INSTRUCTION MANUAL

Optronic SkyLine™ Dobsonian Telescopes

#52908 8", #52910 10", #52912 12"

#52908

IN 534 Rev. A 10/14

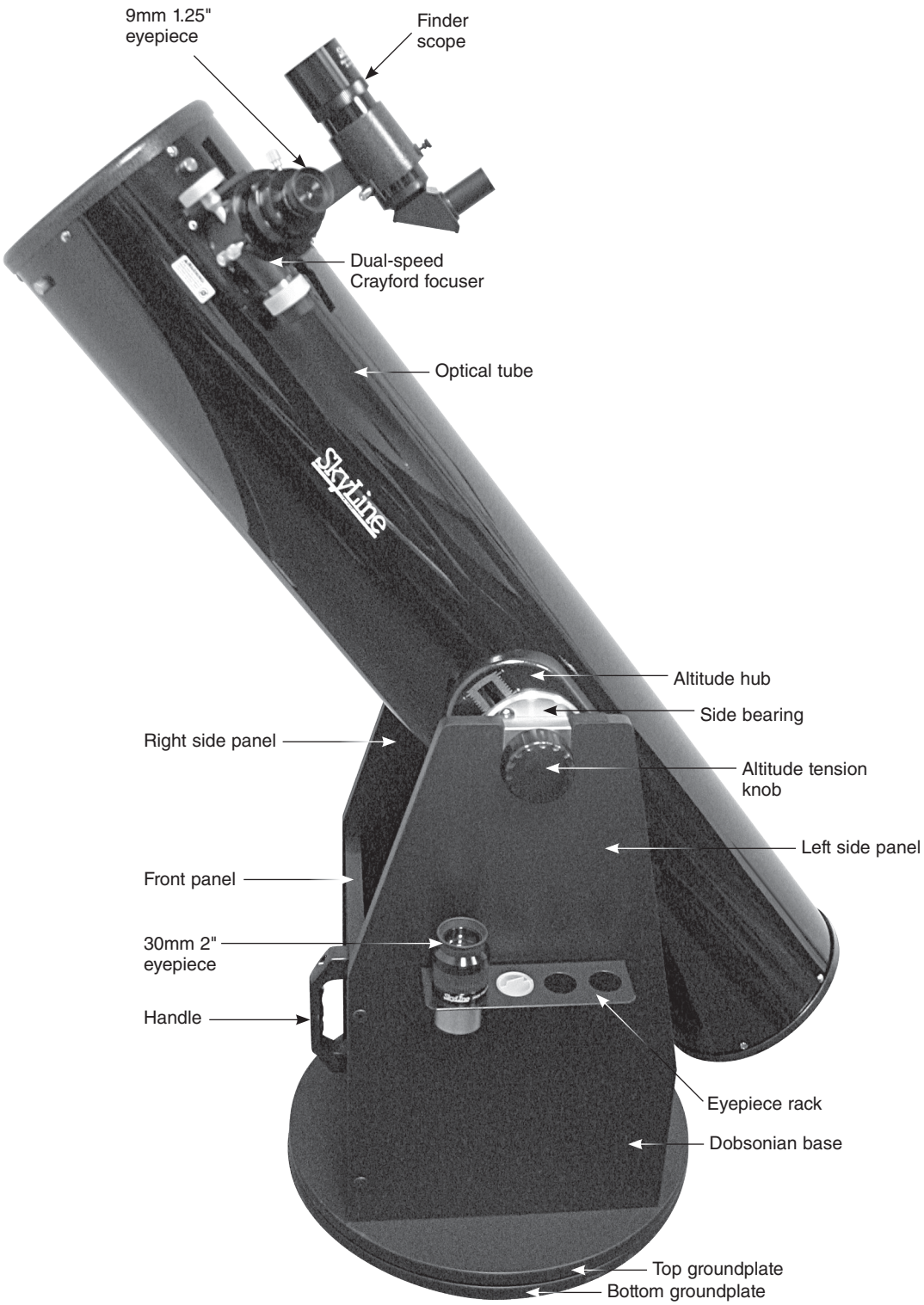


Figure 1. The SkyLine Dobsonian (8" model shown)

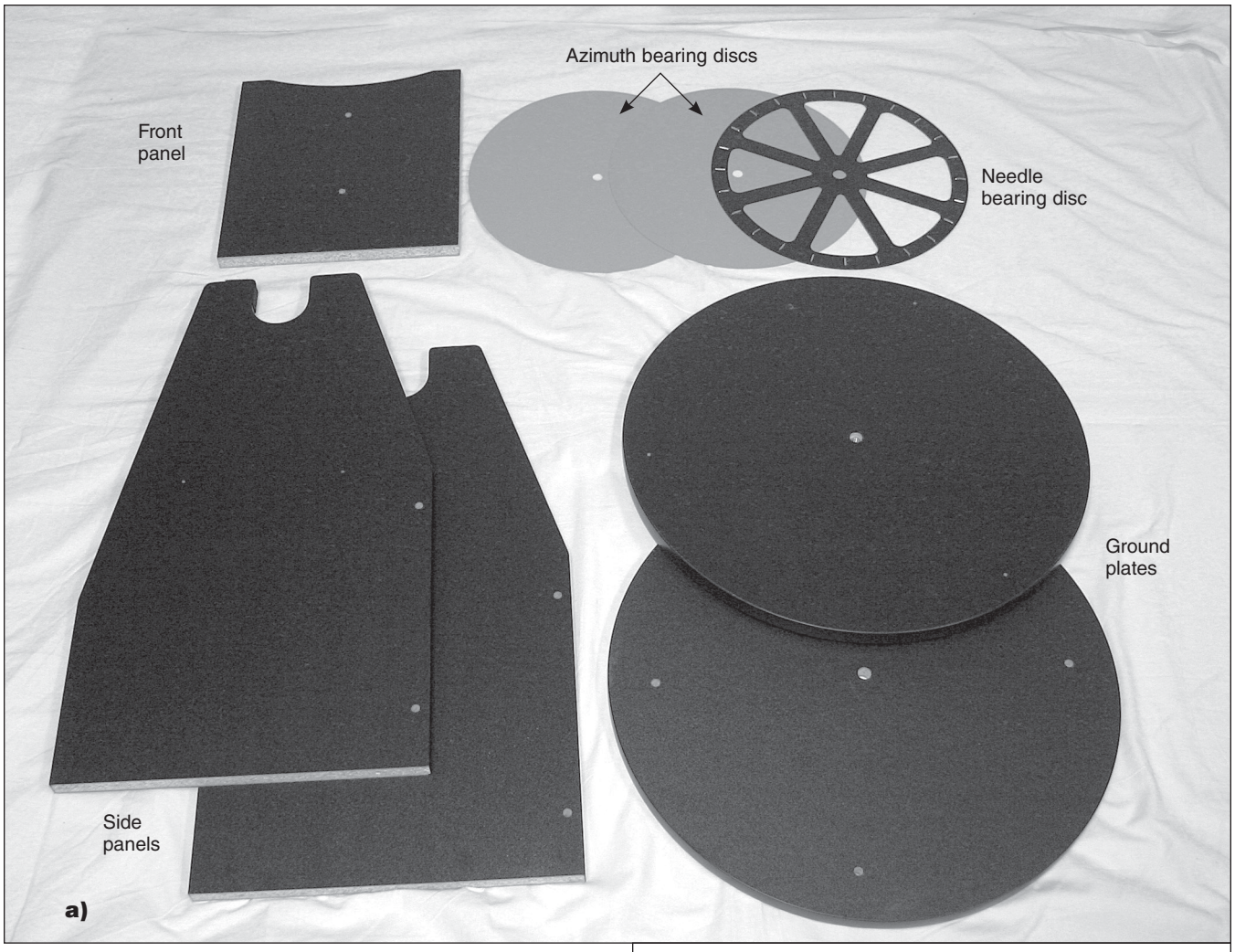
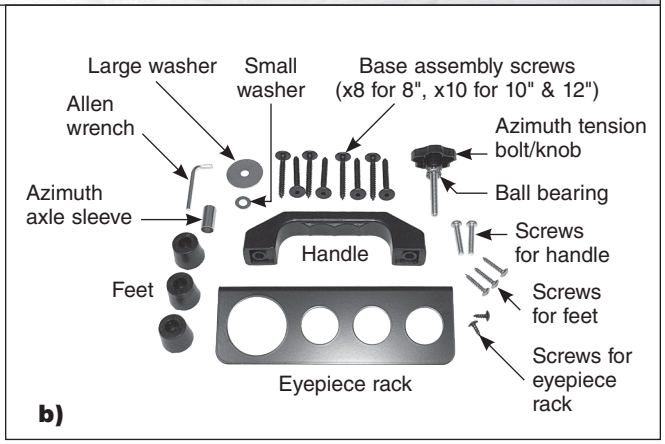


