

When the scope is already set up in the dome, you can jump to Step 26. However, in that case, some directions for opening the dome without damaging it are also necessary. The dome is a commercial product made of fiberglass, but it is far from indestructible. Also, we need to add some directions for turning on the control room power supplies, and remembering to turn them off afterwards.

This mount is a Losmandy G-11. Its [user manual](#) is on-line.

WARNING

- When lifting heavy parts, make sure to only hold them by their structural parts. The 1x finder is plastic, not structural. The polar scope illuminator is plastic, not structural.

Before You Set Up

1. A good time to be setting up is just as the sun sets. The light of dusk will make it far easier to not screw up.
2. Make sure you have power that reaches the scope. A very long extension cord from a normal outlet should be sufficient. The 200' extension cord with attached multiplier was purchased specifically for use with this gear.
3. For best results, set up somewhere with good horizon and away from large light sources. There's a spot with a table a little less than 200' behind the duplex. There are pavers well-placed in the dirt for the tripod. It will be hard to do any better than that!
4. Best results will be achieved on a night with minimal moonlight and atmospheric turbulence.
 - a. After a storm or after lots of cloudy weather there is generally lots of atmospheric turbulence.
 - b. Astronomers refer to this as "poor seeing." They measure "seeing" in arcseconds. Three or four arcseconds is typical. Two arcseconds is very good. One arcsecond is unusual and excellent. More than five arcseconds is poor.
 - c. Targets low on the horizon (below 20°) are especially impacted by seeing.
 - d. The best single source for astronomy forecasts (but certainly not the only source) for Deep Springs is [here](#).

Setting up

1. Transport the tripod to the viewing area.
 - a. Orient it so the holder for Gemini II points NW (and one leg points N).
 - b. Make sure all three legs are on a flat, solid surface.
2. Place the mount on the tripod and rotate it slightly *counterclockwise* to lock it into the tripod, and then tighten all three knurled knobs.
3. Using the two levels on the mount, adjust the tripod legs until the mount is level. All three legs should be tight when finished.
4. Screw the counterweight shaft in place on the mount. Remove the counterweight safety from the end of the shaft.
5. Put on the three counterweights just below the tape mark. Tighten the counterweights to the shaft. The tape mark has been set to take care of the balance in RA.

6. Immediately restore the counterweight safety! Bad things can happen if a counterweight were ever to slide off the shaft while the scope on the mount.
7. Rotate the dovetail plate (the plate onto which the scope will eventually go) until the knobs are facing up (towards N) and the plate is horizontal.
8. Place the scope onto the dovetail plate such that it is facing W. *Align the pieces of tape on the plate and the scope.* Aligning the tape marks takes care of the balance in DEC.
9. Tighten the knobs on the dovetail plate until the scope is secure.
10. Put the Gemini 2 computer onto the mount using the two wingnut screws. Do NOT over-tighten (could damage the circuit board—you don't want to be *that* person).
11. Plug the hand controller into the port labeled HC. Place the hand controller face down on the velcro.
12. Plug in the RA and DEC cables.
 - a. The DEC cable (the long one) goes into the DEC port on the computer and plugs into the DEC motor (near the top front of the scope, on the side of the knobs on the dovetail plate).
 - b. The RA cable (short one) goes into the RA port and to the other motor near the back of the scope.
13. Loosen the knurled knobs that lock altitude and the wingnut knobs that lock azimuth.
14. You are ready to polar align. Uncap the polar alignment scope on the mount.
15. Adjust the position of the scope so you can view through the polar alignment scope.
16. Use the polar alignment illuminator to illuminate the polar alignment scope. It is a button near the polar alignment scope.
17. To polar align, consult Losmandy's guide for polar alignment scope: <http://www.losmandy.com/pdf/polar-finder.pdf>
18. Restore the polar alignment caps. Lock the azimuth wingnuts and lock the altitude knurled knobs.
19. Install the two-inch eyepiece in the accessory case onto the scope's diagonal. Make sure it is secure. Dropping an eyepiece on the ground can quickly destroy several hundred dollars of optics.
20. Mount the Telrad 1x finder. Turn it on.
21. Choose any bright star and confirm that the 1x finder and the telescope are pointing together. Adjust the 1x finder if it is not in excellent agreement. You can easily point to within $1/2^\circ$ when the 1x finder is correctly adjusted.
22. There is rarely any need for the 8x50 finder. Leave it in the accessory case.
23. Similarly, only graduate to the smaller (higher-power) eyepieces when you have mastered the large 40mm eyepiece. The power of the scope is the focal length of the scope (in this case 2500mm) *divided by* the focal length of the eyepiece. Smaller eyepieces are higher power! The big 40mm eyepiece gives $2500/40$ which is about 60x and that is plenty of magnification for most circumstances.
24. Plug the wifi and the Losmandy power supply taped to the north tripod leg into the extension cord.
25. Plug the Losmandy's power supply into the Gemini 2 computer.
26. Connect the wifi box and the Gemini 2 computer. The LAN port on the wifi should be connected to the ethernet port on the Gemini 2 computer.
27. There are bubble levels on the mount to assure DEC and RA are correct. Consult the bubble levels to make sure both RA and DEC are balanced.

28. Turn on the Gemini II. Check (and adjust if necessary) the time on the hand controller. It should be in MST year-round.
29. Follow Losmandy's dirt-simple directions for a [one-star alignment](#). If everything has been done quite carefully, even a one-star alignment will allow you to slew to targets pretty well.
 - a. Heck, you can even do no alignment. Just use the 1x finder and push the scope to your target. This is called "push to." Using the computer is called "go to." If you are using push-to, loosen the RA and DEC clutches so that you can easily overpower the connection to the motors. Don't know what the clutches are? Go back to the G-11 user manual.
 - b. Directions for making a model with multiple stars are [here](#) or [here](#).
 - c. The end of the second video explains another one-star alignment (called synchronization), which can be used after the scope has been bumped, assuming the bump only moved RA and DEC and not something more fundamental like the tripod legs. Synchronization keeps the multi-star model, but changes the RA and DEC to match the new ("bumped") reality.
30. If you have an iPad with [SkySafari Plus](#)
 - a. You don't need [SkySafari Pro](#). Telescope control is included in SkySafari Plus which is less expensive.
 - b. Follow their directions for connecting to the mount through the wifi.
 - c. The wifi SSID and the mount IP address are labeled on the side of the wifi box.
 - d. All the target-finding you can do through the hand controller is more easily done with SkySafari Plus.
 - e. You get a nice big star chart so you can see what is around your targets. You may want to flip the star chart left-to-right to match the scope with a diagonal on it. Whether or not you flip the chart, matching what is in the eyepiece to what is on the chart is quite challenging unless you do it a lot.
 - f. iPhones running SkySafari Plus should also work, although the screen will be very crowded.

Putting the scope away is a direct reversal of the setup steps. You begin by powering the Gemini 2 down and removing the wiring and the hand controller. Then you remove the eyepiece and the Telrad. Remove the computer. Then rotate the scope until it points W, loosen the dovetail rail, and put it in its case. Then you remove the counterweights and the counterweight shaft. Then the mount. Finally you fold up the tripod.

To summarize:

1. The least error-prone order of setup is: the tripod, the mount, the counterweights, the small accessories, and finally the electronics.
2. The least error-prone order of teardown is: electronics, small accessories, the scope, and then finally the big stuff: the counterweights, the mount, and the tripod.

Remember to turn off the 1x finder whenever you are not using it, and when you are done!