must be attached from the inside; keep the bracket within arms reach of the end of the tube.

- 2.) Straddle the Hand Box Bracket over the drilled hole and insert the 10-24 x 1.5" bolt through both the countersunk hole of the bracket and the tube wall.

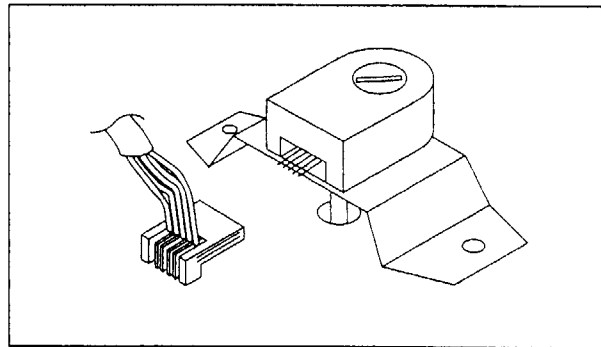


- 3.) Inside the tube, thread the Wing-nut with its #10 Washer onto the bolt and tighten firmly. It may be useful to use the 1/8 Allen wrench on the bolt to keep it from turning.

- 4.) Remove the backing of the Velcro adhesive and press the hand box into place. The hand box can be removed by separating the Velcro pads.

E. Connecting to Magellan

- 1.) Plug the 8-pin phone connector of the Encoder Split Cable into the Magellan hand box.
- 2.) Plug the 4-pin phone connector into the plug on the Altitude Encoder Bracket.
- 3.) The remaining 5-pin connector plugs directly into the Azimuth Encoder. Be certain that the wires coming out from the plug point upward.



F. Troubleshooting

If the encoder display of the hand box shows no change when the telescope orientation is moved, check the following.

- 1.) Make sure the batteries are fresh and connected properly.
- 2.) Check the connections of all the cables. Loose wires will inhibit performance.
- 3.) Tighten the set screws of the T-Nut on the azimuth axis and of the collar on the altitude axis. Be certain that any telescope movement turns the encoder shafts.
- 4.) Check your encoders to be sure that they are secured and operating properly. You can do this by cycling the Magellan power (turn it off and then on again). Press the mode key once and the display will show the raw encoder counts. Move both axes of the telescope to confirm that the encoders are moving correctly (both up and down). Select a reference position for the telescope and note the encoder values. Then move the telescope randomly to various new locations and then back to the original reference and note that the value should again read the same as the original value. If the value has changed, reexamine the installation procedures and make sure that all plugs are seated, all screws tight and that no slipping occurs between the encoders, shafts and brackets.

Magellan I Accuracy

The Magellan I Telescope Computer System is designed to allow dobsonian users to find deep sky objects with ease and accuracy. There are, however, several important considerations which can detract from the accuracy of the Magellan system. These items result from small variations in the manufacture and assembly of the Dobsonian. Each of these issues is addressed below and are as important to repeatable and accurate operation as the alignment procedures described in the user guide. These adjustments are typically done once at the time of installation and will provide a continuing benefit to the system.

The importance of these adjustments depends on how demanding you are as a user. For the casual observer, you may find that your equipment, as manufactured and assembled by you, gives the pointing accuracy you expect. If you demand very repeatable and highly accurate results, you can obtain them (within the tolerances of the encoders) by paying very close attention to the cautionary items discussed and your alignment during any given session.

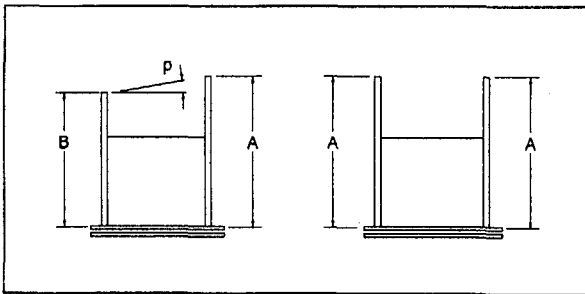
A. Squaring-on of Axes

Your Dobsonian rotates around two axes to achieve its pointing capability. These axes must be perpendicular to each other or inaccuracies will be induced and lead to poor pointing characteristics. The first step in squaring-on of axes involves checking the cabinet housing. The height of the bearing rests from the base must be the same. Minor variations will cause errors in altitude and azimuth according to the equations:

$$\Delta Az = p \sin (\text{altitude})$$

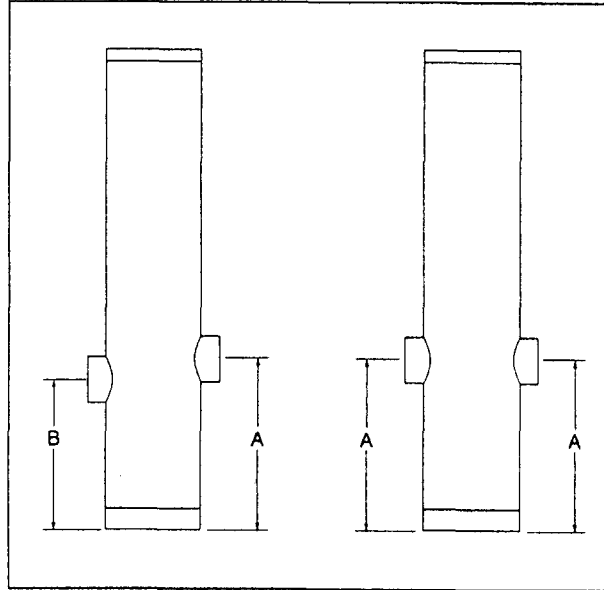
$$\Delta Alt = p^2 \sin (\text{altitude})$$

where p is the angle formed by the difference in height across the span of the panels.



With the telescope in place, measure the height of the bearing bolt head (on each side of the telescope tube) from the base making certain that the panels are fully seated on the base. If one is shorter than the other, adjust the panel height by adding shims until both bolt heads are the same height.

The next step involves checking the bearing distances on the telescope tube. The distance from the bottom edge of the bearing to the end of the telescope tube must be the same for both bearings. Any difference will add error terms to the above equations. The total error in altitude and azimuth is a non-linear combination of both panel height error and bearing distance error.



If the bearing distances are not the same, it will be necessary to adjust the lower bearing distance to match the others distance. This can be done by removing the lower bearing and slotting the tube to allow the bearing to move to a higher position. When the two bearings are at the same height, secure the adjusted bearing.

B. General Adjustments

Several issues which may seem obvious must be considered. For example, the telescope must be rigid for the Magellan system to operate properly. The frame must be assembled with all bolts secure so that no shifting movements between panels result while operating the telescope.

The base of the telescope should no have more than three rubber feet and must be operated on stable hard ground. Any shifting, tilting or other movements of the base after alignment will induce inaccuracies.

Smooth operation of the base is also desirable and will aid the observer in finding objects. The base should turn easily and in small amounts without sticking or resisting. The base bolt should be only tight enough to keep the base from rocking and to permit smooth rotation.

If you have a question regarding any Meade product, please call Meade Instruments Customer Service Department at (714) 451-1450, or fax at (714) 451-1460.