Figure 2. The contents of the base box include **a)** the main components and **b)** hardware.



Contents

Optronic SkyLine Dobsonians are big, fun telescopes with exceptional features and accessories that give them a performance edge. This instruction manual will guide you through the one-time assembly process and provide other important information about your new telescope. Read it over carefully and if you still have questions, call Optronic Customer Service at 800-676-1343 or send an email to support@telescope.com.

1. Included Parts

Refer to **Figures 2** and **3** to make sure all the parts shown are present. The base components should all be found in one shipping box and the optical tube assembly and accessories are contained in the second box.

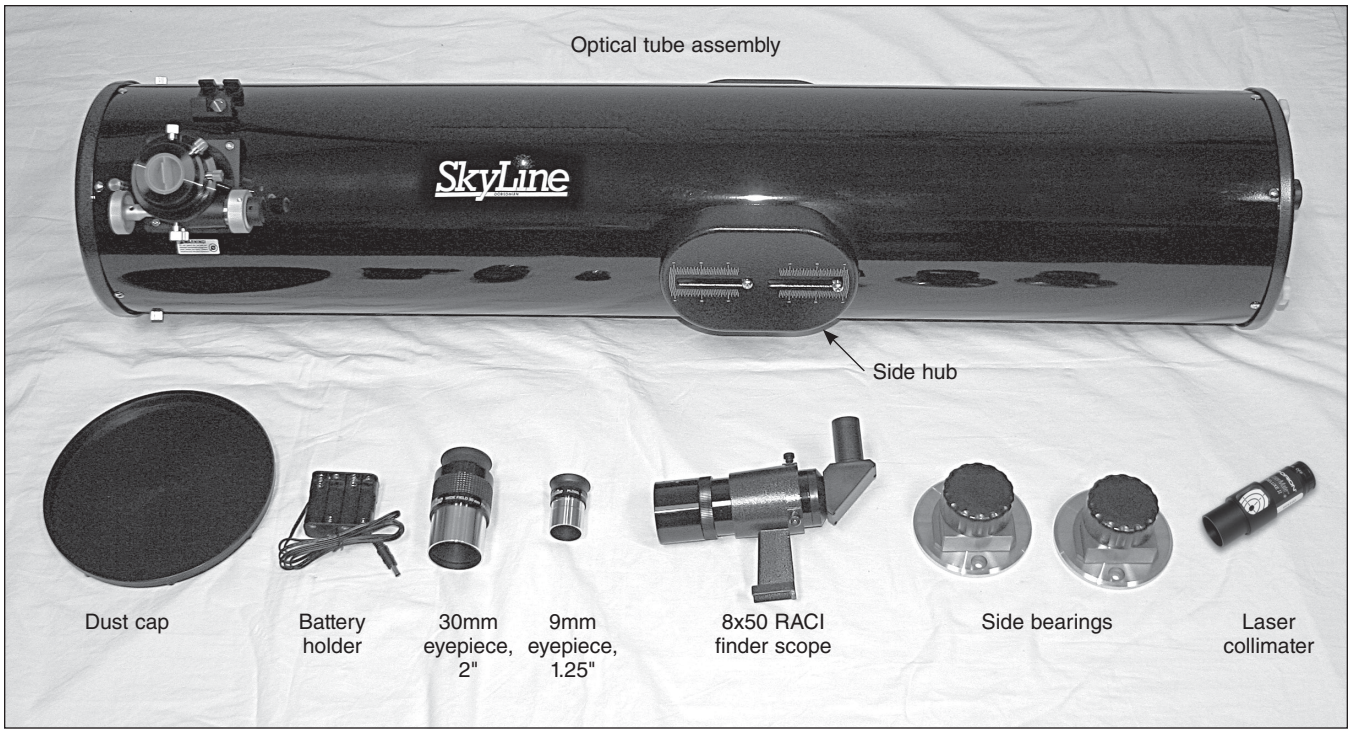


Figure 3. The contents of the optical tube box. *Not shown: 35mm extension adapter (2").*

2. Assembly

Assembly of the Base

The base needs to be assembled only once. The assembly takes about 20 minutes and requires a Phillips screwdriver and the included Allen wrench. Refer to **Figure 2** for identification of the base parts.

Note: When tightening the base assembly screws, tighten them until firm, but be careful not to strip the holes by over-tightening. If you use an electric screwdriver, do the final tightening with a standard screwdriver to avoid stripping.

1. Find the ground plate with the threaded metal insert in the center hole. On one side the metal insert is nearly flush with the goundplate surface – this is the bottom side of the groundplate **(Figure 4)**. Screw the three plastic feet into the small holes on this side using the long Philips screws provided, with a Phillips screwdriver **(Figure 5)**.
2. Attach the front panel to the two side panels with four black base assembly screws in the predrilled holes **(Figure 6a)**. Use the included Allen wrench to tighten the screws. Orient the front panel so that the metal T-nuts face inward. The side panel with the two predrilled holes for the eyepiece rack should be installed on the LEFT side **(Figure 6b)**.

