

Polar Align using the Hand Control

(enhanced and reformatted excerpt from the Celestron CGEM Manual, 02-09 – Rev3)

The CGEM mount has a polar alignment function called "All-Star" polar alignment that will help you polar align your telescope for increased tracking precision and Astrophotography. This feature allows you to choose any bright alignment star to assist in accurately aligning your telescope's mount with the North Celestial Pole. Before using the Polar Align feature, the scope must first be roughly pointed towards North and should be aligned with two stars in the sky:

1. Run the **Two Star Align** (align on two visible stars, from the 'Named Stars' list, or other catalog that you prefer). *Make note of the Alignment stars selected.*
2. Run (**add**) at least **one additional calibration star**.

NOTE: *When making the final centering moves for alignment and calibration stars it is *essential* that you use only the up and right keys for the last moves. If you have to go left or down, then overshoot and come back to center using up and right. Following this rule insures the best accuracy.*

3. Slew the telescope to any bright star in its Named Star database list. This will be your "Polar Alignment Star". For best results choose a polar alignment star that is high in the sky and near the Meridian. Try to avoid stars that are close to the:
 - west or east horizons
 - directly overhead (zenith)
 - or too near the celestial pole.

NOTE: *Further reference (to the user) when being instructed to "SLEW" means to exit your current menu, go to the 'Named Star' list, as described in the following instructions, or preferred catalog, then select a visible star from that list, and select the ENTER button, to instruct the mount-telescope to "go to" the selected star.*

4. Once there, press the ALIGN button
5. Use the UP/DOWN buttons on the hand controller to select POLAR ALIGN from the list.

POLAR ALIGN the Mount

(step numbering is continued)

6. Select the ALIGN MOUNT option. The telescope will then re-slew to the same "Polar Alignment Star".
7. Center the star in the finderscope and press ENTER.
8. Then accurately center the star in your eyepiece and press ALIGN. The telescope will then "sync" on this star and slew to the position that the star should be if it were accurately polar aligned.

NOTE: *For the most accurate alignment it is best to use a reticle eyepiece or a high power eyepiece to precisely center the star in the field of view. If high power EP is all you have, it may be helpful to defocus the telescope as a large round ball which is easier to center than a tiny pinpoint.*
9. A prompt may then appear requesting you to select ENTER to begin the process.
10. Use the mounts latitude and azimuth adjustments to place the star in the center of the eyepiece. **Do not use the direction buttons on the hand control to position the star.**
11. Once the star is centered in the eyepiece, press ENTER; the polar axis should now be pointed towards the North Celestial Pole, and the display will say 'Complete' and return to the menu.
12. Select UNDO to return to the 'Named Stars' list menu level.

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Update your Star Alignment

After polar alignment it's a good idea to check the pointing accuracy of the telescope to see how much it may have been affected by moving the mount. Since the polar alignment process requires you to "sync" the telescope on a bright star before you begin, it will be necessary to undo the sync before re-aligning.

Undo the sync:

13. Press the ALIGN button
14. Use the UP/DOWN buttons on the hand controller to select UNDO SYNC from the list, and press ENTER. The message COMPLETE will display on the LCD.
15. Select the UNDO button and return to the 'Named Stars' list menu level.

Re-align your telescope:

16. Slew the telescope to one of the original alignment stars, or another bright star if the original alignment stars are no longer in a convenient location.
17. One there, press the ALIGN button and use the UP/DOWN buttons on the hand controller to select ALIGNMENT STARS from the list. The hand control will ask you which of the original alignment stars you wish to replace. *Note, if the star does not need to be replaced, select it anyway, and "re-align" to it.*
18. Use the UP/DOWN buttons to select the desired (same) star and press ENTER.
19. Once again center the star in the finderscope and press ENTER.
20. Then center the star in the eyepiece and press ALIGN.
21. Repeat this process again (steps 16-20), by first select UNDO to return to the 'Named Stars' list menu level, and then slew to a second alignment star.

Align on at least one additional Calibration Star located on the opposite side of the Meridian.
This will improve "all-sky" pointing accuracy. To add a calibration star:

22. Select UNDO to return to the 'Named Stars' list menu level.
23. Slew the telescope to a bright star on the opposite of the Meridian from your two alignment stars.
24. Press the ALIGN button
25. Use the UP/DOWN buttons on the hand controller to select 'Calib(ration) Stars' from the list, and press ENTER.
26. Align the star in the finderscope (select ENTER) and then the eyepiece (select ALIGN) as you did with the alignment stars.
27. The display will show '# UNASSIGNED' (where # can be 1 to 4) and will follow your Calibration Star assignments. For the first Calib(ration) star select ENTER. The mount will process and then briefly show the star's name assignment.
28. If it is desired to add other Calibration Stars, repeat this process (steps 22-27), by first selecting UNDO to return to the 'Named Stars' list menu level, then slew again.

NOTE: *Mount parameters that are calculated from the Calib(ration) Stars are retained, even if another Polar Alignment is made, erasing the Calib(ration) Star list.*

29. When done with last star, select UNDO to return to the Ready display or slew to your desired object.