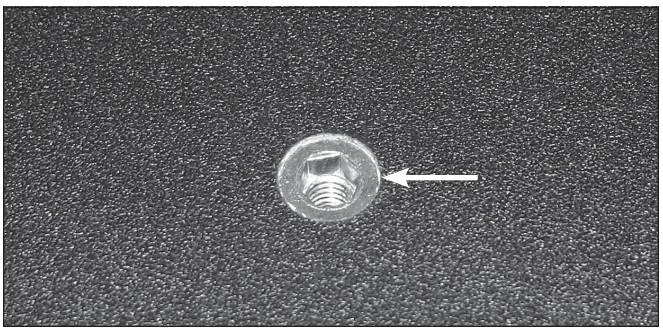


Figure 3. The contents of the optical tube box. *Not shown: 35mm extension adapter (2").*

Figure 5. Install the three feet with the included screws on the bottom side of the bottom groundplate.

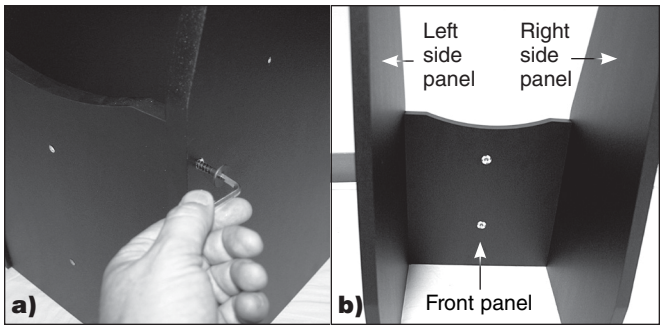


Figure 6. a) Attach the two side panels to the front panel with the base assembly screws and included Allen wrench. **b)** The side panel with the two holes for the eyepiece rack should go on the left side.

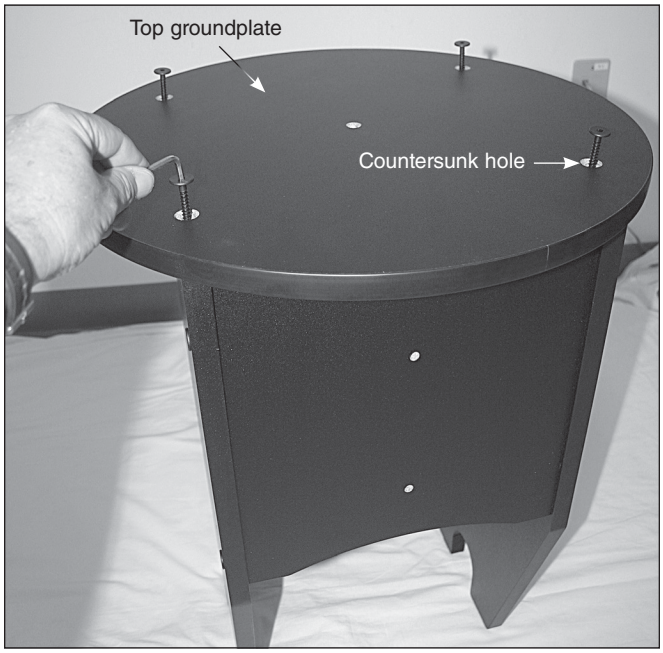


Figure 7. With the front and side panel assembly turned upside down, attach the top groundplate to the assembly with the countersunk holes facing up.

3. Now stand the panel assembly upside down, exposing the bottom edge of the panels. Lay the top goundplate on the panel assembly, aligning the holes in the groundplate with those in the panel edges **(Figure 7)**. **NOTE: Make sure the countersunk holes in the ground plate are facing UP**.
4. Attach the goundplate to the panel assembly with four (SkyLine 8) or six (SkyLine 10 or 12) base assembly screws in the predrilled holes, using the Allen wrench. Tighten all screws.

WARNING: ***Never look directly at the Sun with the naked eye or with a telescope – unless you have a proper solar filter installed over the front of the telescope! Otherwise, permanent, irreversible eye damage may result.***

Figure 8. Install the eyepiece rack on the left side panel with the two small wood screws as shown.

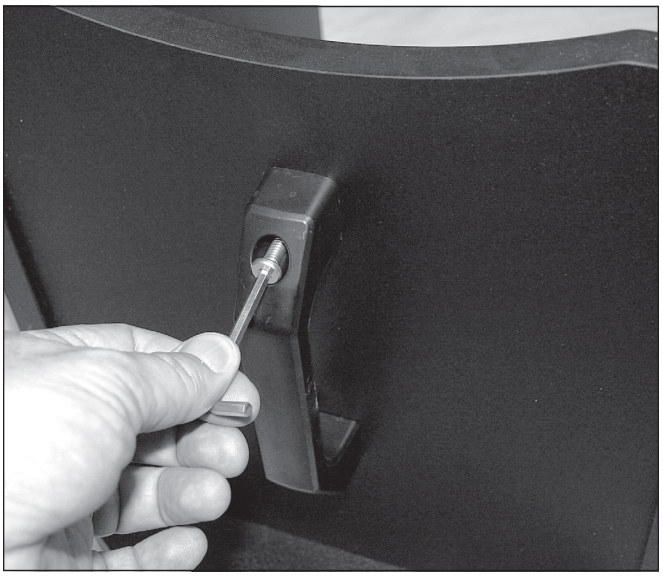


Figure 9. Use the Allen wrench and the two included machine screws to attach the handle to the front panel.

5. Install the eyepiece rack with the two small wood screws provided in the predrilled holes on the left side panel. You will need a Philips screwdriver to tighten the screws. It may be easiest to turn the base on its side for this installation, as shown in **Figure 8**.
6. Install the base handle on the front panel using the two socket head screws and the Allen wrench. Insert the screws through the holes in the handle and into the holes in the front panel, then tighten (**Figure 9**).

7. Place the metal azimuth axle sleeve in the center hole of the bottom groundplate, as in **Figure 10.**
8. Now place the azimuth bearing discs over the axle sleeve, with the black roller bearing disc sandwiched between the two gray discs **(Figure 11)**.
9. Pick up the top base assembly and place it on the bottom groundplate assembly, lining up the center hole in the top groundplate with the axle sleeve. The top base assembly should now freely rotate on the bottom groundplate.
10. On the azimuth tension bolt, place the small washer, the ball bearing, and the large washer, in that order **(Figure 12a)**. Then thread the bolt into the center hole and rotate the knob until the desired tension is achieved **(Figure 12b)**. (More on that later.)

Your Dobsonian base is now fully assembled!

Assembling the Optical Tube

Refer to **Figure 3** for assembly of the optical tube and installation of various accessories. Note that the 35mm extension tube is not shown.

Using the Allen wrench, remove the two bolts from the calibrated hub on one side of the optical tube (**Figure 13a**). This is where you will attach the aluminum side bearing.

11. Align the holes of the side bearing with the nuts inside the slot on the calibrated hub and screw in the bolts (top bolt first). Do not tighten them yet **(Figure 13b)**.
12. Now slide the side bearing up until the top edge aligns with "0" on the scale (**Figure 13c**). This is a good "default" position for the bearings, which you can adjust later if needed (See "Telescope Balance" in Section 3). Then tighten the two bolts.
13. Repeat steps 1 – 3 on the other side of the optical tube.
14. Lift the optical tube and place it onto the base, lowering the side bearings into the indentations at the top of the side panels. The tube should be oriented so that the focuser faces the *left* side of the base (the side with the eyepiece rack). Make sure the *rounded* surface of the aluminum side bearing seats into the side panel indentation, and the flat surface is up **(Figure 14)**.

Installing the Finder Scope

SkyLine Dobsonians come with an 8x50 right-angle correct-image (RACI) crosshair finder scope **(Figure 15a)** as standard equipment. Its wide field of view greatly aids in finding and centering objects for viewing in the main telescope. The right-angle eyepiece orientation provides a more convenient viewing angle than straight finder scopes, especially for Dobsonians. The finder scope arrives pre-installed in its bracket, though it will need to be rotated 180 degrees when unboxed (or less, depending on your preference).

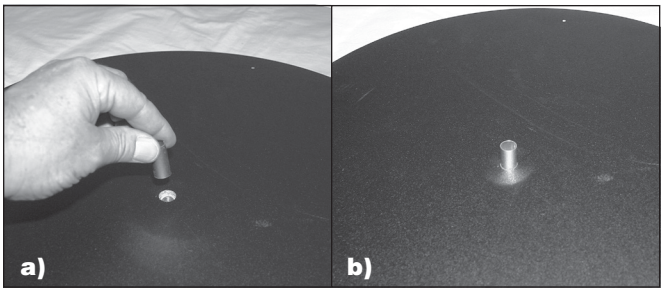


Figure 10. a) Insert the azimuth axle sleeve into the center hole of the bottom groundplate, so it looks like **b)**.

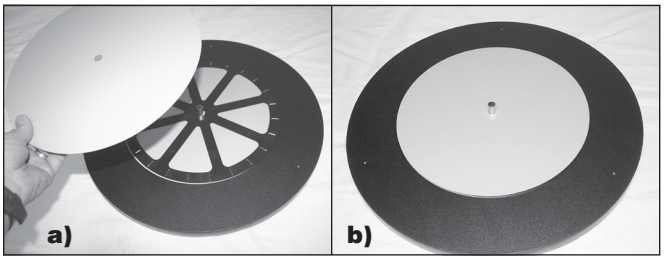


Figure 11. a) Place the azimuth bearing discs on the bottom groundplate, with the black needle bearing disc sandwiched between the two solid gray discs. **b)** The installed discs.

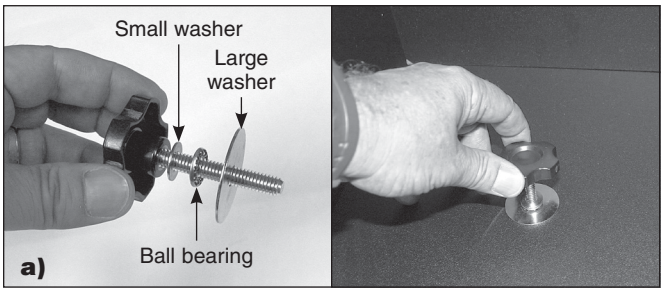


Figure 12. a) Place the two washers and roller bearing ring on the azimuth tension bolt as shown. **b)** Then thread the bolt into the center hole (metal insert) and tighten to the desired tension.

Insert the foot of the finder scope bracket into the dovetail holder **(Figure 15b).** Lock the bracket into position by tightening the knurled thumbscrew on the dovetail holder.

Focusing the Finder Scope

The focus of the finder scope can be adjusted by moving the objective lens forward or backward. You can do this during the daytime. First, rotate the lock ring behind the objective lens cell (**Figure 15a**) counterclockwise a couple of turns. Then rotate the objective lens cell while looking through the finder scope at a target at least ¼ mile away. If you rotate the cell one way and the image gets blurrier, rotate it the other way until the image is sharp. To lock the objective cell in that position, turn the lock ring clockwise until it is tight against the cell.

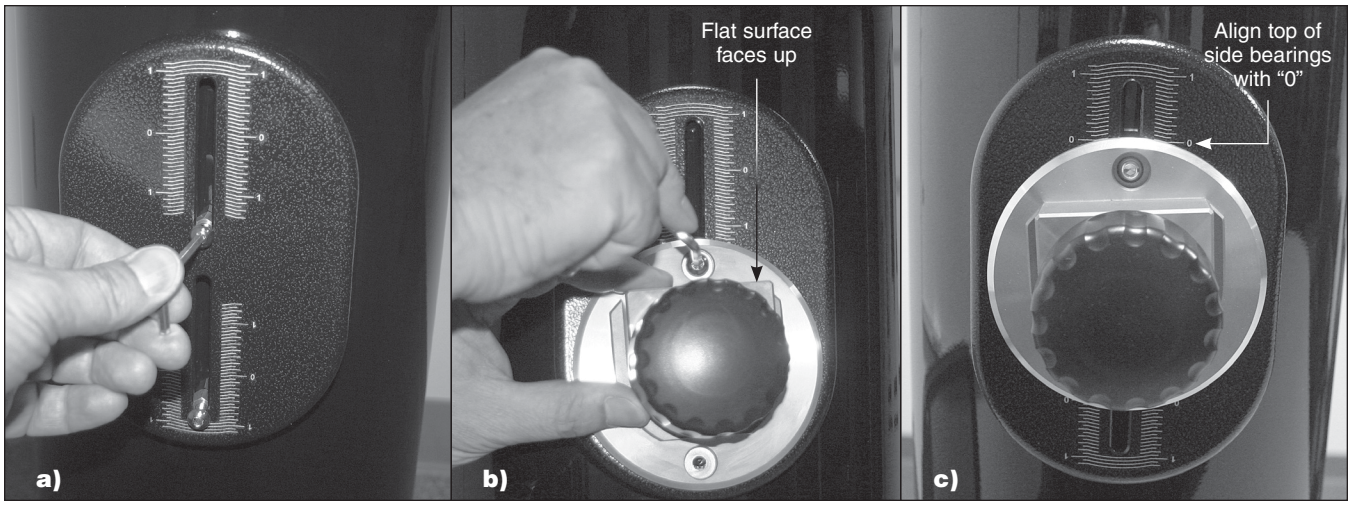


Figure 13. a) Remove the two screws in the side hub with the Allen wrench. **b)** Then align the side bearing with the slot in the hub and install with the screws, top screw first. **c)** Align the top of the side bearing with the “0” on the scale before tightening the screws.

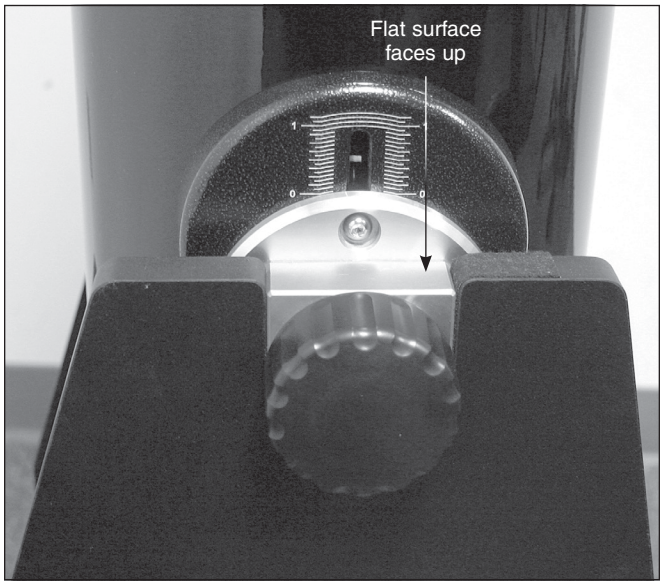


Figure 14. Lift the tube and lower the side bearings into the indentations in the side panels, as shown. They should fit snugly.

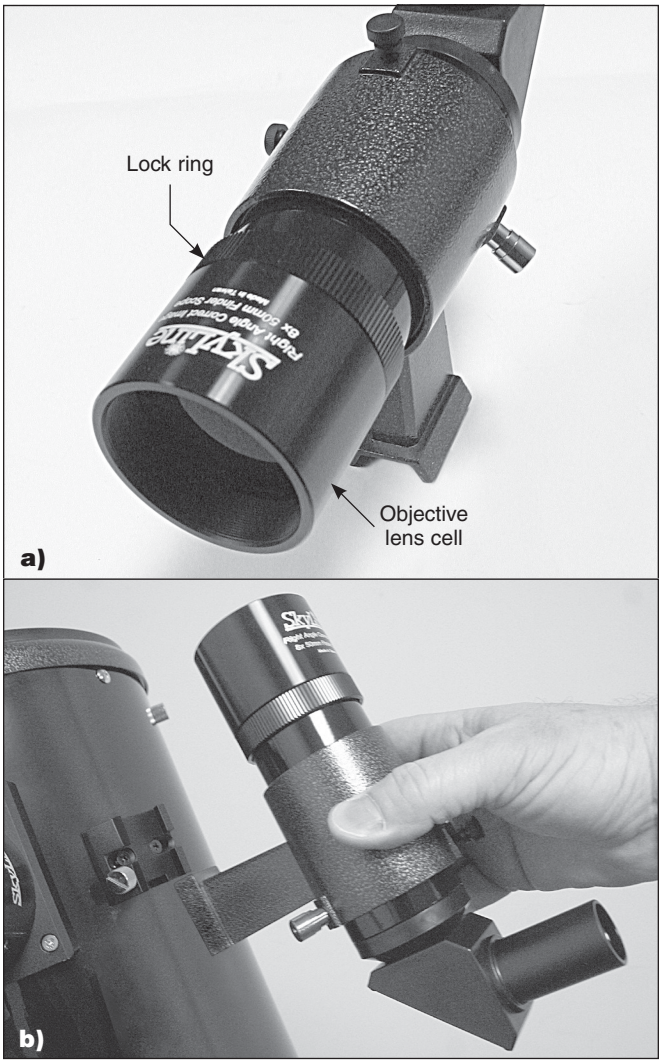


Figure 15. a) The 8x50 right-angle correct-image finder scope. **b)** Insert the bracket foot into the finder scope dovetail shoe and lock with the thumbscrew.

3. Using Your Telescope

Moving the Telescope

The Dobsonian design permits easy manual movement of the telescope in the altitude (up / down) and azimuth (left / right) directions (**Figure 16**). The azimuth motion should be smooth, with just enough resistance to keep the base from rotating when you want it to stop and stay put after you have slewed the telescope. Azimuth tension, or friction, can be adjusted with the azimuth tension knob in the center of the top groundplate – turn it clockwise for more tension, counterclockwise for less.

The altitude axis tension is also adjustable. It can be set to the desired level with the two altitude tension knobs cradled atop the side panels (see **Figure 1**). A clockwise turn increases the tension; counterclockwise decreases it.

Ideally, you want the same amount of resistance in the altitude motion as in the azimuth motion, so adjust the respective tension knobs accordingly.

To move the telescope, you simply grasp the front end of the tube and move the scope where you want it to point. Simple!

Telescope Balance

The optical tube on a Dobsonian must be balanced for proper operation. If the tube drifts up or down when you let go of it, that means the tube is bottom-heavy or top-heavy, respectively, and needs to be balanced. Such imbalance can occur when, for instance, heavy eyepieces or accessories are used on the front of the telescope, causing the front of the telescope to drift downward.

SkyLine Dobsonians have side bearings that can be adjusted a few centimeters forward or aft along the optical tube to counteract any such imbalance. So, for example, if the front of the telescope drifts downward, the side bearings should be moved *forward*. Loosen the two attachment bolts on each side bearing by a half turn or so, then slide the side bearing forward and retighten the bolts. Position the two side bearings at the same point on the calibrated scale. If the front of the telescope drifts upward, reposition the side bearings farther back (toward the bottom end of the tube) until the tube is balanced.

Inserting an Eyepiece

SkyLine Dobsonians come standard with a 2" dual-speed Crayford focuser (**Figure 17**) that accepts both 2" and 1.25" eyepieces. The size refers to the outer diameter of the eyepiece's chrome barrel. Your telescope comes with a 9mm Plössl (1.25") and a 30mm Erfle eyepiece (2"). For some other 2" eyepieces to reach focus, an optional 2" extension adapter may be required.

To insert the 1.25" eyepiece, first remove the cap from the focuser's 1.25" adapter. Loosen the thumbscrew on the 1.25" adapter, then insert the eyepiece into the adapter and secure it by tightening the thumbscrew.

To inset the 2" eyepiece, first loosen the two thumbscrews on the 2" accessory collar and remove the 1.25" adapter from the collar. Then insert the 2" eyepiece barrel into the collar all the way. Retighten the two thumbscrews.

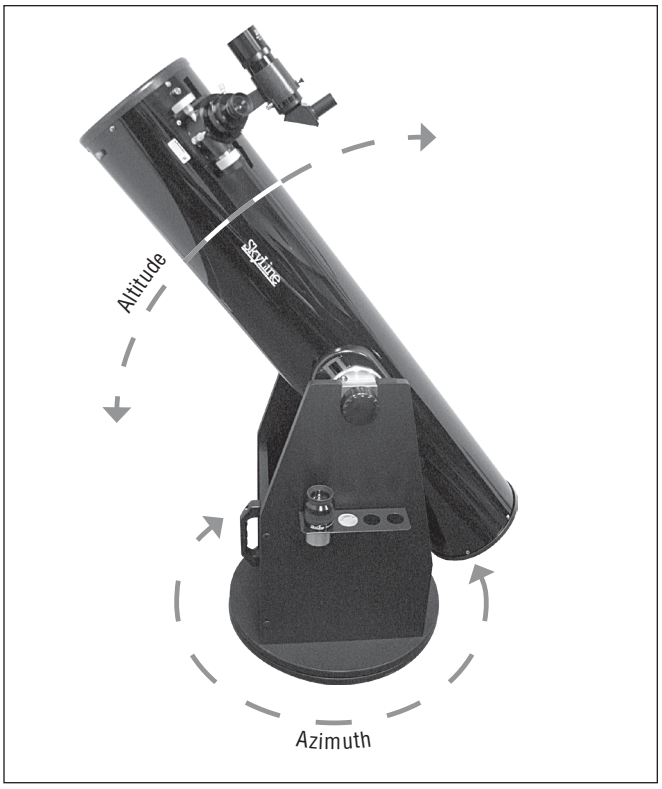


Figure 16. The Skyline Dobsonian has two axes of motion, altitude (up and down) and azimuth (left and right).

Focusing

The focuser has two coarse focus knobs and a fine focus (10:1) knob on the right side for highly precise incremental focusing.

To focus, with an eyepiece in the focuser and secured with the thumbscrews, move the telescope so the front end is pointing in the general direction of an object at least 1/4-mile away. Now, with your fingers, slowly rotate one of the coarse focus knobs until the object comes into sharp focus. Go a little bit beyond sharp focus until the image just starts to blur again, then reverse the rotation of the knob, just to make sure you're close to the focus point.

Now, use the fine focus knob to achieve precise focus. Ten turns of the fine focus knob is equivalent to one turn of the coarse focus knobs, so much finer adjustment is possible than with just the coarse focus knobs alone. You'll find this is a great convenience, especially when attempting to focus at high magnifications. If you have trouble focusing, rotate the coarse focusing knob so the drawtube is inward as far as it will go. Now look through the eyepiece while slowly rotating the focusing knob in the opposite direction. You should soon see the point at which focus is reached.

If you find the drawtube tension when focusing is either too tight (i.e., focus knob is difficult to turn) or too loose (i.e., drawtube moves by itself under the weight of the eyepiece), you can adjust it by tightening or loosening the drawtube tensioning thumbscrew on the underside of the focuser (**Figure 17b**).

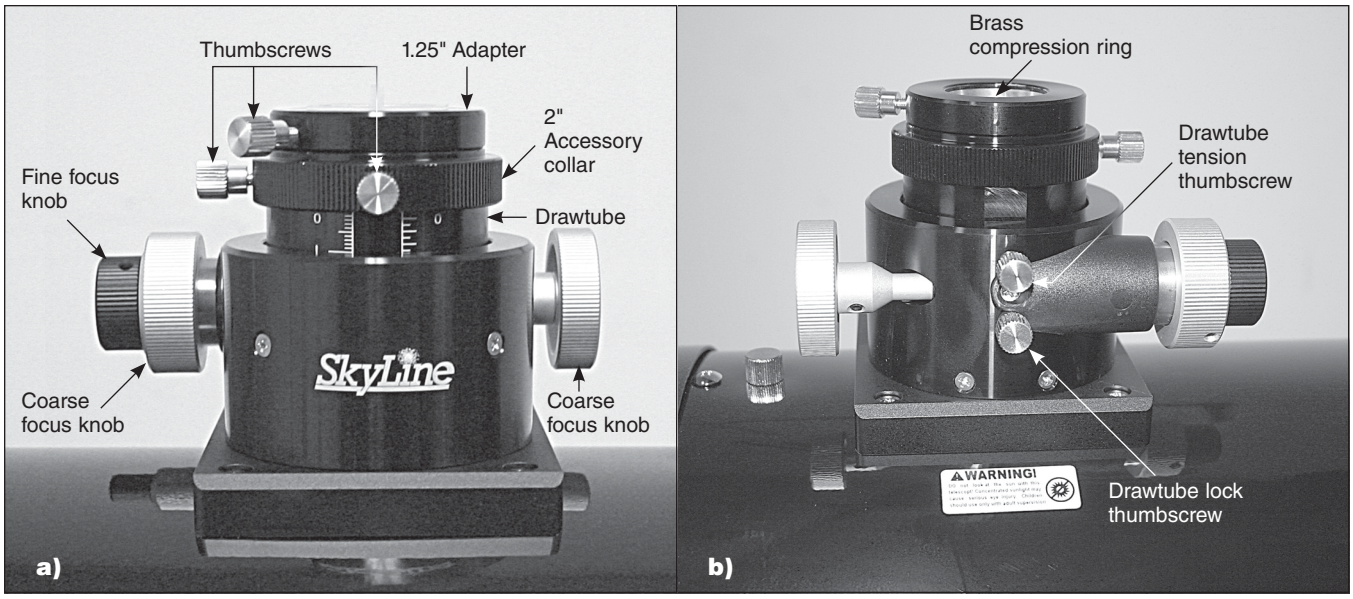


Figure 17. a) The SkyLine's 2" dual-speed Crayford focuser. **b)** Underside of the focuser.

The other thumbscrew on the underside of the focuser is the focus lock thumbscrew, which will lock the focuser drawtube in place, if desired. This is usually not necessary, however.

Extension Adapter

If the focuser is extended outward as far as it will go and the image through the eyepiece is still not in focus, you may need to install the included 35mm extension adapter. This 2"-diameter adapter adds 35mm of length between the focuser and the eyepiece, so it should allow some eyepieces to reach focus that otherwise cannot when inserted directly into the focuser itself.

Remove the 2"-to-1.25" adapter from the 2" accessory collar on the focuser drawtube, then insert the 35mm extension adapter. Lock it in place with the two thumbscrews on the collar. Then install either the 2" eyepiece directly into the extension adapter, or the 2" to-1.25" adapter if you plan to use a 1.25" eyepiece. Secure the 2" eyepiece or the 2"-to-1.25" adapter in the extension adapter with the two thumbscrews on the extension adapter. Now try focusing again; this time you should be able to achieve a sharp focus.

Aligning the Finder Scope

The finder scope must be aligned accurately with the optical tube of the telescope for proper use. This way, when you center an object in the finder scope, it will also be centered in the main telescope's eyepiece and ready to view. The finder scope's bracket has two perpendicular alignment thumbscrews and a silver spring pin. To align the finder scope you will adjust the two thumbscrews, which alters the direction the finder scope is pointing.

First aim the main telescope in the general direction of an object at least 1/4-mile away, e.g., the top of a telephone pole, a chimney, etc. Position that object in the center of the telescope's eyepiece.

Note: The image in the main telescope will appear upside-down (rotated 180°). This is normal for reflector telescopes.

Now look through the finder scope. Ideally, the object should be visible in the field of view. If it is not, then coarse adjustments to the finder scope bracket's alignment thumbscrews will be needed. Once the image is in the finder scope's field of view, you will now use the alignment thumbscrews to center the object on the intersection of the crosshairs. By loosening one alignment thumbscrew, you change the line of sight of the finder scope. Continue making adjustments to the alignment thumbscrews until the image in both the finder scope and the telescope's eyepiece are exactly centered.

Check the alignment by moving the telescope to another object and fixing the finder scope's crosshairs on the exact point you want to look at. Then look through the telescope's eyepiece to see if that point is centered in the field of view. If it is, the job is done. If not, make the necessary adjustments until the two images match up.

The finder scope alignment should be checked before every observing session.

Magnification

Magnification, or power, is determined by the focal length of the telescope and the focal length of the eyepiece. Magnification is calculated as follows:

$$\text{Magnification} = \frac{\text{Telescope Focal Length (mm)}}{\text{Eyepiece Focal Length (mm)}}$$

Magnification of the telescope can be changed by using different eyepieces. For example, the SkyLine 8" Dob has a focal length of 1200mm. So, the magnification with the supplied 9mm Plössl eyepiece is:

1200mm / 9mm = 133x

By the same formula, when using the 30mm Erfle 2" eyepiece the magnification would be 40x.

The maximum attainable magnification for a telescope is directly related to how much light its optics can collect. A telescope with

more light-collecting area, or aperture, can yield higher magnifications than a smaller aperture telescope. The maximum practical magnification for any telescope, regardless of optical design, is about 60x per inch of aperture. This translates to about 480x for the SkyLine 8".

Keep in mind that as magnification is increased, the brightness of the object being viewed will decrease; this is an inherent principle of the physics of optics and cannot be avoided. If magnification is doubled, an image appears four times dimmer. If magnification is tripled, image brightness is reduced by a factor of nine!

Maximum magnifications are achieved only under the most ideal viewing conditions at the best observing sites. Most of the time, magnification is limited to 200x or less, regardless of aperture. This is because the Earth's atmosphere distorts light as it passes through. On nights of good "seeing," the atmosphere will be still and will yield the least amount of distortion. On nights of poor seeing, the atmosphere will be turbulent, which means different densities of air are rapidly mixing. This causes significant distortion of the incoming light, which prevents sharp views at high magnifications. The sharpest images will always be achieved at lower magnifications.

Carrying/Transporting the Telescope

We recommend lifting the telescope tube off the base and carrying the two pieces separately. *We DO NOT recommend carrying the entire telescope – with the tube still attached to the base – by the handle on the base's front panel!* If you do, the telescope tube could swing downward and contact the ground damaging the scope.

When transporting the SkyLine Dobsonian in a vehicle, be sure to isolate the optical tube assembly so that it cannot slide or roll, which could dent the tube. We recommend transporting and storing the tube assembly in a padded case for protection.

Finally, keep the dust cover on the front of the telescope when it is not in use. Doing so will keep dust from accumulating on the primary mirror.

4. Collimation

Your SkyLine Dobsonian comes with a LaserMate laser collimator (**Figure 18**), which makes aligning the optics very easy and very precise. **Please refer to the manual for the LaserMate Deluxe II laser collimator for the step-by-step collimation procedure.**

Collimation is the process of adjusting the mirrors so they are correctly aligned with one another. Your telescope's optics were aligned at the factory, but they could have become misaligned during shipment. Accurate mirror alignment is important to ensure the peak performance of your telescope, so it should be checked regularly. Collimation is relatively easy to do and can be done in daylight or in the field at night.

Figure 18. The LaserMate Deluxe II laser collimator enables quick, precise alignment of the telescope's optics.

You will notice a tiny ring (sticker) in the exact center of the primary mirror. This "center mark" allows you to achieve a very precise collimation of the primary mirror; you don't have to guess where the center of the mirror is.

Note: The center ring sticker need not ever be removed from the primary mirror. Because it lies directly in the shadow of the secondary mirror, its presence in no way adversely affects the optical performance of the telescope or the image quality. That might seem counterintuitive, but it's true!

To make adjustments to the secondary mirror tilt, you will need a small Philips screwdriver. You will adjust the three Phillips screws on the secondary mirror holder (do not adjust the center screw) **(Figure 19a)**. Remember to always slightly loosen (by 1/4 turn or less) one screw before tightening one or both of the other two screws. And do not overtighten them or you could damage the secondary mirror support housing!

The tilt of the primary mirror is adjusted with three BLACK spring-loaded collimation knobs on the back end of the optical tube (bottom of the primary mirror cell) (**Figure 19b**). The three WHITE knobs lock the mirror's position in place; these knobs must be loosened a few turns before any collimation adjustments with the black knobs can be made to the primary mirror.

A simple star test will tell you whether the optics are accurately collimated.

Star-Testing the Telescope

To determine whether your optics are well collimated, when it is dark, point the telescope at a bright star – Polaris is ideal since it will not drift noticeably – and accurately center it in the eyepiece's field of view. Slowly de-focus the image with the focusing knob. If the telescope is correctly collimated, the expanding disk should be a perfect circle (**Figure 20**).

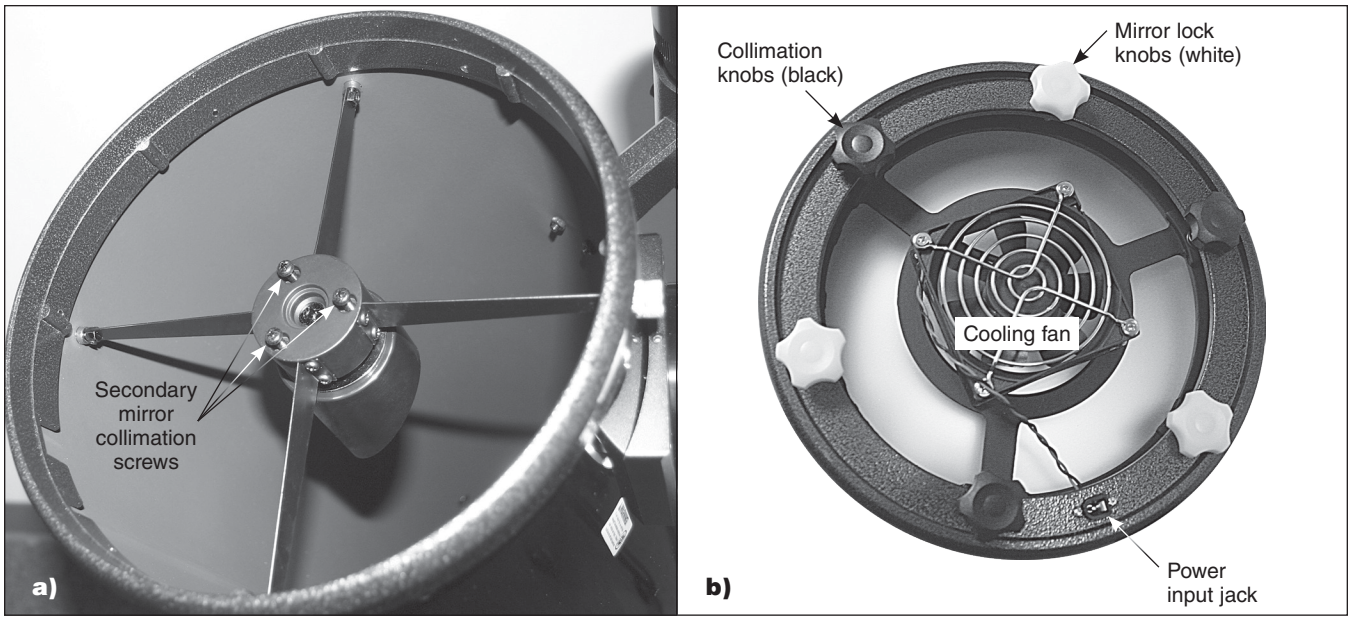


Figure 19. a) The tilt of the secondary mirror is adjusted using the three Philips screws shown here. **b)** The primary mirror's tilt is adjusted with the three black knobs on the rear cell. The three white lock knobs should be loosened a couple of turns first, and then lightly re-tightened once the adjustment has been made.

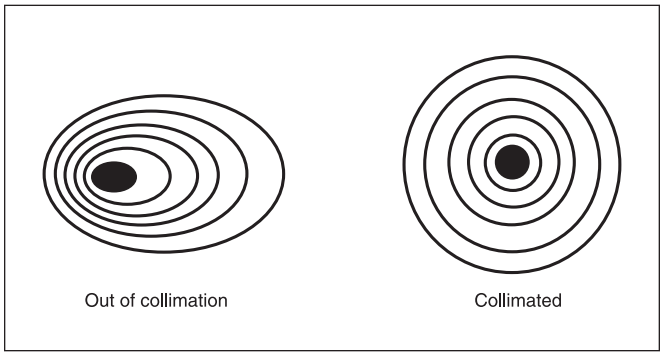


Figure 20. A star test will determine if a telescope's optics are properly collimated. An unfocused view of a bright star through the eyepiece should appear as illustrated on the right if the optics are perfectly collimated. If the circle is unsymmetrical, as in the illustration on the left, the scope needs collimation.

If the image is unsymmetrical, the scope is out of collimation. The dark shadow cast by the secondary mirror should appear in the very center of the out-of-focus circle, like the hole in a donut. If the "hole" appears off-center, the telescope is out of collimation.

If you try the star test and the bright star you have selected is not accurately centered in the eyepiece, the optics will always appear out of collimation, even though they may be perfectly aligned. It is critical to keep the star centered, so over time you will need to make slight corrections to the telescope's position in order to account for the sky's apparent motion.

5. Cooling the Optics

All optical instruments need time to reach "thermal equilibrium" with the ambient air to achieve maximum stability of the lenses and mirrors, which is essential for peak performance. When moved from a warm indoor location to cooler air outside (or vice-versa), a telescope needs time to equilibrate to the outdoor temperature. The bigger the instrument and the larger the temperature change, the more time will be needed.

Allow at least 30 minutes for your SkyLine Dobsonian to equilibrate. If the scope experiences more than a 40° temperature change, allow an hour or more. In the winter, storing the telescope in a shed or garage greatly reduces the amount of time needed for the optics to stabilize. It also is a good idea to keep the scope covered until the Sun sets so the tube does not heat greatly above the temperature of the outside air.

Your SkyLine Dobsonian includes a 12-volt DC cooling fan pre-installed on the rear mirror support (see **Figure 19b**). This small, vibration-free fan quietly blows air onto the back side of the primary mirror, which accelerates the cooling time. It can be kept powered on while observing or turned off once the initial temperature equilibration has been achieved, to save battery life. The fan is powered by eight AA alkaline batteries, sold separately, which you place in the included battery holder. Plug the cable from the battery holder into the fan's input jack on the end ring.

6. Specifications

	SkyLine 8"	SkyLine 10"	SkyLine 12"
Primary mirror focal length	1200mm	1250mm	1500mm
Primary mirror diameter	200mm	250mm	300mm
Focal Ratio	f/6.0	f/5.0	f/5.0
Minor axis of secondary mirror	47.0mm	62.5mm	70mm
Optics	Parabolic, diffraction limited	Parabolic, diffraction limited	Parabolic, diffraction limited
Mirror coatings	Enhanced aluminum (94%-96% reflectivity), with SiO2 overcoat	Enhanced aluminum (94%-96% reflectivity), with SiO2 overcoat	Enhanced aluminum (94%-96% reflectivity), with SiO2 overcoat
Focuser	2" Crayford, dual-speed (10:1), accepts 2" eyepieces and 1.25" eyepieces with included adapter	2" Crayford, dual-speed (10:1), accepts 2" eyepieces and 1.25" eyepieces with included adapter	2" Crayford, dual-speed (10:1), accepts 2" eyepieces and 1.25" eyepieces with included adapter
Base dimensions	27 1/4" H x 19 3/8" W	25 5/8" H x 22 1/8" W	27 1/4" H x 25" W
Drawtube travel	35mm	35mm	42mm
Optical tube material	Rolled steel	Rolled steel	Rolled steel
Eyepieces	9mm Plössl, 1.25" barrel dia.	9mm Plössl, 1.25" barrel dia.	9mm Plössl, 1.25" barrel dia.
	30mm Erfle, 2" barrel dia.	30mm Erfle, 2" barrel dia.	30mm Erfle, 2" barrel dia.
Magnification with supplied eyepieces	120x (9mm Plössl) 40x (30mm Erfle)	139x (9mm Plössl) 42x (30mm Erfle)	167x (9mm Plössl) 50x (30mm Erfle)
Finder scope	8x50 right-angle correct image (RACI)	8x50 right-angle correct image (RACI)	8x50 right-angle correct image (RACI)
Optical tube weight	23.75 lbs.	34.0 lbs.	47.3 lbs.
Base weight	25.4 lbs.	29.1 lbs.	35.9 lbs.
Tube length	46"	48"	57"
Tube outer diameter	9.2"	12.0"	14.2"
Cooling fan	Pre-installed at factory	Pre-installed at factory	Pre-installed at factory

One-Year Limited Warranty

This product is warranted against defects in materials or workmanship for a period of one year from the date of purchase. This warranty is for the benefit of the original retail purchaser only. During this warranty period Optronic Technologies will repair or replace, at Optronic's option, any warranted instrument that proves to be defective, provided it is returned postage paid. Proof of purchase (such as a copy of the original receipt) is required. This warranty is only valid in the country of purchase.

This warranty does not apply if, in Optronic's judgment, the instrument has been abused, mishandled, or modified, nor does it apply to normal wear and tear. This warranty gives you specific legal rights. It is not intended to remove or restrict your other legal rights under applicable local consumer law; your state or national statutory consumer rights governing the sale of consumer goods remain fully applicable.

Optronics Technologies

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